

## Analysing The Correlation Of Lipid Profile Pattern In Chronic Rheumatic Heart Disease (RHD) Patients

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**Abstract:** Background: The global burden of ARF and RHD is significant, and is predominantly found in populations living in low-resource settings. This study was conducted with a view for analysing the lipid profile variation in patients with chronic Rheumatic Heart Disease (RHD) and correlating the same. The early management of RHD has to be started to prevent further cardiac complications. To date no hypothesis is established on the relation between the Lipid Profile and RHD. This study would be beneficial to Indian cardiologists in defining the optimal treatment by the choice of antibiotic therapy and Lipid lowering agents like Statins. Material And Methods: It was a cross-sectional study carried out on the patients visiting Cardiology Out Patient Department (OPD) at a tertiary care hospital in Ahmedabad and who were diagnosed with Rheumatic Heart Disease (RHD). The blood lipids levels of the patients were evaluated with current classification schemes and treatment levels for hyperlipidemia based on the National Cholesterol Education Panel's (NCEP) Adult Treatment Program-3 (ATP-III) guidelines. Result: Total 89 patients were included in the study. 76 patients were associated with dyslipidaemia and 13 patients had normal lipid values. As far as total cholesterol levels were concerned, 23 out of 76 patients (30.26%) had above target levels for total cholesterol. Also 46 patients out of 76 (60.52%) had raised triglycerides levels and 47 patients (61.84%) had raised LDL levels. As far as HDL levels were concerned, 38 out of 76 patients (50.00%) had below desirable levels. The frequency of deranged LDL is higher as compared to HDL, triglycerides and total cholesterol levels. If these values are to be co-related to the disease, then LDL as a lipid parameter stands most significant. Conclusion: Morbidity and mortality in RHD is very high in Indian patients and one of the determinants of the cardiovascular morbidity is the increased lipid levels. The frequency of deranged LDL is higher as compared to HDL and total cholesterol levels in these patients. This study was planned to evaluate an entirely novel hypothesis that RHD is an independent risk factor for Atherosclerosis and CAD. The exact reason behind the occurrence is unknown but it can be environmental or genetic. RHD and Dyslipidaemia might engulf younger patients. The study is also aimed at evaluating all lipid parameters with RHD. [Patel M Natl J Integr Res Med, 2022; 13(4): 23-28, Published on Dated: 10/07/2022]

**Key Words:** RHD, NCEP ATP-3 guidelines, Lipid profile

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**Introduction:** Rheumatic heart disease (RHD) is a chronic cardiac condition with an infectious etiology, causing high disease burden in low-income settings. Affected individuals are young and associated morbidity is high. However, RHD is relatively neglected due to the populations involved and its lower incidence relative to other heart diseases<sup>1,2</sup>.

Although infrequent in the developed world, rheumatic heart disease (RHD) remains a major health problem worldwide and with increasing immigration over the past decades, will continue to be encountered in most cardiology practices. The World Health Organization has estimated

that more than 15 million people worldwide are affected, with a half million new cases of acute rheumatic fever (ARF) yearly<sup>3</sup>. ARF is characterized by an abnormal immune response to infection with rheumatogenic group A streptococci, associations with certain human leukocyte antigen types, abnormal T-cell activation and infiltration, and the presence of B-cells with a distinctive alloantigen have been identified in ARF patients, along with genetic variations in tumor necrosis factor alpha<sup>4,5</sup>.

Hypertension (HT) is a classic pathophysiological consequence of left-sided valvular heart disease such as in RHD. HT is found in 15% to 60% of

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patients with RHD and is more frequent among symptomatic patients<sup>6</sup>. The management of rheumatic fever is geared toward the reduction of inflammation with anti-inflammatory medications such as aspirin or corticosteroids.

Individuals with positive cultures for strep throat should also be treated with antibiotics such as Penicillin<sup>7</sup>.

Although statins were developed to lower blood cholesterol levels and specifically low-density lipoprotein (LDL) levels, it has been appreciated since the 1990s that statins also possess non-LDL-lowering effects. Statins therefore are thought to possess anti-inflammatory properties.

There is thus a rationale for considering statin therapy for the inflammatory aspects of RHD<sup>8</sup>.

**Aim and Objectives:** To access the lipid profile differences in patients with RHD and to establish co-relation between Lipid profile and RHD, if any present.

**Material & Methods:** Study Design: This study began after obtaining permission from the Indian Council of Medical Research (ICMR) and the Institutional Ethics Committee (IEC). The approval of Head of the Department (HOD) & the Hospital Superintendent was taken. Confidentiality of data was maintained. Male and female patients were enrolled irrespective of their ethnicity.

Study Duration: Study was carried out over a period of 2 months.

Study Site: The study was conducted in the cardiology OPD of a tertiary care hospital in Ahmedabad.

Study Population: Those patients who attended the Cardiology OPD and fell in the criteria were selected.

Inclusion Criteria: Patients attending Cardiology OPD who were diagnosed with RHD and those having their lipid profile values.

Exclusion Criteria: RHD patients whose lipid profiles were not available.

A case record form was used to note down the personal details, diagnosis and clinical history of the patients.

The lipid profile variables of the same patients were also collected from laboratory reports and recorded in the Case Record Form. The 4 types of lipid profile tests were taken into consideration: Serum total cholesterol, Serum HDL cholesterol, Serum LDL cholesterol, Serum triglycerides.

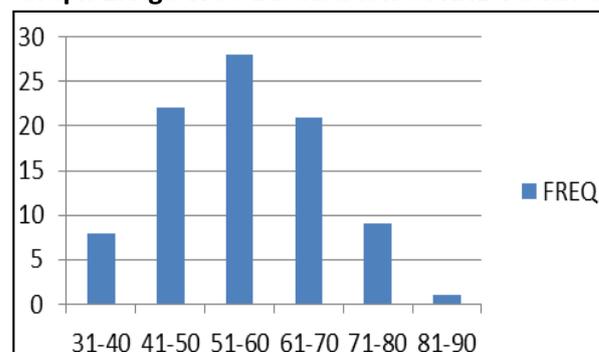
Statistical Analysis: The collected data was entered in Microsoft Excel, 2016 version and was analyzed using SPSS (Statistical Package for Sciences) version 23.0 (IBM Corporation, California).

**Results:** Demographic and clinical characteristics: A total of 89 patients who had RHD were included in the study.

Gender: Out of total 89 patients, RHD was seen in 50 Females (56.17%) and 39 Males (43.82%).

Age: The mean age of the patients was found to be 56.31years.

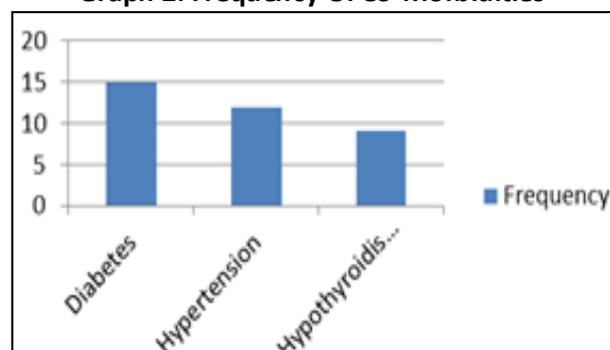
**Graph 1: Age Wise Distribution Of RHD Patients**



Co-Morbidity: The most common co-morbidity was found to be Diabetes with 15 patients suffering from the disease.

Hypertension was found to be the next most common co-morbidity, lastly followed by hypothyroidism.

**Graph 2: Frequency Of Co-Morbidities**



**Table 1: Total Cholesterol and Correlation With ATP III Classification**

Total Cholesterol (mg/dl)	Comments	Number Of Patients
<200	Desirable	66(74.15%)
200-239	Borderline High	22(24.71%)
>240	High	1(1.12%)

**Table 2: HDL Levels and Correlation With ATP III Classification**

HDL Levels (mg/dl)	Comments	Number of Patients
<40	Low	38 (42.70%)
40-59	Normal	41 (46.06%)
>60	High	10 (11.23%)

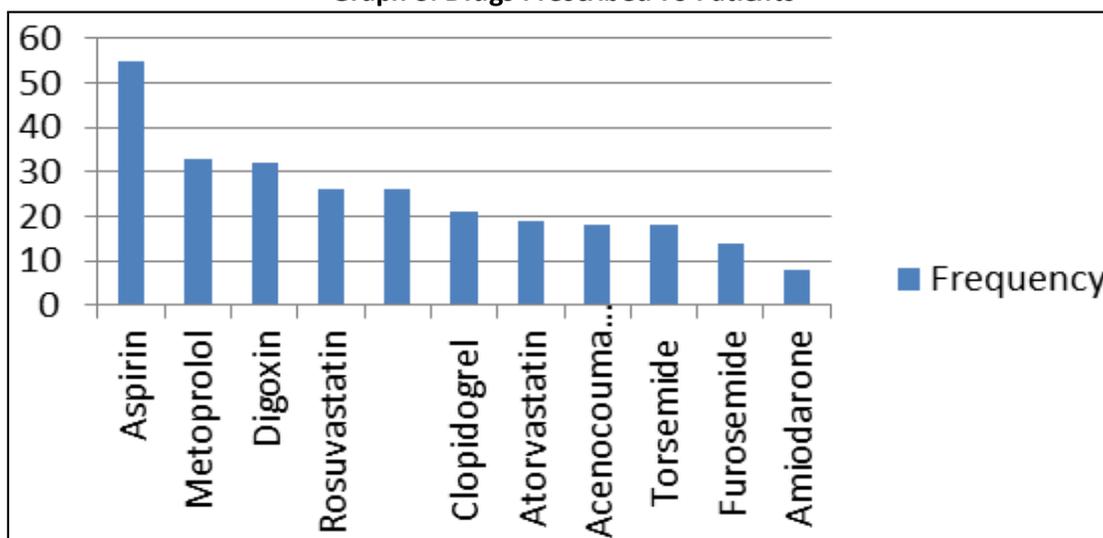
**Table 3: LDL Cholesterol and Correlation With ATP III Classification**

LDL (mg/dl)	Comments	Number of patients
<100	Optimal	42 (47.19%)
100-129	Near/Above Optimal	26 (29.21%)
130-159	Borderline High	15 (16.85%)
160-189	High	5 (5.61%)
>190	Very High	1 (1.12%)

**Table 4: Triglyceride Levels and Correlation With ATP III Classification**

Triglyceride levels (mg/dl)	Comments	Number of Patients
<150	Normal	43 (48.31%)
150-199	Borderline High	30 (33.70%)
>200	High	16 (17.98%)

**Graph 3: Drugs Prescribed To Patients**



In this study, which included 89 patients of Rheumatic heart disease, 76 patients were associated with dyslipidaemia and 13 patients had normal lipid values.

As far as total cholesterol levels were concerned, 23 out of 76 patients (30.26%) had above target levels for total cholesterol. Also 46 patients out of 76(60.52%) had raised triglycerides levels and 47 patients (61.84%) had raised LDL levels. As far as HDL levels were concerned, 38 out of 76 patients

(50.00%) had below desirable levels. The frequency of deranged LDL is higher as compared to HDL, triglycerides and total cholesterol levels.

If these values are to be co-related to the disease then LDL as a lipid parameter stands most significant.

**Discussion:** Elevated levels of blood lipids are well-documented risk factors for cardiovascular disease. Current classification schemes and

treatment levels for hyperlipidemia are based on the National Cholesterol Education Panel's (NCEP) Adult Treatment Program-3 (ATP-III) guidelines.

Modern primary care practitioners spend considerable time and effort on preventive medicine.

Diagnosing and managing hyperlipidemia as a way to prevent cardiovascular disease (CVD) is a common activity for primary care physicians.

According to Centres for Disease Control data from a survey of 1,492 physicians who provide ambulatory care in non-government settings, hyperlipidemia is second only to hypertension in the list of the 10 most common chronic conditions that were seen<sup>9</sup>. The fact that hyperlipidemia is a strong risk factor for CVD is well established.

An important step in the interpretation of lipid screening results is the performance of a cardiovascular risk assessment.

This point is strongly emphasized in the report of ATP-III and in numerous peer reviewed journal articles reviewing the topic of lipid management.

The basic principle is that the higher a person's CVD risk, the greater the benefit in aggressively treating all modifiable risk factors, including hyperlipidemia.

The National Cholesterol Education Program (NCEP), a program within the National Institute of Health's Heart, Lung, and Blood Institute, published a guideline for screening and treating hyperlipidemia.

Physicians have since become familiar with the NCEP concept of basing treatment decisions on assessment of patient risk factors (smoking, age, diabetes, hypertension, family history of early coronary artery disease [CAD]) and application of algorithms linked to desired low-density lipoprotein (LDL) cholesterol levels. The advantage of this strategy is its simplicity.

Physicians assess whether the NCEP risk factors are present and then work with their patients to achieve the desired LDL level through lifestyle modification, drug therapy, or both. Hyperlipidemia can occur because of

multifactorial reasons such as obesity, Diabetes, genetic factors or they could be drug induced.

In this study, 76 out of 89 patients had co-existing Heart disease and Dyslipidaemia. Significant variations in patterns of dyslipidaemia prevalence, its relation to cardiovascular disorders and response to hypolipidemic agents are noted in Patients.

This study also took consideration into the co-morbidities of RHD patient and it was found that most patients had Diabetes as the common co-morbidity, followed by Hypertension and Hypothyroidism which is in contrast to study<sup>8</sup> carried out which showed patients with RHD were more prone to Renal Failure.

Interestingly, study conducted by by Maria I. New, M.D. et. Al<sup>10</sup>, found that dyslipidaemias were seen more in diabetic patients than in non-diabetics. This was in favour of our study as maximum number of patients with diabetes as co-morbidity had dyslipidaemias.

The lipid profiles of 268 patients with hypothyroidism were examined in the Thyroid Clinic at the Mayo Clinic during a 1-year period. It was found that dyslipidaemia was commonly associated with hypothyroidism.

This supports our study that many patient who had hypothyroidism, also had lipid level alterations, who were taking lipid lowering agents.

A total of 407 drug formulations were prescribed to 89 patients. The mean number of drugs per prescription was 4.57.

The hypolipidemic drugs prescribed included drugs from the statins group either singly or as a fixed dose combination with other drugs. Statins were combined with drugs like Aspirin or Clopidogrel.

The most commonly prescribed hypolipidemic drug was Rosuvastatin in 26 patients followed by Atorvastatin in 19 patients.

In our study the prescription of Rosuvastatin among all other statins has dominated the drug prescribing pattern. Rosuvastatin is a newer statin but its efficacy is not superior to other statins. Atorvastatin on the other hand is

documented to have additional antioxidant property which may prove to be useful in patients<sup>11</sup>. This is in contrast to Atorvastatin being most commonly prescribed in the study carried out by Sanket et al<sup>12</sup>.

While in case of non-hypolipidaemic drugs, the most commonly prescribed formulation was Aspirin in 55 patients, followed by Metoprolol in 33 patients. There was not a single drug which was prescribed by its generic name.

Many practitioners do not rely on the quality of generic drugs and that could be one of the reasons for not prescribing by generic name.

Hence government authorities should ensure that generic drugs also meet the quality standards.

Lipid profile patterns and ATP III risk assessment: Serum samples of the patients were collected and four variables were worked out as a part of lipid profile: Total cholesterol, HDL, Total triglycerides and LDL.

All the patients were evaluated based on the Third Report of the National Cholesterol Education Program (NCEP) – The Expert Panel, Adult Treatment Panel (ATP) III Guidelines.

Baseline lipid profile revealed mean ( $\pm$ SD) level of total cholesterol 173.26 ( $\pm$ 36.20) mg/dl which was desirable, triglycerides 174.10 ( $\pm$ 88.93) mg/dl which was borderline high, HDL cholesterol 43.46 ( $\pm$ 12.62) mg/dl which was normal, LDL cholesterol 104.80 ( $\pm$ 34.77) mg/dl which was near optimal.

HDL cholesterol levels were low in among 42.70% patients (out of total 89 patients). This supports the study carried out by Sanket Bhardwaj<sup>12</sup> et.al which stated HDL levels variation among the patients having cardiovascular problems. Despite therapy of lipid lowering drug, these patients didn't have normal LDL levels which is astonishing.

**Strengths Of Study:** This kind of study was done for the first time to compare The Lipid Profile Pattern in Patients with Chronic Rheumatic Heart Disease (RHD). ATP-III guidelines by NCEP were used to classify the lipid levels. The study noted the effects of an array of hypolipidemic drugs on various lipid parameters (total cholesterol, HDL, triglycerides, LDL).

**Limitations Of Study:** Although sample size was less, to prove or disapprove our hypothesis, nevertheless with limited time available to the researcher, the association between the two needs to be proved. In spite of the fact stated above, our study points to alteration in lipid levels in patients with RHD, weakly supporting the hypothesis.

**Conclusion:** Rheumatic Heart Disease (RHD) is highly prevalent in developing country like India. Morbidity and mortality in rheumatic heart disease is very high in Indian patients and one of the determinants of the cardiovascular morbidity is the increased lipid levels. In this study, HDL cholesterol levels were low in among 42.70% patients (out of 89) and total cholesterol was high in 25.83% patients (out of total 89). To date no hypothesis is established on the relation between the Lipid Profile and RHD. This study would be beneficial to Indian cardiologists in defining the optimal treatment by the choice of antibiotic therapy and Lipid lowering agents like Statins.

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