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An In-Depth Study On The Effect Of Oxidized Ldl From Different Subgroups Of People On Endothelium– Dependent Relaxation In Order To Elucidate The Mechanisms Responsible For The Higher Incidence Of Coronary Heart Disease In Diabetes

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Abstract

Diabetes increases the risk of cardiovascular disease and makes it more widespread in the general population. An elevated risk of coronary heart disease (CHD) is linked to total blood cholesterol in both those with diabetes and those without the condition. Blood lipid abnormalities in diabetics include decreased levels of high-density lipoprotein (HDL), increased levels of very low-density lipoprotein (VLDL), and triglyceride levels. All of these factors are associated with being overweight and occur before diabetes sets in. Heart failure and mortality are increased risks associated with diabetes, which is more prevalent in women and increases the risk of coronary heart disease (CHD) in all its manifestations. For men, it means a higher chance of silent myocardial infarctions. Patients with diabetes must undergo multifactorial care in order to lower their risk of coronary heart disease. Rather than looking at total LDL cholesterol levels, the best indicator of lipid-induced coronary heart disease risk is the LDL/HDL cholesterol ratio. In and of itself, triglyceride quantities do not matter. While low HDL cholesterol is the main cause of low LDL/HDL ratio in diabetics, most methods used to prevent coronary heart disease (CHD), such as reducing body fat, increasing physical activity, quitting smoking, and enhancing glucose tolerance, also increase HDL cholesterol. Management of weight should be a primary priority due to the beneficial effects it has on lipid profiles, glucose tolerance, and blood pressure.

KEYWORD: Cholesterol, Control Study, Effective Dose, Low-Density Lipoprotein

1. INTRODUCTION:

Atherosclerosis and its sequelae are among the top killers on a global scale. An alarming rise in the frequency of early-onset obesity is being fueled by the ubiquity of fast food and sedentary lifestyles. The benefits of statin treatment are becoming more widely recognized, leading to an increase in its usage. Cardiovascular and cerebrovascular events still pose a significant risk. In this work, the researchers aimed to examine lipids apart from LDL. In order to identify the lipid parameter most strongly linked to metabolic syndrome and coronary artery disease, this investigation was carried

out. In addition, they are interested in studying northern Indians in particular to see if metabolic syndrome is associated with non-HDL cholesterol (Esguerra, 2020).

Over the course of the research, 140 healthy people served as controls and 113 patients suffering from coronary artery disease provided the actual data. The ages of the participants ranged from 35 to 75. Racially and geographically, there was no difference between the cases and controls. A signed consent was acquired for both the control and the case groups. In order to identify the instances, we examined historical data in conjunction with established norms. We assessed systolic and diastolic blood pressures, waist and hip measurements, lipid profiles, and other vital indicators. In 69 (61.06%) individuals with coronary artery disease and 52 (37.1%) patients without coronary artery disease, metabolic syndrome was found. It was determined that individuals had CAD by reviewing their medical data. In addition to checking systolic and diastolic blood pressures and lipid profiles, every participant had their height, weight, waist, and hips assessed. These anomalies related to coronary artery disease are ranked according to age. There was a robust association between abdominal obesity and systolic blood pressure, non-HDL cholesterol and diastolic blood pressure in that order of strength. The correlation and significant values for total cholesterol, triglycerides, low density lipoproteins, and HDL cholesterol all decreased as the levels rose from low to high. The diagnostic function of non-high-density lipoprotein cholesterol is to ascertain the cardiovascular risk in metabolic syndrome patients. In order to determine the function of non-HDL cholesterol in the evaluation of CHD risk, Sigedel et al.²⁸ conducted a research. Blood cholesterol levels and low-density lipoprotein cholesterol measurements have been used as related factors for quite some time. Because it is possible to detect non-HDL by subtracting HDL cholesterol from total cholesterol, a substantial amount of research has established non-HDL as a significant and straightforward indicator. A "cross-sectional" design was used in this study (Sergi, 2019).

With the use of a patient's medical history, electrocardiogram (ECG), echocardiogram, and enzyme analysis, 51 MI patients and the same number of controls were determined to have had a myocardial infarction. In order to get HDL cholesterol readings, total cholesterol was subtracted from high density lipoprotein. The data was subjected to a statistical analysis. The lipid profiles of 42 MI patients were aberrant, in contrast to 20 healthy controls. Among the variables tested, the results showed that high-density lipoprotein (HDL) cholesterol was the most significant risk factor for cardiovascular disease. The p-values for low-density lipoprotein (LDL) and non-HDL cholesterol (LDL) were 0.05 and 0.2, respectively, in this study. Compared to low-density lipoprotein, high-density lipoprotein (HDL) and non-HDL cholesterol are better indicators. The piece was written by Vaccaro and coworkers. Vaccaro et al. conducted a research to find out whether adherence to the lifestyle adjustments recommended by doctors had any effect on participants' non-high density lipoprotein cholesterol levels. Researchers gathered data in a number of nations, the United States included. In it, you can find the results of many surveys carried out all around the nation. It turned out that minority groups in the US have gotten more dietary suggestions than anybody else. Those who were instructed to did so by an overwhelming majority (80%). Low or normal non-HDL cholesterol levels were more common among those whose weight reduction programs were already in progress. It was emphasized that one should persevere in spite of difficulties (Lin, 2020).

2. BACKGROUND OF THE STUDY:

Based on their medical history, the individuals were diagnosed with CAD. All of the subjects had their BP, weight, waist, and hip measurements taken, in addition to their height, weight, and lipid profiles. Abnormalities in coronary artery disease are ranked according to their severity when

adjusted for age. After systolic blood pressure and non-HDL cholesterol, abdominal obesity and non-HDL cholesterol were placed second and third, respectively. Readings of triglycerides, total cholesterol, low density lipoproteins, and HDL cholesterol occurred in that sequence of importance, with the significance and degree of correlation decreasing with each passing reading. The use of non-high density lipoprotein cholesterol in the screening for coronary vascular risk is being considered for individuals with metabolic syndrome. The researchers wanted to know if non-HDL cholesterol may increase the likelihood of coronary artery disease (CAD). Total and low-density lipoprotein cholesterol levels have been used as correlational indicators for quite some time. According to many research, non-HDL cholesterol is a meaningful and straightforward biomarker as it can be determined by subtracting HDL cholesterol from total cholesterol (Czech, 2020).

3. PURPOSE OF THE RESEARCH:

Few would argue against the idea that reducing levels of low-density lipoprotein, often known as "bad cholesterol," reduces the likelihood of cardiovascular disease. However, it does not apply to all victims. A large portion of the population has normal levels of LDL cholesterol. More and more research is pointing to non-HDL cholesterol as a major warning sign of possible cardiac issues. The total cholesterol level is calculated by subtracting the HDL cholesterol level from the atherogenic lipoprotein particle cholesterol level. HDL cholesterol is short for low-density lipoprotein cholesterol. Certain populations, including diabetics, need non-HDL cholesterol for the treatment of dyslipidaemia, a condition characterized by low HDL cholesterol levels and high triglyceride levels. Measures of non-HDL cholesterol are thought to reflect the danger that triglyceride-rich particles pose. Scientists discovered that non-HDL cholesterol significantly correlated with the intensity and development of coronary artery disease, and it was also a strong predictor of death from cardiovascular disease. Changes to one's food and one's medicine regimen may both lower levels of non-HDL cholesterol. Few statins, such as rosuvastatin and simvastatin, are effective in lowering non-HDL cholesterol levels. It is possible to lower triglyceride and non-HDL cholesterol levels significantly by using fibrates. Details: total and HDL cholesterol levels are measured directly, while non-HDL cholesterol is computed using these two values; to forecast LDL cholesterol levels, the FRIEDWALDS equation is used. All of the atherogenic particles seen in the lipid profile are non-HDL cholesterol. As a result, its predictive power surpasses that of rival "methods" (Bernelot Moens, 2019).

4. LITERATURE REVIEW:

Based on their medical history, patients who were diagnosed with coronary artery disease were located. The following measurements were taken from each participant: height, weight, waist, and hip circumferences; blood pressures, and lipid profiles, were also recorded. This is the sequence in which age-standardized changes in coronary artery disease were discovered. Systolic blood pressure and high non-HDL cholesterol were first and third, respectively, followed by abdominal obesity. Low density lipoproteins, HDL cholesterol, triglycerides, and total cholesterol "readings" all showed a declining correlation value and relevance as the significance order went up. As a screening tool, non-high density lipoprotein cholesterol is used to assess metabolic syndrome patients' risk of coronary vascular disease. To determine if non-HDL cholesterol may be used as a risk factor for coronary artery disease (CAD), Sigedel and colleagues will undertake a research. Total cholesterol and low-density lipoprotein cholesterol levels have been used as correlational indicators throughout the whole of human history. This way of doing things has been common. The non-HDL cholesterol has been considered a simple yet crucial indicator in several research. The reason for this is because calculating it is as easy as dividing total cholesterol by HDL cholesterol (Kanter, 2019).

5. RESEARCH QUESTIONS:

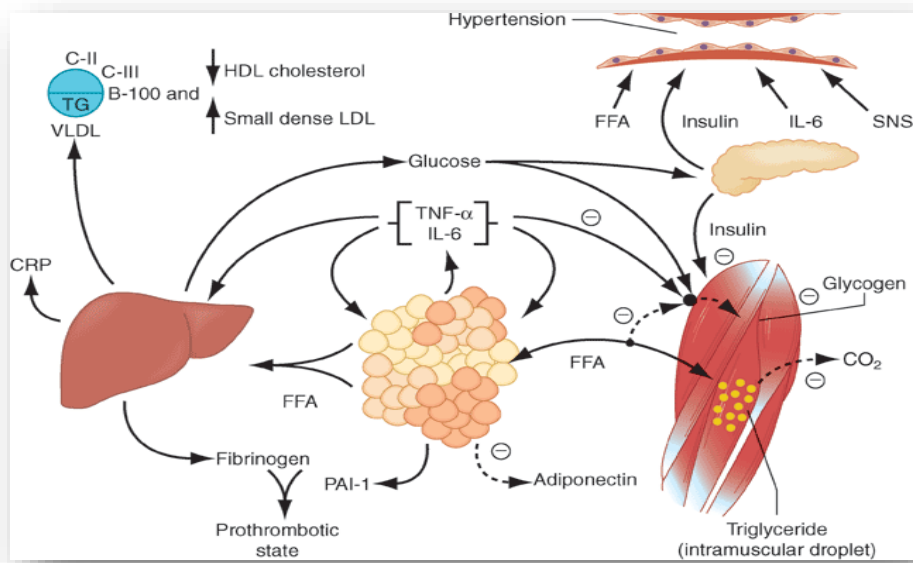
- Are there "significant of diverse vs. the lipid-lowering effects of statin on macrovascular endothelial structure and function, vascular function and markers of aggravation in patients with dysglycemia and" heart-related conditions?
- In individuals who have type two diabetes and coronary artery disease, how are L-arginine and BH4 impacted by I/R-induced endothelial dysfunction?

6. RESEARCH METHODOLOGY:

In this experiment, patients with coronary artery disease and an ischemic stroke within five years of the start of their first coronary event would be enrolled if they were treated with atorvastatin. Group 1 patients met the following criteria: they were on atorvastatin 10 mg daily for at least a year, they had a history of cerebrovascular events (stroke, for example) within five years of their first coronary event, and they had an electrocardiogram showing the presence of coronary disease or an electrocardiogram showing that the patient had been taking the medication for at least a year. For the purpose of this study, we also included a control group of patients with coronary artery disease who had been on atorvastatin 10 mg for more than five years. The purpose of this was to guarantee that the control group accurately reflected the population at large. A normal CT brain scan and the absence of a history of transient ischemia events are diagnostic criteria for these individuals. In this experiment, patients with coronary artery disease and an ischemic stroke within five years of the start of their first coronary event would be enrolled if they were treated with atorvastatin. Group 1 patients met the following criteria: they were on atorvastatin 10 mg daily for at least a year, they had a history of cerebrovascular events (stroke, for example) within five years of their first coronary event, and they had an electrocardiogram showing the presence of coronary disease or an electrocardiogram showing that the patient had been taking the medication for at least a year. For the purpose of this study, we also included a control group of patients with coronary artery disease who had been on atorvastatin 10 mg for more than five years. The purpose of this was to guarantee that the control group accurately reflected the population at large. A normal CT brain scan and the absence of a history of transient ischemia events are diagnostic criteria for these individuals.

• Research Design:

From forty to eighty-plus years old, participants will span both sexes. An internal university committee gave the research the go-ahead. Risk factors such as obesity (BMI), hypertension (blood pressure), alcohol use, diabetes, and cigarette smoking will be included in the study, along with both modifiable and non-modifiable variables. A thorough history-taking method will uncover the risk factors related to smoking and alcohol use. Conditions like high blood pressure and diabetes mellitus may be better understood with the use of a patient's medical history, routine laboratory tests, and BP monitoring. Following a 10-hour fast the night before, the Hitachi 704 Analyzer will take measurements of total cholesterol, HDL "cholesterol, and triglycerides at 7 a.m. Finding low density lipoprotein cholesterol will be done using the well-known FRIEDWALD formula. To get the non-HDL cholesterol, divide the total cholesterol by the HDL content. Both the patients and the controls underwent ECG and echocardiography to confirm the presence of coronary artery disease. The patient will have metabolic syndrome ruled out as a potential diagnosis after analyzing the results of their normal blood tests. The study will not include participants whose liver function tests are abnormal or whose renal parameters are high.



7. CONCEPTUAL FRAMEWORK:

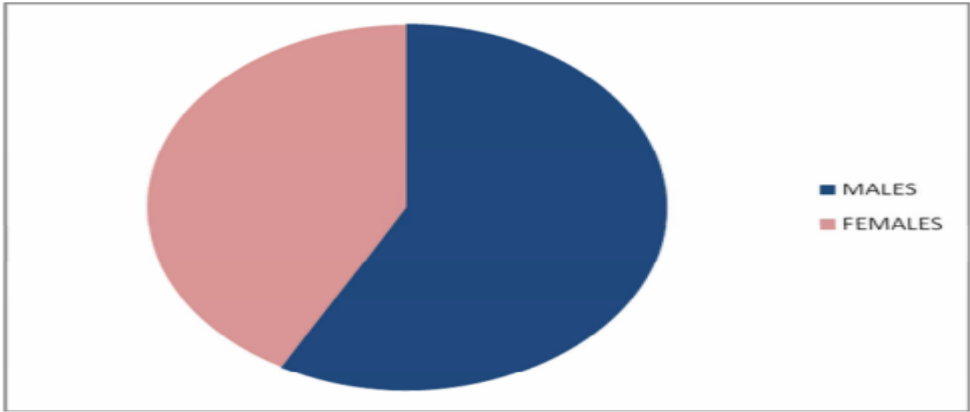
8. RESULT:

Fifty patients were enrolled in the study if they had a history of coronary artery disease confirmed by electrocardiogram (ECG) or echocardiography (ECHO), were taking atorvastatin 10 mg regularly for more than a year, and then experienced a cerebrovascular event such as an ischemic stroke confirmed by computed tomography (CT) or magnetic resonance imaging (MRI) of the brain within five years of the initial coronary event. The age, smoking status, blood sugar, blood pressure, and alcohol consumption of fifty patients were all included in the control group.

Table 1: Sex

SEX	No. OF CASES
MALES	29
FEMALES	21
TOTAL	50

Table 2: Sex distribution

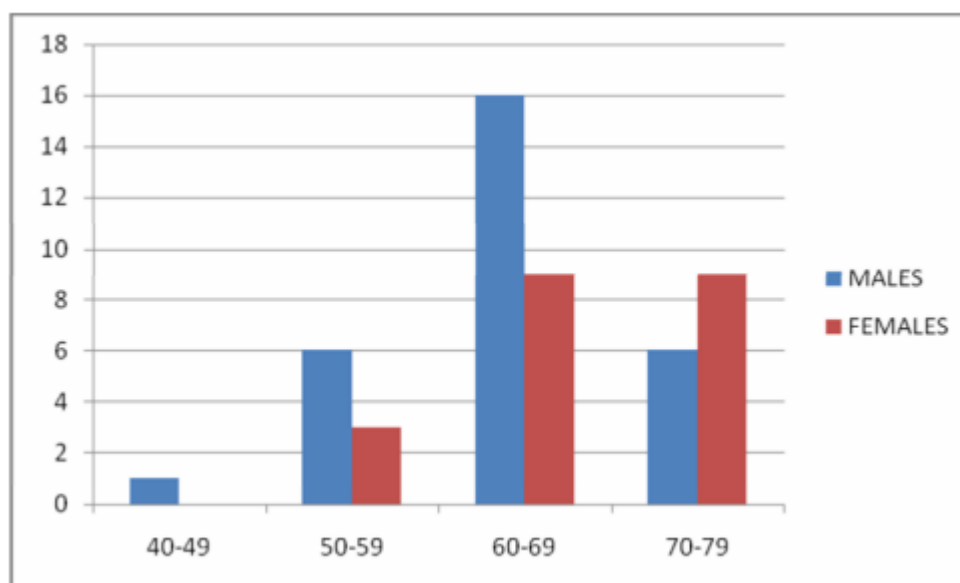


There were 29 men and 21 females among the 50 patients.

Table 3: Age Sex Ratio

AGE	MALES	FEMALES	RATIO
40-49	1	0	0% female
50-59	6	3	50% FEMALE
60-69	16	9	56.25% FEMALE
70-79	6	9	150 %FEMALES
TOTAL	29	21	

Table 4



The age-sex ratio indicates that vascular events occurred later in females compared to males. In the group, 21 were female and 29 were male. The average age of the female participants was 67.72, making them a few years older than the male participants. Of the total number of seniors, half were in their 60s and 70s. Rresearcher, a 45-year-old electrician with hyperhomocysteinemia, was the youngest person present. Additionally, the researcher suffers peripheral artery disease. He came from a long line of people who suffered from heart conditions and neurological issues.

9. DISCUSSION:

Among its institutions, it has the highest prescription volume for lipid-lowering medications. Hepatotoxicity and myopathy are the most prevalent adverse effects. One of its benefits is a reduction in bad LDL cholesterol and, to a lesser extent, triglycerides. The general population's LDL cholesterol levels should be lower in patients on atorvastatin. In contrast to rosuvastatin, it does not considerably raise HDL levels. Consequently, non-HDL cholesterol levels remain unchanged. Using

a sample of individuals with low LDL levels, this study aimed to address the issue, "Does non-HDL cholesterol significantly influence CVA risk in a group with low LDL levels?" For the first thirty days after diagnosis of acute coronary syndrome, 80 mg once day is the typical dose recommendation. It is recommended to progressively reduce dosage after LDL targets are met. The ideal plasma LDL level for people with coronary artery disease (CAD) is 70 mg/dl. As its release is at its peak throughout the night, you are free to take HMG Co A reductase anytime you choose. Other cardiac medications, such as thiazide diuretics and beta blockers, may also change lipid profiles. Everyone who was given atorvastatin and took 10 mg of it daily was included in the trial so that comparisons could be made consistently. One year was the minimal minimum for enrollment. Neither the cases nor the controls reached the target level of low-density lipoprotein, suggesting that most patients did not achieve it. Among the fifty patients and fifty controls, only two achieved the goal of lowering their LDL levels to below 70 mg/dl. In contrast, levels of "bad" cholesterol (LDL) were lower than the average for the country (Wang, 2020).

10. CONCLUSION:

"Keeping tabs on the current level of cerebrovascular risk and following up on attempts to reduce that risk does not necessarily rely on LDL cholesterol as the most important factor. Their investigation found no difference in the predictive power of LDL, HDL, and non-HDL cholesterol levels for ischemic stroke risk. A small percentage of the population does, in fact, benefit from lower LDL cholesterol levels in terms of preventing atherosclerotic events. Additionally noteworthy are triglycerides, non-HDL cholesterol, Apo lipoproteins, lipoprotein a, and lipoprotein an. Patients at risk of an ischemic stroke may benefit substantially from goal monitoring and risk assessment utilizing non-HDL cholesterol. Concentrating on low-density lipoprotein (LDL) instead of high-density lipoprotein (HDL) is recommended by the Third Adult Treatment Panel of the National Cholesterol Education Programme (NCEP). Doctors should often ask labs to provide the non HDL cholesterol number instead of the estimated and expected LDL value since the non HDL value is the more accurate one.

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