CODEN [USA]: IAJPBB ISSN: 2349-7750

INDO AMERICAN JOURNAL OF
PHARMACEUTICAL SCIENCES

http://doi.org/10.5281/zenodo.3596915

Available online at: http://www.iajps.com *Research Article*

# LIPID ABNORMALITIES IN NON-DIABETIC, NON-OBESE AND HYPERTENSIVE PATIENTS

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**Article Received:** November 2019 **Accepted:** December 2019 **Published:** January 2020

**Abstract:**

***Objective:*** *Dyslipidemia and hypertension are the main factors contributing to the coronary artery disease pathogenesis, and coexistence does not increase risk, but increases. The objective of this study was to govern the incidence of dyslipidemia in obese and non-diabetic patients with hypertension and to compare them with obese and non-diabetic patients with normotension.*

***Methods:*** *This case control study was conducted at Medicine Unit II of Jinnah Hospital Lahore for Six months duration from January 2019 to June 2019. The study included 120 adults of any sex; Forty, not obese, without diabetes, with hypertension and 80 without obesity, without diabetes, with normotension. Demographics and eating habits were recorded for each patient using a questionnaire. The blood glucose levels and fasting lipid profile were assessed in all patients. All data were compared among 2 groups.*

***Results:*** *In the hypertensive group low density lipoprotein cholesterol (LDL-C), triglyceride levels (TG) and total cholesterol (TC) were higher and lower value for high density lipoprotein cholesterol (HDL-C) than normotensive group. Only in men and TG, CT, LDL-C, HDL-C abnormalities were more common and in the group with hypertension TG was common (ratio = 2.96, 2.67, 4.28 and 4.57). HDL-C abnormality was similar in both groups (ratio = 1.47).*

***Conclusion:*** *People with hypertension are more prone to various lipid abnormalities, i.e. LDL-C, Total cholesterol and HDL-C (male) and triglycerides than the normotensive population.*

***Keywords:*** *not obese, without diabetes, hypertension and dyslipidemia.*

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*Please cite this article in press Negarish Batool et al.,* ***Lipid Abnormalities In Non-Diabetic, Non-Obese And Hypertensive Patients.,*** *Indo Am. J. P. Sci, 2020; 07(01).*

## INTRODUCTION:

Hypertension is a major health problem worldwide due to its prevalence and increased risk of associated cardiovascular diseases[1-2]. Advances in diagnosis and treatment have played an important role in recent dramatic declines in coronary artery disease and mortality from stroke in the Western world. Lifetime hypertension[3-4]. The higher the blood pressure, the more likely myocardial infarction, heart failure, stroke and kidney disease. Hypertension is the strongest and most important modifiable risk factor that causes a risk of triple stroke[5]. There are many factors that may play a key role in the development of hypertension, such as age, gender, occupation, alcohol consumption, and salt intake, the amount of blood pumped through the heart, the condition of blood vessels, and various hormone levels. Among these factors, the role of obesity and diabetes is widely known. Dyslipidemia is often associated with essential hypertension[5-6]. The percentage of patients with cardiovascular disease is much higher in patients with concomitant hypertension and dyslipidemia than in patients with isolated hypertension or dyslipidemia[7]. Total and non-HDL (high density lipoprotein) cholesterol increases significantly with both systolic and diastolic blood pressure increases[8]. It has been reported that hypertension affects 17.7% of the adult population of non-diabetic and non-obese people in Punjab, Pakistan. Low-density lipoprotein cholesterol (LDL-C) is not a direct cause of hypertension, but works indirectly by accelerating atherosclerosis. HDL cholesterol is thought to activate cholesterol from developing and present atherosclerosis and transport it to the liver for secretion in the bile[9].

Metabolic syndrome is another clinical scenario in which dyslipidemia and hypertension have a role in obesity and glucose intolerance. The main culprit is visceral or upper torso obesity. Hypertension rarely occurs as an isolated condition; rather, it is in a constellation of other risk factors. In 1991, the Tromso study showed a significant increase in both HDL and HDL-free cholesterol in both sexes with increasing systolic and diastolic blood pressure[10]. Baral et al. reports that dyslipidemia is closely related to hypertension. In addition, hypertension can lead to convection of the intima of LDL arteries and other atherogenic particles[11].

Non-obese, non-diabetic hypertensive patients are just as important as obese and diabetic patients, because insulin resistance also occurs in non-obese people and can cause dyslipidemia, and their presence has been reported in the Southeast Asian population and people who are not obese can take over this problem.

The main purpose of this study was to determine the frequency of lipid abnormalities in patients with essential obesity and without diabetes with essential hypertension.

## MATERIALSAND METHODS:

This case control study was conducted at Medicine Unit II of Jinnah Hospital Lahore for Six months duration from January 2019 to June 2019. The study involved 120 people of any sex between the ages of 35-65; Forty people were obese, without diabetes, with primary hypertension (group A, cases), and 80 were without obesity, without diabetes, and with normotension (group B, controls). Patients were selected with non-probability purposive sampling. Patients with myocardial infarction (MI), congestive heart failure (CCF), renal failure, cerebrovascular accident (CVA), glucose intolerance, other conditions requiring long-term treatment, and lipid-lowering drugs were excluded. Forty patients in the study group were admitted to the emergency and outpatient departments. Eighty control people were enrolled in accordance with the above criteria. Informed consent was obtained from all study participants and their data was recorded.

Selected people were called with a 10-hour fast in the morning. They sat in a quiet environment for half an hour without smoking. Blood samples were taken for biochemical analysis. Medical history such as smoking, drugs and family history of dyslipidemia was performed, and a physical examination was carried out including measuring blood pressure in a sitting position. All this information was saved in the form.

Non-obesity status was defined according to BMI between 18.5 and 24.9.
Diabetic status was defined as fasting glucose (FBG) <100 mg / dL (5.6 mmol / L) and 100 mg / dL (5.6 mmol / L) to 126 mg / dL (7 mmol) were marked glucose intolerance (IGT).

Essential systemic hypertension was diagnosed if there was no reason in the clinical trial and preliminary laboratory data, and in the presence of any of the following: diastolic blood pressure> 90 mmHg during at least two visits or mean multiple reading of systolic artery pressure> 140 mmHg in two or more visits. A diagnosis of dyslipidemia is made if any of the following symptoms occur; total cholesterol> 200 mg / dl, triglycerides> 150 mg / dl, LDL> 100 mg / dl and HDL <40 mg / dl (male) and 50 mg / dl (female).

**DATA ANALYSIS:**

All collected information was entered and analyzed using SPSS version 16.0. Quantitative variables such as age + duration of hypertension, blood pressure, weight, BMI, blood glucose and lipid levels were presented by calculating the mean + SD (standard deviation). Qualitative variables such as gender, smoking and eating habits are presented as frequency and percentage. Probability indices for various lipid abnormalities were calculated in exposed individuals (test group) and unexposed subjects (control group).

**RESULTS:**

The mean age was 46.43 ± 7.58 years in group A (study group) and 46.96 ± 7.76 years in group B (control group), with the majority of participants aged 35-45, i.e. 21 in group A (52.5%) and group B 40 (50%), the lowest number of people in the age group 56-65, i.e. group A 7 (17.5%) and group B 12 (15%) 46-55 age group 12 (30%) in group 28 (35%).

The distribution by sex was similar in both groups; 23/40 (57.5%) men in Group A and 47/80 (58.7%) men in Group B, Table 1.

**Table 1:** baseline Characteristics of study population:

| **Parameter** | **Group-A (n = 40)** | **Group-B (n = 80)** | **P value** |
|---|---|---|---|
| Age (years) Mean± SD | 46.43±7.58 | 46.96±7.76 | 0.63 |
| 35-45 | 21 (52.5) | 40 (50) | 1.00 0.73 |
| Age Groups | 12 (30) | 28 (35) | 0.92 |
| 46-55 | 07 (17.5) | 12 (15) | |
| (years) - n (%) | | | |
| 56-65 | | | |
| Male | 23 (57.3) | 47 (58.7) | |
| Sex- n (%) | 17 (42.5) | 33 (41.3) | 0.896 |
| Female | | | |
| Fasting blood glucose- Mean+ SD | 88.83±3.87 | 89.80±3.95 | 0.202 |
| Smoking- n (%) | 15 (37.5) | 19 (23.8) | 0.12 |
| Weight (kg) -Mean± SD | 66.00±9.86 | 67.47±9.14 | 0.419 |
| Body mass index (BMI)- | 23.38±1.20 | 23.66±0.98 | 0.164 |
| Height (m)- Mean± SD | 1.68±0.10 | 1.69±0.10 | 0.642 |

**Table 2:** Dietary Habits of Two Groups.

| **Variable** | **Group-A (n = 40)** | **Group-B (n = 80)** | **P value** |
|---|---|---|---|
| Consumption of Chicken/ Fish - n (%) | 30 (75.0) | 59 (73.8) | 0.883 |
| Consumption of Red Meat -n (%) | 09 (22.5) | 20 (25.0) | 0.763 |
| Eggs/Dairy Products- n (%) | 23 (57.5) | 41 (51.3) | 0.518 |
| Consumption of Vegetables/ Fruits- n (%) | 39 (97.5) | 76 (95.0) | 0.518 |
| Use of rice - n (%) | 13 (32.5) | 38 (47.5) | 0.117 |
| Use of Pulses - n (%) | 23 (57.5) | 49 (61.3) | 0.692 |

**Table 3:** Lipid Profile (in mg/dL) of Two Groups.

| **Variable** | **Group-A (n = 40)** | **Group-B (n = 80)** | **P value** |
|---|---|---|---|
| LDL-C (Mean ± SD) | 121.7±29.6 | 101.5±15.3 | <0.001 |
| Total Cholesterol (Mean ± SD) | 208.5±43.7 | 178.4±23.1 | <0.001 |
| Triglyceride (Mean ± SD) | 220.8±99.8 | 155.5±56.3 | 0.002 |
| HDL-C (Mean ± SD) | 43.2±7.8 | 45.8±6.0 | 0.044 |

**Table 4:** Comparison of Two Groups on the basis of Different Lipid abnormalities (values in mg/dL).

| Lipid abnormality | Group-A (n = 40) | Group-B (n = 80) | P value |
|---|---|---|---|
| LDL-C >100 - n (%) | 27 (67.5) | 35 (43.7) | 0.014 |
| Total cholesterol >200 - n (%) | 17 (42.5) | 16 (20.0) | 0.009 |
| Triglyceride >150 - n (%) | 27 (67.5) | 25 (31.3) | < 0.001 |
| HDL-C (Women) <50 - n (%) | 08 (53.3) | 14 (43.7) | 0.539 |
| HDL-C (Men) <40 - n (%) | 14 (56.0) | 11 (22.9) | 0.004 |

Both groups were similar in smoking status, glycemic status, height, weight and BMI (Table 1).
The mean systolic and diastolic blood pressure in group A was 158.07 ± 9.20 and 102.55 ± 4.8.

MmHg. The corresponding values for group B were 121.04 ± 6.86 and 79.60 ± 6.38 mmHg. In the majority of hypertensive patients, i.e. in the study group, 37 (92.5%) had hypertension from 1 to 5 years (Fig. 1).
Controls for eating habits in the study group and daily consumption of meat, poultry / fish, fruit / vegetables, eggs / dairy products, legumes and rice are presented in Table 2 and can be compared in both groups.

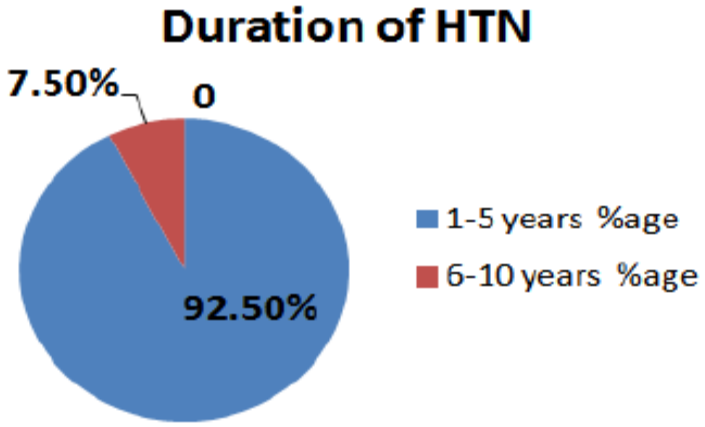
Table 3 shows the average values of different lipids in two groups. Total cholesterol, LDL-C and triglyceride levels were significantly higher in the hypertension group (A) than in the normotension group (B). The HDL-C level was lower in group A (43.2 ± 7.8 mg / dl) than in group B (45.8 ± 6.0 mg / dl), P = 0.044. Table 4 shows a comparison of different lipid abnormalities in both groups. In our group with hypertension, women more often had all the abnormalities except HDL-C; [Ratio for CT (OR) = 2.96 (95% CI 1.2-7.4), OR = 2.67 (95% CI 1.12-6.41) for LDL-C abnormalities, OR = 4 , 28 (95% CI 1.35-13.89) for HDL-OR = 1.47 (95% CI 0.36-6.01) for men C, HDL-C abnormalities for women, OR = 4.57 (95% CI 1.89-11,22) for TG abnormalities].

## DISCUSS ION:

Our single center observational study showed a possible relationship between hypertension and lipid abnormalities in non-obese and non-diabetic patients. We found that all lipid abnormalities except HDL-C abnormalities were more common in the hypertensive group in women[12]. Baral et al. Study He showed a direct relationship to dyslipidemia in hypertensive patients, while Foucan et al reported conflicting findings; OR = 1.39 for dyslipidemia[13]. Lee et al. Support our conclusion that dyslipidemia and hypertension are more frequent and this can be considered a different syndrome.

Saha et al. Total cholesterol, triglyceride and LDL-C were found to be significantly elevated and HDL-C levels were significantly lower in hypertensive patients compared to control patients and were consistent with our results. They also did not observe a significant change in lipid profile in men and women with hypertension, but it was observed that the abnormal lipid profile was more common in men than in controls.

Figure. 1: Duration of Hypertension




Most of our patients with hypertension were between 35 and 45 years old. Kotokey et al reported that hypertension is more common in the 50-59 age group in the Dibrugarh region of Upper Assam; The incidence of general hypertension was 27.9%, and 54% of people with hypertension had dyslipidemia. Although it had a mixed population, the working population was just a city; another factor that can explain this difference in age group is geographical diversity[14]. The high frequency of dyslipidemia in the hypertensive population is consistent with our research[15].

## CONCLUSION:

People with hypertension are more prone to various lipid abnormalities, i.e. LDL-C, Total cholesterol and HDL-C (male) and triglycerides than the normotensive population.

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