DOI: https://doi.org/10.53350/pjmhs2115123156

ORIGINAL ARTICLE

Evaluation of Serum Lipid Profile in Type II Diabetes Patients at Mirpur Khas, Sindh, Pakistan

PIR ABDUL HAYEE[1], KHALIL AHMED MEMON[2], ATTAULLAH[3], MOHAMMAD AKBER HASSAN[4], SHAFAQ ANSARI[5], HABIB-UR-REHMAN CHOHAN[6], KARISHMA KUMARI[7], MARVI[8], ABDUL SAMAD[9]

[1]*Assistant Professor, Department of Medicine, Muhammad Medical College, Mirpurkhas, Sindh, Pakistan*
[2]*Lecturer, Department of Pathology, Liaquat University of Medical Health Sciences, Jamshoro, Sindh, Pakistan*
[3]*Senior Lecturer, Department of Community Medicine, Mekran Medical College Turbat, Baluchistan*
[4]*Associate Professor, Department of Pathology, Baqai Medical University, Karachi, Sindh, Pakistan*
[5]*Assistant Professor,*[6]*Associate Professors, Department of Physiology, Muhammad Medical College, Mirpurkhas, Sindh, Pakistan*
[7]*Final Year MBBS Student, Dow Medical College, DUHS Karachi*
[8]*Assistant Professor, Department of Pharmacology, Faculty of Pharmacy and Health Sciences, University of Balochistan, Quetta*
[9]Assistant Professor, Department of Forensic Medicine& Toxicology, PUMHSW, Nawabshah, District (SBA), Sindh, Pakistan
Correspondence to Dr. Pir Abdul Hayee, Cell: 0335-2831238, Email: drpirabdulhayee@yahoo.com

ABSTRACT

Aim: To assess the serum cholesterol levels of the diabetes patients in the rural areas of the Sindh.
Study design: Prospective observational study
Place and duration of study: Department of Medicine, Muhammad Medical College Hospital, Mirpurkhas Sindh, Pakistan from 1st January 2020 to 31st December 2020.
Methodology: Five hundred and seventeen diabetic type II patients were enrolled in the study after the written informed consent. The serum lipid profile was assessed and analyzed the relation with glycemic values and their treatment. The prescription was also assessed and data were transferred in to data analysis sheet.
Results: There were 368 (71.18%) males and 149 (28.82%) females. Moreover 223(43.13%) patients were aged from 51 to 60 years. Patients had 3 to 6 years of diabetic history (51.26%). Patients had glycemic value 151-200mg/dL (33.27%). One hundred and eighty nine patients had total cholesterol value 201-250 mg/dL. One hundred and seventy six patients were prescribed from Sulphonylurea with 34.04%, 205 patients were prescribed lovastatin (39.65%), 97 patients were prescribed rosuvastatin
Conclusion: The changes in the lipid profile levels of diabetic patients might occur at different ages along with the morbid condition such as diabetes mellitus and condition can be more complicated if not managed properly. The disruption in the serum lipid profile, total cholesterol, triglycerides, LDL, HDL and obesity cannot be ignored the condition is worse in developing countries like Pakistan.
Keywords: Lipid, Diabetes Mellitus, Mirpurkhas, Sindh, Pakistan

INTRODUCTION

Diabetes mellitus (DM) is a chronic disease that is characterized by the metabolic disorder. The diabetes mellitus involves the various other complications.[1] Diabetes mellitus is not an epidemic but it has turned out as the pandemic in the undeveloped countries[2]. The insulin malfunction disabled the production cells that produces the insulin, in response to that the high amount of blood glucose is found in the blood. The High blood glucose levels are known as diabetes mellitus. The disease of high blood glucose levels involves the multiple complications[3]. Most cases of high glucose levels are linked with dyslipidemia, gender-based diabetes effects the patients with cholesterol levels[4].

The type II diabetes mellitus is characterized by the in-sufficient insulin in the body which normally occurs in the adult ages. The numbers of effected people with diabetes increase with every year, according to an estimation the diabetes patients increased from 19 million to the 40 million within 10 years, however the number is projected to increase till 69.9 million by the year 2025.[5] The type II DM not only effect the insulin and pancreatic activities, but also disturbs the other organ of the body, hence causing the various co morbidities. The changes in the lipid profile levels of diabetic patients occur in different ages of diabetes people and affect the patients with multiple complications.[6] The alteration in the serum lipid profile, total cholesterol, triglycerides, LDL, HDL and obesity cannot be ignored.

The high cholesterol levels have the evident risks to develop the coronary artery diseases. The increase in the serum cholesterol levels rises of risks of heart problems, cardiovascular disease and the coronary heart diseases.[7] Although the relationship between has not been researched much, yet the few researchers have worked on the similar issues. The diabetes mellitus patients need to assess their serum levels to reduce the chances of heart problems. The lipid profile is mandatory to be assessed with the blood glucose levels.[8] Type II DM is clearly associated with the serum profile of the patients, and cluster of plasma lipids levels, the abnormalities of lipoprotein. The abnormalities of HDL and LDL are predominance.[9] The pre-diabetic often exhibits the altered pattern of serum levels, and higher cholesterol levels lower levels of HDL cholesterol than the non-diabetic.[10] The reduction in the HDL and serum lipid profile is a multi-factorial part, where the resistance in the insulin is linked with the lipoprotein and reciprocal profile of lipids in the serum. The triglycerides and LDL are the most likely to be linked with impaired glucose levels of the body.[11] The objective of the study was to assess the serum cholesterol levels of the diabetes patients in the rural areas of the Sindh.

Received on 24-06-2021
Accepted on 13-11-2021

MATERIALS AND METHODS

A prospective observational study was conducted at Muhammad Medical College Hospital, Mirpurkhas, Sindh, Pakistan from January 2020 to December 2020 after approval from IRB. A total of 517 diabetic type II patients were enrolled in the study after the written informed consent. The place of study was selected on the basis of flow of diabetic patients. The patients were enrolled from the diabetic out-patient department. The serum lipid profile was assessed and analyzed the relation with glycemic values and their treatment. The prescription was also assessed and data were transferred in to data analysis sheet. The analysis sheet contains gender, age, locality, history, glycemic values, medicines prescribed and serum lipid profile. The data were assessed descriptively by using Microsoft excel and SPSS version 20.

RESULTS

There were 368(71.18%) male patients and 149(28.82%) female patients. One hundred and one (19.54%) patients were aged from 41 to 50 years, 223(43.13%) patients were aged from 51 to 60 years, 129(24.95%) patients were aged from 61 to 70 years and 64 (12.38%) patients were aged more than 70 years. One hundred and eighty two (35.20%) patients had 1 to 3 years of diabetic history, 265 (51.26%) patients had 3 to 6 years of diabetic history,

70(13.54%) patients had more than 6 years of diabetic history. Three hundred and ninety one (75.63%) 391 patients were from urban areas while 126 (24.37%) patients were from rural areas (Table 1).

Thirty six (6.95%) patients had glycemic less than 100mg/dL, 80(15.47%) patients had glycemic between 100-150mg/dL, 172(33.27%) patients had glycemic between 151-200mg/dL, 141(27.27%) patients had glycemic between 201-250mg/dL and 88 (17.20%) patients had glycemic value more than 250mg/dL. Sixty six (12.76%) patients had total cholesterol less than 150mg/dL, 136(26.31%) patients had total cholesterol between 151-200mg/dL, 189(36.56%) patients had total cholesterol between 201-250 mg/dL, 126(24.37%) patients had total cholesterol more than 250mg/dL (Table 2).

Seventy six (14.70%) patients were prescribed from biguanides, 176(34.04%) patients were prescribed from Sulphonylurea, 110(21.28%) patients were prescribed from thiazolidinedione, 88(17.02%) patients were prescribed from Dipeptidyl Peptidase IV Inhibitors and 67(12.96%) patients were prescribed insulin (Table 3).

Sixty nine (13.35%) patients were prescribed atorvastatin, 205(39.65%) patients were prescribed lovastatin, 97 (18.76%) patients were prescribed rosuvastatin, 53 (10.25%) patients were prescribed simvastatin and 93(17.99%) patients were prescribed ezetimibe (Table 4).

Table 1: Demographic information of the patients (n=517)

Variable	No.	%
Gender		
Male	368	71.18
Female	149	28.82
Age (years)		
41 – 50	101	19.54
51 – 60	223	43.13
61 – 70	129	24.95
> 70	64	12.38
History of Diabetes (years)		
1 – 3	182	35.20
3 – 6	265	51.26
> 6	70	13.54
Locality		
Urban	391	75.63
Rural	126	24.37

Table 2: Frequency of post-prandial glycemic and serum total cholesterol

Variable	No.	%
Glycemic (mg/dL)		
< 100	36	6.96
100 – 150	80	15.47
151 – 200	172	33.27
201 – 250	141	27.27
> 250	88	17.02
Total cholesterol (mg/dL)		
< 150	66	12.76
151 - 200	136	26.31
201 – 250	189	36.56
> 250	126	24.37

Table 3: Trend of antidiabetic medications (n=517)

Antidiabetic medications	No.	%
Biguanides	76	14.70
Sulphonylurea	176	34.04
Thiazolidinediones	110	21.28
Dipeptidyl Peptidase IV Inhibitors	88	17.02
Insulin	67	12.96

Table 4: Trend of antilipidemic medications (n=517)

Antilipidemic medications	No.	%
Atorvastatin	69	13.35
Lovastatin	205	39.65
Rosuvastatin	97	18.76
Simvastatin	53	10.25
Ezetimibe	93	17.99

DISCUSSION

The cases of diabetes mellitus are increasing every year, and numbers of effected people complications associated with diabetes are getting worse, the worldwide prevalence of diabetes is increasing by the 10% every year.[12] The researchers have estimated the diabetes patients increased from 19 million to the 40 million within 10 years, however the number is projected to increase till 69.9 million by the year 2025.[13] The type-II DM not only effects the insulin and pancreatic sensitivity but also effects the release of the insulin and performance of pancreases along with the disruption of the other body organs.[14] The alteration in the serum lipid profile, total cholesterol, triglycerides, LDL, HDL and obesity cannot be ignored.

There were 71.18% males and 28.82% females, showing the majority of the male patients in the serum profile with diabetes similarly shown in a study.[15] The gender is associated with the lipid profile disruption since the more numbers of male are affected with the high lipid levels compared with the females as shown in the study.[16] The age is an important factor in the chronic condition like diabetes and associated problem like high cholesterol levels and percentage was the age wise detail of patients enrolled in the study.[17] 19.54% patients were in the age range of 41 to 50 years however 43.13% patients were aged from 51 to 60 years similar to our study.[18] The majority of the patients were among the high ages' groups showing the cholesterol disruption associated with diabetes. and percentage 24% patients were in the age range of 61 to 70 however the 12.3%% cases were seen with the above age of 70 years, similarly the study conducted among the diabetes patients showing the least numbers of patients above the age of 65 years[19].

The changes in the lipid profile levels of diabetic patients occur in different ages of diabetes people, and affect the patients with multiple complications. The glycemic value less than 100 mg/dL were observed among 6.9% of the diabetespatients, the glycemic level of 100-150mg/dL was observed among 15.4% patients. The study showed the quite similar values of glycemic levels among 14.2% of the patients supporting our study.[20] The high glycemic value 151-200 mg/dL were observed among the 33.27% of the cases, and raised values of glycemic levels were observed 201-250mg/dL among the 27.2% cases. The study conducted to evaluate the glycemic levels showed the raised values seen among 29% of the patients which is almost the same as we found in the study.[21] 17% of patients were observed with the highest values of 250mg/dL. The prescription evaluation was also the part of study showing that 14.7% of the patients with managed with the biguanides and more numbers of patients i.e., 34% were prescribed the medication from the class sulfonyl urea similarly the study showed the majority of patients prescribed with class sulfonyl urea.[22] The results revealed that 117% of patients were prescribed with the medication from the class thiazolidinedione. The Dipeptidyl Peptidase IV Inhibitors was seen only among the 17% which showed the similarity in the glycemic reduction levels. Along with the oral medication for the glycemic control the insulin was observed among the 12.9% of the cases which certainly deviates from the results of the study showing higher number of patients with the insulin prescription, might be due the prescribing trend followed by the health care practitioner.[23] High cholesterol levels require the medication therapy to control the lipid profile, along with the management of the diabetes.

The antilipidemic agents controls and manages the levels of the lipid in the body the prescription evaluation made to observe the therapy showed the 13.3% of the patients showed atorvastatin as the first line treatment of the high lipid. Majority of the patients 39.6% of the patients were prescribed with the rosuvastatin which is supported by the study conducted on the anti-lipidemic drugs[24]. Only 10% of the patients were prescribed with simvastatin.

CONCLUSION

The changes in the lipid profile levels of diabetic patients might occur at different ages along with the morbid condition such as diabetes mellitus and condition can be more complicated if not managed properly. The disruption in the serum lipid profile, total cholesterol, triglycerides, LDL, HDL and obesity cannot be ignored the condition is worse in the developing countries like Pakistan. However, the appropriate management, life style modification, following the treatment guidelines can overcome the situation.

REFERENCES

1. Suryawanshi NP, Bhutey AK, Nagdeote AN, Jadhav AA, Manoorkar GS. Study of lipid peroxide and lipid profile in diabetes mellitus. Indian J Clin Biochem 2006; 21(1): 126.
2. Smith S, Lall AM. A study on lipid profile levels of diabetics and non-diabetics among Naini region of Allahabad, India. Turkish J Biochem 2008; 33(11): 138-41.
3. Jain HR, Shetty V, Singh GS, Shetty S. A study of lipid profile in diabetes mellitus. Int J Sci Study 2016; 4(9): 55-60.
4. Bhowmik B, Siddiquee T, Mujumder A, Afsana F, Ahmed T, Mdala IA, Omsland TK. Serum lipid profile and its association with diabetes and prediabetes in a rural Bangladeshi population. Int J Environ Res Public Health 2018; 15(9): 1944.
5. Ugochukwu NH, Babady NE, Cobourne M, Gasset SR. The effect of Gongronemalatifolium extracts on serum lipid profile and oxidative stress in hepatocytes of diabetic rats. J Biosci2003; 28(1), 1-5.
6. Hussain A, Ali I, Ijaz M, Rahim A. Correlation between hemoglobin A1c and serum lipid profile in Afghani patients with type 2 diabetes: hemoglobin A1c prognosticates dyslipidemia. TherapAdvan Endocrinol Metabol2017; 8(4): 51-57.
7. Arab G, Zahedi A, Kazemi NM, Sanagoo V, Azimi M. Correlation between hemoglobin a1c and serum lipid profile in type 2 diabetic patients referred to the diabetes clinic in gorgan, iran. J Clin Basic Res 2018; 2(1): 26-31.
8. Zabeen B, Balsa AM, Islam N, Parveen M, Nahar J, Azad K. Lipid profile in relation to glycemic control in type 1 diabetes children and adolescents in Bangladesh. Indian J Endocrinol Metab2018; 22(1): 89.
9. Kianbakht S, Dabaghian FH. Improved glycemic control and lipid profile in hyperlipidemic type 2 diabetic patients consuming Salvia officinalis L. leaf extract: a randomized placebo. Controlled clinical trial. Complementary Therap Med 2013; 21(5): 441-6.
10. Tagoe DNA, Amo-Kodieh P. Type 2 diabetes mellitus influences lipid profile of diabetic patients. Ann Biol Res 2013; 4(6): 88-92.
11. Jarab AS, Alqudah SG, Mukattash TL, Shattat G, Al-Qirim T. Randomized controlled trial of clinical pharmacy management of patients with type 2 diabetes in an outpatient diabetes clinic in Jordan. J Managed Care Pharmacy 2012; 18(7): 516-26.
12. De Pablos PL, Martinez J, Martinez MP, Doreste JA. Prevalence of micro-and macroalbuminuria in a Canarian population of type 2 diabetic patients. Relationship with blood pressure, lipid profile, obesity and metabolic control. Diabetes Metabol 1998; 24(4): 337-43.
13. Wallymahmed ME, Morgan C, Gill GV, Macfarlane IA. Nurse-led cardiovascular risk factor intervention leads to improvements in cardiovascular risk targets and glycaemic control in people with Type 1 diabetes when compared with routine diabetes clinic attendance. Diabetic Med 2011; 28(3): 373-379.
14. Sh Y, Larijani B, Bastanhagh MH, Pajouhi M, Zahedi F, Zendehdel K, Akrami SM. Metabolic and clinical effects of Ramadan fasting in patients with type II diabetes. JCPSP (2003; 13(6): 329-32.
15. Nigam PK. Serum lipid profile: fasting or non-fasting?.Indian J Clin Biochem2011; 26(1): 96-7.
16. Ihedioha JI, Noel-Uneke OA, Ihedioha TE. Reference values for the serum lipid profile of albino rats (Rattus norvegicus) of varied ages and sexes. Comparative Clin Pathol2013; 22(1): 93-9.
17. Sahu S, Abraham RE, Vedavalli R, Daniel MARY. Study of lipid profile, lipid peroxidation and vitamin E in pregnancy induced hypertension. Indian J PhysiolPharmacol2009; 53(4): 365-9.
18. Tsimihodimos V, Bairaktari E, Tzallas C, Miltiadus G, Liberopoulos E, Elisaf M. The incidence of thyroid function abnormalities in patients attending an outpatient lipid clinic. Thyroid 1999; 9(4): 365-8.
19. Michos ED, McEvoy JW, Blumenthal RS. Lipid management for the prevention of atherosclerotic cardiovascular disease. NEJM 2019; 381(16): 1557-67.
20. Lin SH, Cheng PC, Tu S, Hsu SR, Cheng YC, Liu YH. Effect of metformin monotherapy on serum lipid profile in statin-naïve individuals with newly diagnosed type 2 diabetes mellitus: a cohort study. Peer J 2018; 6: e4578.
21. Bule M, Albelbeisi AH, Nikfar S, Amini M, Abdollahi M. The antidiabetic and antilipidemic effects of Hibiscus sabdariffa: A systematic review and meta-analysis of randomized clinical trials. Food Res Int 2020; 130: 108980.
22. Kingcade A, Ahuja N, Jefferson A, Schaffer PA, Ryschon H, Cadmus P, Ramsdell H. Morbidity and mortality in Danio rerio and Pimephalespromelas exposed to antilipidemic drug mixtures (fibrates and statins) during embryogenesis: Comprehensive assessment via ante and post mortem endpoints. Chemosphere 2021; 263: 127911.
23. Asghar N, Mushtaq Z, Arshad MU, Imran M, Ahmad RS, Hussain SM. Phytochemical composition, antilipidemic and antihypercholestrolemic perspectives of Bael leaf extracts. Lipids Health Dis 2018; 17(1): 1-9.
24. Zahoor M, Bari WU, Zeb A, Khan I. Toxicological, anticholinesterase, antilipidemic, antidiabetic and antioxidant potentials of Grewia optiva Drummond ex Burret extracts. J Basic Clin PhysiolPharmacol2020; 31(2).