

# Prevalence of Dyslipidemia among Diabetic Patients in a Tertiary Care Hospital

Muhammad Rehan<sup>1</sup>, Saman Waqar<sup>2</sup>, Haroon Khan<sup>3</sup>

<sup>1</sup>House Physician, Pakistan Institute of Medical Sciences, Islamabad.

<sup>2</sup>Assistant Professor, Department of Chemical Pathology, Federal Medical and Dental College Islamabad.

<sup>3</sup>Professor, Department of Chemical Pathology, Rawal Institute of Health Sciences, Islamabad

## ABSTRACT

**Objective:** To identify the frequency of dyslipidemia in diabetic patients.

**Patients and Methods:** A cross sectional study was conducted among the patients visiting Pathology laboratory in Pakistan Institute of Medical Sciences (PIMS). After taking informed consent from the patients, a brief history was taken from the patients with the help of a questionnaire. Lipid profiles for these patients were analyzed using the same samples as of HbA1c to determine diabetic dyslipidemia.

**Results:** A total number of 206 diabetic patients were inducted in this study. Out of the total sample, 179 (72.7%) respondents were on anti-diabetic therapy alone. About 31 (17.3%) were on antihypertensive therapy along with anti-diabetic therapy. Only 36 (20.1%) patients were on lipid lowering medication along with anti-diabetic and anti-hypertensive treatment. Dyslipidemia was more common in patients that were only on anti-diabetic therapy.

**Conclusion:** Annual screening for dyslipidemia and management were not practiced according to guidelines for diabetic patients. Combination therapy comprising anti-diabetic and anti-dyslipidemia medications should be considered by clinicians instead focusing only on diabetes.

**Key words:** Diabetes mellitus, Dyslipidemia, Lipid profile, Treatment.

### Author's Contribution

<sup>1</sup> Conception, synthesis, planning of research and manuscript writing Interpretation and discussion

<sup>2</sup> Data analysis, interpretation and manuscript writing, <sup>3</sup> Active participation in data collection.

### Address of Correspondence

Saman Waqar

Email: samanwaqar@yahoo.com

### Article info.

Received: September 10, 2017

Accepted: April 24, 2018

**Cite this article.** Rehan M, Waqar S, Khan H. Prevalence of Dyslipidemia and Assessment of Treatment Regimens among Diabetic Patients in a Tertiary Care Hospital. JIMDC.2018; 7(2):136-139

**Funding Source:** Nil

**Conflict of Interest:** Nil

## Introduction

In year 2014 global prevalence for Diabetes was estimated to be 9% in young adults.<sup>1</sup> About 1.5 million deaths in year 2012 were directly because of Diabetes.<sup>2</sup> The relationship between Diabetes, diabetic dyslipidemia and Cardio Vascular Diseases(CVS) has been established long ago. Vascular diseases have a major share in lowering quality of life and death.<sup>3</sup> A number of risk factors have been determined for coronary artery and cardiovascular diseases, among these deranged lipid profiles are a major contributor to the development of coronary artery disease.<sup>4</sup> Lipoproteins increase is

associated with significant risk of atherosclerosis.<sup>5</sup> Globally dyslipidemia results in 4 million deaths per annum.<sup>6</sup> Dyslipidemia means the derangement in body lipid levels, but most of the time dyslipidemia presents as hyperlipidemia. Hyperlipidemia may be due to hyperlipoproteinemia i.e. Increased levels of Low Density Lipoprotein (LDL), hypercholesterolemia or as hypertriglyceridemia or may be all combined. These were defined according to Fredrickson Classification.<sup>7</sup> But dyslipidemia may present as hypolipidemia i.e. low levels of High Density Lipoproteins (HDL).<sup>8</sup> A number of risk

factors has been identified that leads to dearrangements in body lipids. These include lifestyle, obesity, high insulin and a number of other genetic and environmental factors. In present situation clinicians are focusing more on diagnosis and treatment of diabetes only. Dyslipidemia associated with this condition is usually given lesser attention by the clinicians. Lipid profiles are not done frequently for diabetic patients. In this study we planned to identify the frequency of dyslipidemia in diabetic patients and to know if the population is taking only anti diabetic treatment or a combination with lipid lowering drugs.

### Patients and Methods

A cross sectional survey was conducted among the patients visiting Pathology laboratory in Pakistan Institute of Medical Sciences (PIMS), Shaheed Zulfiqar Ali Bhutto Medical University (SZAMBU), Islamabad from May, 2016 to July, 2016 by convenient sampling technique. A study sample of 222 patients was obtained using WHO calculator taking prevalence 17.5%, confidence level 95% and absolute precision of 5%.<sup>9</sup> A total 250 diabetic patients were inducted in the study. Out of 250, total 4 patients lost the study follow up and were excluded.

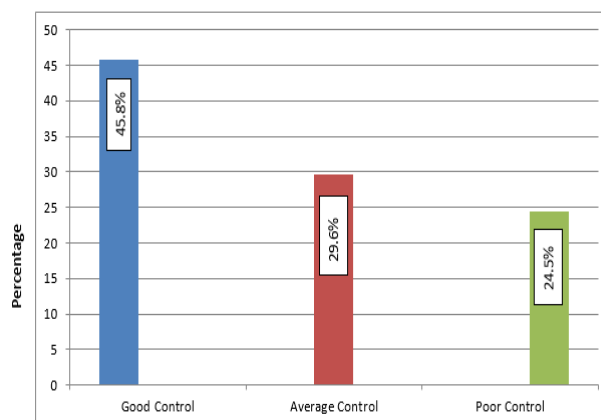
After induction, patients were divided into three groups. Group 1 comprised of patients only on antidiabetic therapy. Group 2 comprised of patients receiving antihypertensive therapy along with antidiabetic medications. Group 3 included patients on lipid lowering medication along with antidiabetic and antihypertensive therapy. Group 1 Patients were further divided into three sub-groups on the basis of their HbA1c levels. Group 1a comprised of good glycemic control with normal HbA1c levels (HbA1c  $\leq$ 6.5%), group 1b included patients with average glycemic control (HbA1c 6.6-9%) and group 1c with poor glycemic control (HbA1c > 9%). All subgroups of Group 1 were then considered for lipid profile evaluation. Dyslipidemia was defined according to the National Cholesterol Education Program Adult Treatment Panel (ATP) III. Presence of dyslipidemia was identified when LDL  $\geq$  130mg/dl, HDL <40 mg/dl, TC  $\geq$ 200 mg/dl and triglycerides were  $\geq$ 150 mg/dl.

After taking informed consent from the patients, a brief history including drug details was taken with the help of a questionnaire. Total 3 ml fasting blood sample was taken

to analyze HbA1c levels. By using the same fasting samples lipid profile was also calculated to determine diabetic dyslipidemia. Patients with deranged lipid profiles were identified and their drug therapy was assessed according to the history. Patients were followed by their phone numbers. Nominal data was collected and analyzed using SPSS version 20.

### Results

Total number of 246 participants included this study. Mean age of the respondents was  $57.5 \pm 15.2$  years. Mean HbA1c value was  $8.7 \pm 2.5$  %. Male patients were 132 (53.6%) and females were 114 (46.3%). Out of 246 diabetic patients, total 179 (72.7%) respondents were in group 1 (anti diabetic therapy alone), 31 were in group 2 (anti diabetic + anti-hypertensive therapy) and 36 were in group 3 (anti diabetic+ anti-hypertensive +lipid lowering medications). After further sub division of group 1, total 82 (45.8%) patients were in group 1a (good glycemic control), 53 (29.6%) were in group 1b (average glycemic control) and 44 (24.5%) patients were in group 1c (poor glycemic control) (Figure 1).



**Figure 1: Comparison of glycemic control in patients only on anti-diabetic therapy (n=179)**

In group 1, regarding lipid profile, HDL levels were deranged in large number of participants (70.3%). Prevalence of other lipid parameters with percentage derangements is shown in (Table 1).

Family history for diabetes and hypertension was found positive among 65 (36.3%) of the respondents. Only 48 (26.8%) had their lipid profile done in the past one year.

Table 1: Deranged lipid parameters in patients only on anti-diabetic therapy (n=179)	
Lipid Parameters	n(%)
Low density lipoprotein (LDL-C)	24 (13.4)
Total Cholesterol	41 (22.9)
Triglycerides	73 (40.7)
High density lipoprotein (HDL-C)	126 (70.3)

Lipid parameters were maximally deranged in patients having poorly controlled diabetes (Table 2).

Table 2: Lipid Profile according to HbA1c values (n=179)				
HbA1c values (%)	LDL n (%)	Cholesterol n (%)	Triglycerides n (%)	HDL n (%)
≤ 6.5	2 (1.1)	5 (2.79)	9 (5.02)	32 (17.87)
6.6 – 9	7 (3.91)	7 (3.91)	21 (11.73)	27 (15.08)
> 9	15 (8.37)	29 (16.2)	43 (24)	67 (37.43)

## Discussion

This study was conducted to evaluate the prevalence of dyslipidemia in our population along with treatment regimens for diabetic patients. The study concluded that most of the population is unaware of association between Diabetes with dyslipidemia. Only a small population had lipid lowering drugs prescribed along with anti-diabetic therapy (20.1%). Only anti-diabetic regimen was also observed among people of Czech Republic.<sup>10</sup> Dyslipidemia screening practices were not adequate in diabetic patients of our study (26.8%). Annual screening of diabetics by lipid profiles is the recommended guidelines by American Association of Clinical Endocrinologists (AACE).<sup>11</sup>

Contrary to this monotherapy approach was prevalent in our population. Combination regimens to control dyslipidemia was found in very few. A statin should be prescribed to a patient of age greater than 40 years with diagnosed diabetes.<sup>12</sup> Stone et. al. in their guidelines also highlighted the use of statin therapy in a patient with diabetes and age 40 to 75 years or the LDL > 190 mg/dl.<sup>13</sup> More than 50% of our population had uncontrolled Diabetes Mellitus. This is a factor that contributes to increased number of complications including vascular diseases and atherosclerosis.<sup>14</sup> In our neighboring country the percentage of uncontrolled diabetes exceeds 80% and due to uncontrolled diabetes, lipids are more deranged in Indian population.<sup>15</sup> TC and

TGs values of our population (22.9% and 40.7%) were more than Chinese population data (16.4% and 7.6%).<sup>16</sup> Values of these parameters were less when compared to Turkish population.<sup>17</sup> LDL values for our population was far less than Turkish population<sup>17</sup> (13.4% versus 36.2%). Surprisingly HDL levels of our population were significantly reduced (in about 70%). These values did not coincide with any of other populations viewed in literature.

## Conclusion

Annual screening for dyslipidemia and management was not practiced according to guidelines among diabetic patients. Combination therapy comprising anti-diabetic and anti-dyslipidemia medications should be considered by clinicians instead focusing only on diabetes. Low levels of HDL require special attention. Further studies are required with large sample size and multi-center surveys to identify the causes of such low HDL prevalence among our population.

## References

1. Global status report on non-communicable diseases 2014. Geneva, World Health Organization, 2012.
2. World Health Organization. Global Health Estimates: Deaths by Cause, Age, Sex and Country, 2000-2012. Geneva, WHO, 2014.
3. Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, de Ferranti S, Després JP, Fullerton HJ, Howard VJ, et al. Heart disease and stroke statistics--2015 update: a report from the American Heart Association. *Circulation*. 2015;131:e29-322.
4. R C Turner, H Millns, H A W Neil, I M Stratton, S E Manley, D R Matthews, R R Holman, Risk factors for coronary artery disease in non-insulin dependent diabetes mellitus: United Kingdom prospective diabetes study (UKPDS: 23). *BMJ* 1998; 316:823.
5. Nicholls S, Lundman P. The emerging role of lipoproteins in atherogenesis: beyond LDL cholesterol. *Semin Vasc Med*. 2004; 4:187-195.
6. Quantifying selected major risks to health. In: The World Health Report 2002—Reducing Risks, Promoting Healthy

- Life. Chapter 4: Geneva: World Health Organization; 2002:47-97.
7. Fredrickson DS, Lees RS. A system for phenotyping hyperlipoproteinemia. *Circulation* 1965;31:321-327.
  8. Ronald M. Lipid and lipoproteins in type 2 diabetes. *Diabetes Care*. 2004;27:1496-504
  9. Sarfraz M, Sajid S, Ashraf MA. Prevalence and pattern of dyslipidemia in hyperglycemic patients and its associated factors among Pakistani population. *Saudi J Biol Sci* 2016;23:761-6.
  10. Šnejdrová M, Češka R, Janíčková-Žďárská D, Honěk P, Dušek P, Pavlík T, Kvapil M. Hypolipidemic and antihypertensive therapy in diabetic patients in the Czech Republic: notes on the VZP (General Health Insurance Company) Data. *Vnitř Lek*. 2015; 61(11 Suppl 3):3S30-7.
  11. Jellinger P, Smith D, Mehta A, Ganda O, Handelsman Y, Rodbard H, Shepherd M, Seibel J. American Association of Clinical Endocrinologists' guidelines for management of dyslipidemia and prevention of atherosclerosis. *Endocrine practice*. 2012.
  12. Walker BR, Colledge NR. *Davidson's principles and practice of medicine*. Elsevier Health Sciences; 2013.
  13. Stone NJ, Robinson JG, Lichtenstein AH, Merz CN, Blum CB, Eckel RH, Goldberg AC, Gordon D, Levy D, Lloyd-Jones DM, McBride P. 2013 ACC/AHA guideline on the treatment of blood cholesterol to reduce atherosclerotic cardiovascular risk in adults: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines. *Journal of the American College of Cardiology*. 2014; 63(25\_PA):2889-934.
  14. Shera A, Jawad F. Prevalence of chronic complications and associated factors in Type 2 Diabetes. *J Pak Med Assoc* 2004; 54:54-9.
  15. Pandya H, Lakhani JD, Dadhania J, Trivedi A. The prevalence and pattern of dyslipidemia among type 2 diabetic patients at rural based hospital in Gujarat, India. *Indian J Clin Pract*. 2012;22(12):36-44.
  16. Sun GZ, Li Z, Guo L, Zhou Y, Yang HM, Sun YX. High prevalence of dyslipidemia and associated risk factors among rural Chinese adults. *Lipids in health and disease*. 2014; 13(1):1.
  17. Bayram F, Kocer D, Gundogan K, Kaya A, Demir O, Coskun R, Sabuncu T, Karaman A, Cesur M, Rizzo M, Toth PP. Prevalence of dyslipidemia and associated risk factors in Turkish adults. *Journal of clinical lipidology*. 2014; 8(2):206-16.