

# Co-Relation of Inflammatory Serum Markers with Lipid Profile as an Atherosclerotic Cause: Cross -Sectional Study

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## ABSTRACT

**Background:** Dyslipidemias are the main contributors for atherosclerosis among healthy individuals globally.

**Aim:** To ascertain the tie in between CRP and Sialic Acid with the lipid profile among both genders.

**Study Design:** Cross-sectional analysis.

**Methodology:** From the sample of 200 healthy individuals, the present project was under consideration from January to December 2018 in the Department of Biochemistry, Khyber Medical University, Peshawar following the Hospital's Ethical Committee consent. The lipid profile, plasma CRP and Sialic Acid levels inclusive of the association between before mentioned parameters with the lipid profile was calculated for all the enrolled individuals. Chronic Patients and pregnant women were eliminated from this study. Gathered data was reviewed by using SPSS software, v25 Pearson-Correlation covariance was used to find correlation among CRP and Sialic acid with the lipid profile.

**Results:** Among enrolled participants age  $\pm$  SD was 33.39 $\pm$ 9.76 years, average height and average weight were 167.86 $\pm$ 10.8 cm and 66.87 $\pm$ 11.39Kgs respectively. Substantial relation between CRP levels and total cholesterol was present.

**Conclusion:** It was concluded that a significant positive correlation was present between serum Sialic Acid & triglycerides among males and females.

**Keywords:** Inflammatory Markers, Lipid Profile, CRP and Anthropometric Measurements.

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## INTRODUCTION

The most common cause of death among humans globally is atherosclerosis. It has number of reasons but dyslipidemias of any type are the prime contributors for it worldwide as reported by previous literature review<sup>1</sup>. It has been reported previously that a concrete connection is there between serum cholesterol level and bad lipids (LDL) levels with respect to cardiac disease like atherosclerosis and ischemic heart diseases (IHD)<sup>2</sup>. Eventually it can be the reason to "hyperlipidemia" commonly, hypercholesterolemia, but current recommendations show that it is an inflammatory problem basically<sup>3</sup>.

Tenderness and endothelial disorder together are considered to be the basis of atherosclerosis in these days. Indeed, genetic reactions take place in the guise of atherosclerosis, which is the outcome of provocative reactions<sup>4</sup>. Some acute phase reactant proteins, phagocytes, and chemotactic materials are produced which activates the host defense system to potentiate an inflammatory response in atherosclerosis<sup>5</sup>.

The primary acute phase protein is C-Reactive protein in humans. Usually, concentrations are low in arbitrary conditions, rising to several hundred times in an intense ailment<sup>6</sup>. C reactive protein (CRP) is found to be raised in an intense situation which is an initial acute phase response to tenderness. During persistent inflammatory processes such as atherosclerosis minute rise in CRP level is also found<sup>7</sup>. "High sensitivity CRP" (hs CRP) is the trustworthy marker of puffiness incorporation with atherosclerosis<sup>8</sup>.

CRP is the classic marker of an acute phase response in a number of pathological issues such as chronic inflammatory disorders, infections and tissue rupture<sup>6,9</sup>. Plasma CRP levels ranging from (<5mg/L) and future cardiovascular events were present in concrete fellowship in 15 well managed studies<sup>10</sup>. In the light of increasing burden of this disease among our population and with limited local data available, we designed the current study to assess the combination between CRP and Sialic Acid with the lipid profile among both males, and females due to elevating rate in atherosclerosis in Pakistani population.

## METHODOLOGY

From January to December 2018 in the Department of Biochemistry, Khyber Medical University, Peshawar followed by the permission of the Hospital's Ethical Committee present proposal (n=200) was handled. From everyone of 200 healthy individuals 5cc fasting blood sample was collected. All the samples were certified for plasma lipid profile, C-Reactive Proteins (CRP), and Sialic Acid levels. They parameters were calculated scientifically. Individuals with chronic diseases and females in the family way were excluded from this study. For identification marking they were given identification codes.

**Statistical Analysis:** The findings were verified by using SPSS 25. Average  $\pm$ SD was given for age, anthropometric parameters as well as the clinical profile. Frequency and percentage were mentioned for both the gender, and vitamin deficiency. Pearson-Correlation covariance was

used to figure out association of CRP and Sialic acid with the lipid profile considering P-value ≤ 0.05 as significant.

## RESULTS

Basic parameters like age, gender, anthropometric measurements of experimental individuals are shown in Table-1. Clinical parameters, including lipid profile, CRP and Sialic Acid among experimental entities are shown in table-2. The strong association of inflammatory markers with lipid profile levels was present as shown in table-3. Results showed that a significant co-relation between CRP and lipid profile among males as shown in table-4. Results showed a concrete co-relation between CRP and Sialic acid with lipid profile as shown in table-5.

Table-1 Basic Information Of Enrolled Subjects

Variables	Frequency	Percentage
Gender	107 (males)	53.5%
	93 (females)	46.5%
	<b>Mean</b>	<b>SD</b>
Age (years)	33.24 (males)	10.13
	33.55 (females)	9.34
Height (cm)	167.86	10.8
Weight (kg)	66.87	11.39
Hip-waist ratio	0.93	0.16
BMI	24.12	3.65

Table 2: Clinical parameters of enrolled subjects as Mean ± SD

Parameters	Mean ± SD
Total Cholesterol (mg/dl)	170.29±48.41
HDL(mg/dl)	38.48±12.17
LDL(mg/dl)	107.27±42.21
TGs (mg/dl)	147.85±90.69
CRP (mg/L)	5.63±10.80
Sialic Acid (mg/dl)	86.62±28.02

Table 3: Association between Sialic acid and CRP with lipid profile of subjects

Parameters	Total Cholesterol	HDL	LDL	TG
CRP	0.02*	0.00*	0.00*	0.32
Sialic Acid	0.18*	0.01*	0.97	0.04*

\*Statistically Significant

Table 4: Co-relation of Inflammatory markers with lipid profile among males

Parameters	Total Cholesterol	HDL	LDL	TG
CRP	0.1	0.00*	0.02*	0.14
Sialic Acid	0.23	0.17	0.88	0.74

\* Significant P-value

Table-5: Co-relation of Inflammatory markers with lipid profile among females

Parameters	Total Cholesterol	HDL	LDL	TG
CRP	0.11	0.00*	0.08	0.95
Sialic Acid	0.55	0.01*	0.91	0.02*

\*Statistically significant

## DISCUSSION

Despite great progress in the field of pharmacological therapies, chronic conditions are the mandatory cause of death in this era. Puffiness has basic role in initiating these conditions<sup>9</sup>. Cardiovascular diseases highlight an

immediate need to identify other potential contributors due to global hardship. A possible danger for cardiovascular disease is Sialic acid (SA)<sup>11</sup>. C-reactive protein (CRP) is a potent forecaster of later heart issues and synthetic disorders in an apparently active individuals as an important acute phase responder as revealed by literature review<sup>6</sup>. Increased levels of LDL, TGs, total cholesterol and decreased levels of HDL are accompanied by atherosclerosis that further head to predisposition of other critical myocardial diagnostics<sup>12</sup>. Activation of LDL, starts a series of localized inflammation, in turn starts the formation of atherosclerotic plaques. Limited data is available regarding the relationship between CRP, lipid profile and sialic acid with respect to atherosclerotic disease of the heart, although they initiate atherosclerosis. That's why the current study is conducted to check any correlating solidity among CRP levels with lipid profile and sialic acid parameters.

In present study, 38 participants showed an elevated plasma lipids, CRP and sialic acid levels. Results showed that mean total cholesterol levels was 170.28±48.39 mg/dl among enrolled subjects. Commonly, LDL (11.4%) and TG (9.6%) levels raised in relation with CRP and sialic acid. Males had slightly lower total cholesterol (166.48±48.87mg/dl) when compared to whole population. However, in females' elevated amount of lipids, CRP and sialic acid were present as compared to males. Our findings were in line with one past research by Ridker who reported similar results depicted dyslipidemias with mean concentrations of cholesterol 184±38 mg/dL, and TG 105.6±99.6 mg/dl<sup>13,14</sup>.

Lipid profile of the enrolled subjects with plasma sialic acid and CRP levels were calculated. A strong affiliation between CRP levels and total cholesterol (*p*-value=0.017), HDL (*p*-value=0.00) and LDL levels (*p*-value=0.00) was found. No correspondence was present between CRP levels and plasma triglyceride levels in present study. A strong correlation between HDL (*p*-value=0.01) and Triglyceride levels (*p*-value=0.04) was found for sialic acid. No sodality between sialic acid levels and the plasma lipid profile was present in male healthy individuals while CRP levels were found to be correlated with HDL (*p*-value=0.00) and LDL levels (*p*- value=0.02). HDL showed a strong correlation with the CRP levels (*p*-value=0.00) from the healthy female entities. Strong correspondence was found between the sialic acid and HDL (*p*-value=0.01) and triglycerides (*p*-value=0.02). Comparable data to the above mentioned findings was recorded in other previous studies<sup>15</sup>.

A relation between CRP, cholesterol and triglycerides was confirmed. Recently, Ahuja et al, proclaimed that acute stroke patients had significant alliance between CRP and lipid profile<sup>16</sup>. Ahuja et al, reported a correlation between the triglycerides and CRP, which varies from the findings of the current study. Moreover, they conducted their study on 100 patients while present study had 200 subjects. Ahuja et.al and Waheed et.al findings showed similar results<sup>16,17</sup>. In Waheed et al, there was no fellowship between triglycerides and CRP in contrast to this study. In this study 200 healthy individuals were tested from Khyber-Pakhtoonkhwa, while in Waheed et al 30 patients were

examined who were already suffering with type 2 diabetes mellitus<sup>17</sup>.

**Limitations:** Lack of other serum markers with genetic study, limited resources and financial constrain are the limiting factors for this presented study.

## CONCLUSIONS

The results showed that a significant positive correlation was present between serum sialic acid & triglycerides among males and females. Hence, concluded that measuring serum inflammatory markers with lipid profile can be a helpful tool in diagnosing atherosclerosis and other health issues. Moreover, measuring serum inflammatory markers must be a routine in-order to predict risk factor for atherosclerosis even among healthy individuals.

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