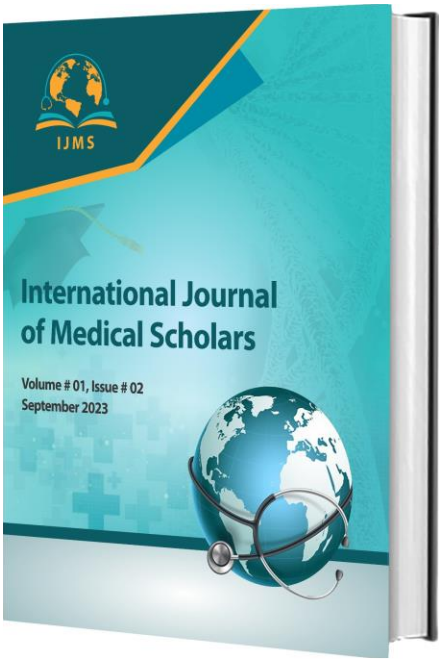
International Journal of Medical Scholars
Article DOI:
Volume 1, Issue 2, September 2023



Dyslipidemia in type 2 diabetic patients with hypertension

Publication History

Received: Apr 07, 2023 Revised: Apr 11, 2023
Accepted: May 18, 2023 Published: Sep 30, 2023

Authors

Kashif Nawaz[1*], Faisal Ramzan[2]
[1]Mayo Hospital, Lahore, Pakistan
[2]CPEIC, Multan, Pakistan
[*]**Corresponding Author Email:**
dr.faisalahmdani@gmail.com

Conflict of Interest:

Author(s) declared no conflict of interest.

Acknowledgment:

No Funding received.

Citation: Nawaz K, Ramzan F. Dyslipidemia in type 2 diabetic patients with hypertension. International Journal of Medical Scholars. 2023 Sep 30; 1(2):7-12.

Please scan me to access online.

An official publication of
Medteach Private Limited, Multan, Pakistan.
Email: info@medteach.org, Website: https://www.medteach.org/index.php/ijms

International Journal of Medical Scholars

Volume 1, Issue 1, 2023; pp: 7-12
Original Article

Dyslipidemia in type 2 diabetic patients with hypertension

Kashif Nawaz[1*], Faisal Ramzan[2]
[1]Mayo Hospital, Lahore, Pakistan
[2]CPEIC, Multan, Pakistan
[*]Corresponding Author Email: dr.faisalahmdani@gmail.com

ABSTRACT

Objective: *to evaluate the dyslipidemia frequency in patients diagnosed with both type 2 diabetes and hypertension.*

Methods: *Study was conducted between March 2022 to February 2023 in one year. Patients with type 2 diabetes and hypertension, with high blood pressure (130/80 mmHg), presented at outpatient department were enrolled. Dyslipidemia is diagnosed based on a laboratory report indicating elevated serum cholesterol levels exceeding 180 mg/dl, serum triglyceride levels surpassing 150 mg/dl, and low HDL cholesterol levels below 40 mg/dl in males and 50 mg/dl in females during fasting lipid profile testing.*

Results: *dyslipidemia presence in 80.7% of patients, with 57.2% showing increased cholesterol levels and 70.3% having elevated triglycerides. Additionally, 80% of patients exhibited low high-density lipids.*

Conclusion: *Patients with Type 2 diabetic combined with hypertension are at a heightened risk of developing dyslipidemia, with the most common abnormal finding in their lipid profile being a low level of high-density lipids (HDL).*

Keywords: *Diabetes type 2, Hypertension, Dyslipidemia, Cholesterol, High density lipids*

1. INTRODUCTION

Type 2 diabetes, a chronic metabolic disorder stemming from insufficient insulin production or action, has seen a notable surge in prevalence globally, with an International Diabetes Federation survey from 2006 indicating around 246 million affected individuals, a figure projected to surpass 380 million within the next two decades. Notably, individuals with type 2 diabetes face a fourfold increase in the risk of cardiovascular diseases, which stand as a leading cause of mortality among diabetic populations.

Numerous past studies have established a strong association between hypertension and abnormal lipid levels, including diabetic dyslipidemia, contributing to cardiovascular mortality. Prolonged dyslipidemia leads to endothelial cell damage, impairing vasomotor function and ultimately fostering atherosclerosis, which can further exacerbate hypertension.

Syndrome X, characterized by elevated levels of insulin, glucose, and triglycerides along with decreased high-density lipoprotein concentrations, has been strongly associated with hypertension, forming a significant risk factor for coronary artery disease. In hypertensive diabetic patients with dyslipidemia, both qualitative and quantitative changes in lipoproteins can occur, emphasizing the critical need for timely identification and proper management to mitigate the heightened risk of stroke and CAD.

The study may highlight the importance of collaborative care models involving multidisciplinary healthcare teams. By collaboration among primary care physicians, endocrinologists, cardiologists, dietitians, and other specialists, healthcare systems can deliver more comprehensive and coordinated care to patients with complex medical needs, including those with concurrent type 2 diabetes, hypertension, and dyslipidemia.

2. METHODOLOGY

A study was conducted at outpatient department of diabetes at Nishtar Hospital Multan over a duration of six months, following ethical approval from the hospital's ethical board and consent obtained from patients after providing detailed descriptions of the study.

Patients with type 2 diabetes and hypertension, with high blood pressure (130/80 mmHg), presented at outpatient department were enrolled. Dyslipidemia is diagnosed based on a laboratory report indicating elevated serum cholesterol levels exceeding 180 mg/dl, serum triglyceride levels surpassing 150 mg/dl, and low HDL cholesterol levels below 40 mg/dl in males and 50 mg/dl in females during fasting lipid profile testing.

Exclusions comprised ischemic heart disease, those with type 1 diabetes, family history of stroke and dyslipidemia, pregnant women, decompensated heart failure, cerebrovascular accident, chronic liver disease, and those refused to participate. Physical examination and detailed medical history were conducted, followed by researcher-administered fasting blood sample collection to investigate dyslipidemia.

Data collected were inputted into SPSS version 27 for analysis, a significance threshold of $p \leq 0.05$ was adopted for determining statistical significance.

3. RESULTS

The analysis included data from 145 patients, with 53.8% being male and 46.2% female. The mean age of the patients was 54.27 years, with a mean body mass index of 28.63 kg/m^2. The average duration of

diabetes was 9.43 years, while hypertension lasted for an average of 8.19 years, and smoking history was measured at 7.87 pack years. Total cholesterol averaged at 202.03 mg/dL, triglycerides at 188.85 mg/dL, and high-density lipids at 38.82 mg/dL. Graph-1 depicted dyslipidemia presence in 80.7% of patients, with 57.2% showing increased cholesterol levels and 70.3% having elevated triglycerides. Additionally, 80% of patients exhibited low high-density lipids, as indicated in Table-2.

Table 1: Lipid profile of study participants

Characteristics	Frequency (Mean ± SD)
Sex	
Male	77 (53.1)
Female	68 (46.8)
Age	54.2±7.9
BMI	29.6±4.9
Diabetes duration	9.4±4.0
Hypertension duration	8.1±2.3
Status of Smoking	7.8±6.6
Level of Cholesterol	202±39.2
Level of Triglycerides	188.8±48.9
HDL	38.7±8.4

Graph 1: Frequency of dyslipidemia in patient population

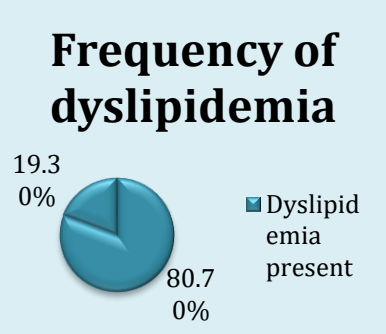


Table 2: Cross tabulation of dyslipidemia and duration of disease

Characteristics		Duration below 8 years N = 62	Duration equal or above 8 years N = 83	P-value
Dyslipidemia	**Yes**	50	67	0.679
	No	12	16	
Hypercholesterolemia	**Yes**	42	41	0.062
	No	20	42	
Hypertriglyceridemia	**Yes**	44	58	0.610
	No	16	27	
Low HDL	**Yes**	49	65	0.867
	No	11	18	

4. DISCUSSION

In this study, patients have 8.19 ± 2.39 years duration of hypertension, with dyslipidemia was observed in 80.7% of cases. A study by Ilanne-Parikka et al[12] in 2004 found that 75% of patients with type 2 diabetes had hypertension alongn with dyslipidemia, emphasizing the importance of targeted therapy for metabolic syndrome. Additionally, Yadav et al[13] reported a dyslipidemia proportion of 64.1% in the population, with hypertension prevalent in 49% of type 2 diabetic patients.

Shrewastwa et al[14] conducted a study on the 108 hypertensive and diabetic combined Nepali nationals, their fasting lipids were evaluated that revealing 90.7% dyslipidemiasuch patients; however, but association was not observed. In a separate study by Ahmad et al[15] in Pakistan, hypertriglyceridemia was observed in 78% of type 2 diabetic patients, with 92 patients exhibiting borderline LDL-cholesterol values.

In a study conducted by Kengne et al[16], an equal ratio of male and female patients was observed, with a mean age of 55.8 ± 10.5 years. Prevalence of metabolic syndrome was 71.7% these patients, with a higher occurrence among female patients. Marjani et al's[17] study in 2011 found that males exhibited a greater susceptibility to hypertension and associated issues compared to females. Additionally, metabolic syndrome

was identified in 76.7% of patients according to IDF criteria.

Janghorbani et al[18] in 2012 conducted a study revealing that among type 2 diabetic patients, dyslipidemia and hypertension were prevalent in females, with 62% dyslipidemia and 77% hypertension. Similarly, Osuji et al[19] study on the Nigerian population reported 55% dyslipidemia in diabetic and hypertensive patients, aligning with the findings of our own research.

In their study, Gilani et al[20] examined 150 diabetic patients, uncovering a notable proportion afflicted with hypertension and dyslipidemia. Their findings suggest that the coexistence of contributing factors like type 2 diabetes, hypertension, and dyslipidemia may foster atherogenic conditions. Moreover, they propose that early intervention and management of these abnormalities could hold promise in mitigating the risk of coronary artery disease (CAD) progression[21].

In their study, Raza et al[22] found that individuals diagnosed with type 2 diabetes mellitus and hypertension face a heightened susceptibility to dyslipidemia, with the most prevalent lipid anomaly being a low (HDL).

Limitations: study design is cross-sectional, it can only provide a snapshot of the relationship between dyslipidemia, type 2 diabetes, and hypertension at a single point in time. Longitudinal studies would be needed to establish causal relationships and observe changes over time.

5. CONCLUSION

Patients with Type 2 diabetic combined with hypertension are at a heightened risk of developing dyslipidemia, with the most common abnormal finding in their lipid profile being a low level of high-density lipids (HDL).

REFERENCES

1. Bingham JM, Black M, Anderson EJ, Li Y, Toselli N, Fox S et al. Impact of telehealth interventions on medication adherence for patients with type 2 diabetes, hypertension, and/or dyslipidemia: a systematic review. Annals of Pharmacotherapy. 2021 May;55(5):637-49.
2. Gheflati A, Bashiri R, Ghadiri-Anari A, Reza JZ, Kord MT, Nadjarzadeh A. The effect of apple vinegar consumption on glycemic indices, blood pressure, oxidative stress, and homocysteine in patients with type 2 diabetes and dyslipidemia: A randomized controlled clinical trial. Clinical nutrition ESPEN. 2019 Oct 1;33:132-8.
3. Fan D, Li L, Li Z, Zhang Y, Ma X, Wu L et al. Effect of hyperlipidemia on the incidence of cardio-cerebrovascular events in patients with type 2 diabetes. Lipids in health and disease. 2018;17(1):1-7.
4. Bramlage P, Lanzinger S, van Mark G, Hess E, Fahrner S, Heyer CH et al. Patient and disease characteristics of type-2 diabetes patients with or without chronic kidney disease: an analysis of the German DPV and DIVE databases. Cardiovascular diabetology. 2019 Dec;18(1):1-2.
5. Lee DH, Yi HC, Bae SH, Cho JH, Choi SW, Kim H. Risk factors for retinal microvascular impairment in type 2 diabetic patients without diabetic retinopathy. PloS one. 2018 Aug 9;13(8):e0202103.
6. Timpel P, Oswald S, Schwarz PE, Harst L. Mapping the evidence on the

effectiveness of telemedicine interventions in diabetes, dyslipidemia, and hypertension: an umbrella review of systematic reviews and meta-analyses. Journal of medical Internet research. 2020 Mar 18;22(3):e16791.

7. Guimarães MF, Rodrigues CE, Gomes KW, Machado CJ, Brenol CV, Krampe SF, Andrade NP, Kakehasi AM. High prevalence of obesity in rheumatoid arthritis patients: association with disease activity, hypertension, dyslipidemia and diabetes, a multi-center study. Advances in Rheumatology. 2019 Oct 28;59.
8. Akalu Y, Belsti Y. Hypertension and its associated factors among type 2 diabetes mellitus patients at Debre Tabor general hospital, northwest Ethiopia. Diabetes, Metabolic Syndrome and Obesity: Targets and Therapy. 2020;13:1621.
9. Sohrab G, Roshan H, Ebrahimof S, Nikpayam O, Sotoudeh G, Siasi F. Effects of pomegranate juice consumption on blood pressure and lipid profile in patients with type 2 diabetes: A single-blind randomized clinical trial. Clinical nutrition ESPEN. 2019 Feb 1;29:30-5.
10. Tsimihodimos V, Elisaf M. Editorial: Secondary dyslipidemias. The Open Cardiovasc Med Journal. 2011;5:43-6.
11. Wu J, Song Y, Li H, Chen J. Rhabdomyolysis associated with fibrate therapy: review of 76 published cases and a new case report. Eur J Clin Pharmacol. 2009;65:1169-74.
12. Ilanne-Parikka P, Eriksson JG, Lindström J, Hamalainen HE, Keinänen-Kiukaanniemi S, Laakso M, Louheranta A, Mannelin M, Rastas M, Salminen V, Aunola S. Prevalence of the metabolic syndrome and its components: findings from a Finnish general population sample and the Diabetes Prevention Study cohort. Diabetes care. 2004 Sep 1;27(9):2135-40.
13. Yadav D, Mishra M, Tiwari A, Bisen PS, Goswamy HM, Prasad GB. Prevalence of dyslipidemia and hypertension in Indian type 2 diabetic patients with metabolic syndrome and its clinical significance. Osong Public Health Res Perspect. 2014 Jun;5(3):169-75. doi: 10.1016/j.phrp.2014.04.009.
14. Shrewastwa MK, Thanpari C, Yadav NK, Mittal RK, Rohil V. Dyslipidemia in type-2 diabetes mellitus patients in western of nepal: A Hospital Based Study. Bali Med J. 2013;2:44.
15. Ahmed N, Khan J, Siddiqui TS. Frequency of dyslipidaemia in type 2 diabetes mellitus in patients of hazara division. J Ayub Med Coll Abbottabad 2008;20(2):51-4.
16. Kengne A.P., Limen S.N., Sobngwi E. Metabolic syndrome in type 2 diabetes: comparative prevalence according to two sets of diagnostic criteria in sub-Saharan Africans. *Diabetol Metab Syndr*. 2012 May 31;4(1):22.
17. Marjani A., Shirafkan A. The metabolic syndrome in type 2 diabetic patients in Gorgan: according to NCEP ATPIII and IDF definitions. *Diabetes Metabol Syndr: Clin Res Rev*. 2011 Apr;5(4):207–210.

18. Janghorbani M., Amini M. Incidence of metabolic syndrome and its risk factors among type 2 diabetes clinic attenders in Isfahan, Iran. *ISRN Endocrinol*. 2012;2012:167318.

19. Osuji C.U., Nzerem B.A., Dioka C.E. Metabolic syndrome in newly diagnosed type 2 diabetes mellitus using NCEP-ATPIII, the Nnewi experience. *Niger J Clin Pract.* 2012 Oct–Dec;15(4):475–480.

20. Fiuza M. Metabolic syndrome and coronary artery disease. Revista Portuguesa de Cardiologia: Orgao Oficial da Sociedade Portuguesa de Cardiologia= Portuguese Journal of Cardiology: an Official Journal of the Portuguese Society of Cardiology. 2012 Nov 6;31(12):779-82.

21. Gilani SY, Bibi S, Ahmed N, Shah SR. Gender differences of dyslipidemia in type 2 diabetics. Journal of Ayub Medical College Abbottabad. 2010 Sep 1;22(3):146-8.

22. Raza A, Virk MA, Yasin A, Azam R. Frequency of dyslipidemia in patients of type 2 diabetes with hypertension in southern punjab tertiary care hospital: Type 2 Diabetes With Hypertension. PAFMJ [Internet]. 2018 Aug. 31 [cited 2024 Feb. 10];68(4):749-54.