

## ORIGINAL ARTICLE

## PREVALENCE OF DYSLIPIDEMIA IN HYPERTENSIVE AND DIABETIC PATIENTS

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**Background:** Hypertension and diabetes play a major role in development of cardiovascular disorders. Dyslipidemia also plays a central role in the progression of atherosclerotic disease. This study aims to assess the association of dyslipidemia in diabetic and hypertensive patients as this population is at a higher risk of ischemic heart diseases. **Methods:** A cross-sectional study was conducted at the Pathology Department of Pakistan Institute of Medical Sciences, Islamabad. Using WHO calculator, a sample size of 130 was calculated. All participants were above 18 years of age. The patients with previous history of myocardial infarction, stroke, type 1 diabetes, with fasting blood glucose >126 mg/dl, and who did not give consent were excluded from the study. Fasting lipid profiles of all the participants were carried out. Study outcome was measured in terms of percentages of diabetic and hypertensive patients having dyslipidemia. **Results:** The mean age of the patients was 44.9±9.4 years. Out of 130 cases, 48.4% participants were diabetic and 51.6% had hypertension. Dyslipidemia was found in 68.1% diabetic and 71.6% hypertensive patients and this association was significant ( $p<0.001$ ). **Conclusion:** Dyslipidemia is directly associated with diabetes and hypertension. Strict monitoring of diabetic and hypertensive patients with dyslipidemia should be done to avoid development of cardiovascular disorders.

**Keywords:** Dyslipidemia, diabetes, hypertensive, prevalence, cardiovascular

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## INTRODUCTION

Dyslipidemia is an abnormally high level of non-high density lipoprotein cholesterol (HDL-C) in the body. It has been observed that dyslipidemia is strongly associated with other metabolic diseases like hypertension and diabetes. In addition, these three diseases further contribute to the development of atherosclerotic heart diseases.<sup>1</sup>

The overall burden for atherosclerotic diseases is on the rise worldwide.<sup>2</sup> Controlling risk factors for cardiovascular diseases will eventually lead to decreased mortality. If one knows about the prevalence of dyslipidemia in hypertensive and diabetic patients, there would be lesser mortalities as better strategies could be designed to cope with the problem.<sup>3</sup>

Although studies have found association between dyslipidemia, hypertension and diabetes mellitus, the data from South Asian population from epidemiological point of view is scant.<sup>3</sup> In this study, we have tried to find out the prevalence of dyslipidemia in population of Islamabad, Pakistan. The study aimed to find the prevalence of dyslipidemia in diabetic and hypertensive patients.

## MATERIAL AND METHODS

A cross-sectional study was conducted at the Pathology Department of Pakistan Institute of Medical Science, Islamabad. Using WHO calculator, a sample size of 130 was calculated. Informed consent was taken from all

study participants after explaining the procedure. All participants were either hypertensive or diabetic. The participants labelled as hypertensive were those who had their blood pressure greater than 140/90 mmHg. On the other hand, diabetic patients were chosen on the basis of fasting blood glucose levels of greater than 126 mg/dl and HbA1c levels of greater than 6.5%. The participants with a history of stroke or ischemic heart disease, type-I diabetes mellitus, smoking history, age less than 18 and those who did not give consent were excluded from the study. Blood samples were taken and analysed in Beckman Coulter AU680 Chemistry Analyser for different cholesterol measurements. Cholesterol measurements included low density lipoproteins cholesterol (LDL-C), triglycerides (TG), high density lipoproteins cholesterol (HDL-C) and free fatty acids (FFAs). The data was collected and analysed for Chi-square test using SPSS-21.

## RESULTS

The mean age of the participants was 44.9±9.4 years. Total numbers of diabetic and hypertensive patients are shown in Table-1.

Dyslipidemia was found prevalent in majority (68.1%) of the diabetic cases. Those participants were considered dyslipidemic who had triglyceride levels greater than 150 mg/dl, higher levels of low density lipoproteins, (greater than 130 mg/dl) and low levels of high density lipoproteins (less than 60 mg/dl) (Table-2).

Dyslipidemia was also present in more than half of hypertensive population. Around 71.6% hypertensive patients had abnormal lipid measurements (Table-3).

**Table-1: Distribution of diabetic and hypertensive participants**

Disease Type	Number	Percentage
Diabetes mellitus	63	48.4
Hypertension	67	51.6
Total	130	100

**Table-2: Dyslipidemia in diabetic cases**

Disease Type	Number	Percentage	<i>p</i>
Diabetic patients with dyslipidemia	43	68.1	<0.001
Diabetic patients without dyslipidemia	20	31.9	<0.001
Total diabetic patients	63	100	<0.001

**Table-3: Dyslipidemia in hypertensive cases**

Disease Type	Number	Percentage	<i>p</i>
Hypertensive patients with dyslipidemia	48	71.6	<0.001
Hypertensive patients without dyslipidemia	19	28.4	<0.001
Total hypertensive patients	67	100	<0.001

## DISCUSSION

Hypertension, diabetes and dyslipidemia or deranged lipid profile play a central role in development of cardiovascular disorders.<sup>1</sup> This study aimed to find the prevalence of dyslipidemia in diabetic and hypertensive patients.

The mean age of participants in this study was 44.9±9.4 years. A study done by Sherpa *et al*, had almost the same age group, i.e., 48 years in their study.<sup>4</sup> The late age of onset could be due to the lifestyle of individuals.

South Asian population is the most vulnerable to development of dyslipidemia due to cultural norms and unhealthy diet consisting of saturated fats.<sup>5</sup> The prevalence of dyslipidemia in general has been studied by many authors. A notable mention is Zaid and Hasnain (2018) who found out that the major form of dyslipidemia exists in the form of low HDL-C levels in 17.3% of the study population followed by high triglyceride levels in 11.2% individuals.<sup>6</sup> However, their study was limited only to dyslipidemia and other factors like diabetes and hypertension were not taken into account.

We found that 68.1% of diabetic patients had dyslipidemia. As per the study of Taskinen and Boren (2015), and Low Wang *et al* (2016) the prevalence of diabetic patients with dyslipidemia falls somewhere between 30–60%.<sup>7,8</sup> Studies have also shown that people even with better control of circulating glucose are at risk of developing dyslipidemia.<sup>9</sup> So this population should be given special attention as people

having atherosclerotic diseases have more than one factors at play. In addition, Ginsberg and MacCallum concluded that the main lipid abnormality usually found in the diabetic dyslipidemic patients was increased levels of very low density lipoproteins (VLDL) and intermediate density lipoproteins (IDL).<sup>9</sup> However, our study did not particularly focus on the type of lipid abnormality. This lipid abnormality seen in diabetic patients might be due to the fact that Asians consume more fatty food as compared to the western people.

On the other hand, the prevalence of dyslipidemia in hypertensive patients came out to be 71.6%. This prevalence is alarming and should be paid special attention. A study by Dalal *et al*<sup>3</sup> noticed a lesser prevalence of 31%. This significant difference between the prevalence could be once again attributed to sluggish lifestyle. The research of Otsuka *et al*<sup>1</sup> labelled dyslipidemia a cause of hypertension instead of a consequence in Japanese population. They argued that deranged lipid profile plays two roles. First, they impair the endothelial cells function causing decreased production of nitric oxide which in return causes disruption in blood pressure regulation. Second, they reduce the sensitivity of baroreceptors.<sup>1,10</sup> It can be said that either hypertension is a cause or consequence, this population should be routinely checked for dyslipidemia.

## CONCLUSION

The prevalence of dyslipidemia in diabetic and hypertensive patients is alarming in our population. Physical inactivity as well as high fat diet remained the main culprits of high prevalence of metabolic disorders. More comprehensive study should be done to enhance the scope of the metabolic disorders within the region.

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