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Research Article

**ASSOCIATION OF GLYCEMIC INDEX WITH THE
PROBLEMS FACED BY DIABETIC PATIENTS OF BAHAWAL
VICTORIA HOSPITAL, BAHAWALPUR PAKISTAN****Muhammad Shahrukh Qaisrani¹, Anam Laraib², Shehroz Masood³**
¹⁻³ Quaid-e-Azam Medical College, Bahawalpur, Pakistan**Abstract:**

Diabetes is a metabolic disorder portrayed by abnormal fuel metabolism which results most notably in hyperglycemia and dyslipidemia due to defect in Insulin secretion, insulin action or both. The chronic hyperglycemia of diabetes is associated with long term damage, dysfunction and failure of various organs especially eyes, kidneys, nerves, heart and blood vessels.

***Objective:** To find out the association of glycemic index with the symptoms and complications of diabetes.*

***Methodology:** A hospital based observational study was conducted from 2.02.2017 to 3.10.2018 in the medical, surgical ward and medical OPD of Bahawalpur Victoria Hospital (B.V.H), Bahawalpur. To check the extent of diabetic control we collected patient's blood samples for the testing of HbA1C levels and early morning samples for lipid profile. The levels were analyzed in the pathology department of Q.A.M.C (Quaid-E-Azam Medical College), B.V.H and the data obtained was eventually analyzed through Spss version 20.*

***Results:** A majority (72.7%) of the patients had normal or near normal blood pressures, in the range of 120/80 mmHg – 125/85 mmHg. (72.7%); while 36 patients suffered from high blood pressure (140/95 mmHg). A large number of participants complained about lethargic feeling most of the time (54.1%) in addition to difficulty in memorizing things and a cognitive decline (47.3%). Apart from malaise and lethargy most of the time some of the patients reported moderate degree of generalized pain in body (47.7%), followed by mild degree of pain (38.6%). General outlook and health of the patients was found to be fair (60.5%) according to our study criteria, while some had very poor general health.*

***Conclusion:** The patients who adopted healthy lifestyle, practiced more precautionary measures and followed dietary schedule of diabetes showed good diabetic control and delayed complications of the disease. The patients who had a good glycemic control had less symptoms and less complications of diabetes.*

***Key words:** Diabetes Mellitus, Hyperglycemia, Glycemic index.*

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INTRODUCTION:

Diabetes is becoming a severe health problem in the world and its prevalence is increasing day by day. According to international diabetes federation, the prevalence of diabetes was 415 million in 2017, narrated in diabetes atlas and this number is expected to eventually rise to 642 million by the year 2040. Underdeveloped countries are facing the greatest burden of it [1].

Approximately 7 million Pakistani people are suffering from diabetes mellitus and it is estimated that this number will increase to 13 million by the year 2025 according to diabetes atlas.

Diabetes mellitus is considered to be the leading cause of morbidity and mortality in the world. Diabetes as such is not a harmful disease if monitored strictly [2].

Prolonged and elevated levels of glucose in the blood results in serious diabetic complications and sometimes even death. Diabetics are advised to check their blood sugar level daily for proper monitoring. A complete history of blood glucose results help patient and his physicians in controlling the disease. Failure to maintain strict testing can accelerate the signs and symptoms of this multifactorial disorder [4]. It is therefore recommended that diabetics should strictly monitor their glucose levels regularly.

Uncontrolled diabetes can lead to severe complications and problems for the patients [4]. The general complaints of diabetic patients may range from mild symptoms such as nausea, vomiting, abdominal pain, weakness, generalized body aches to moderate or severe symptoms such as increased urination (polyuria), increased appetite (polyphagia), increased thirst (polydipsia), night disturbance, dehydration, ketoacidosis, neuropathies, nephropathies, retinopathies, diabetic foot and atherosclerosis [5].

The reason for these problems and complications is poor diabetic control due to lack of knowledge, indifferent attitude towards the disease and insufficient preventative practice [6]. Good diabetic control can be achieved by different measures strictly followed by diabetic patients. These measures include regular glucose and lipid profile checkup, strict diet control, proper medication and exercise.

Glycemic control plays the key role in diabetes management. Good glycemic control means that glucose levels (both random and fasting) are always in normal range. As blood glucose levels fluctuate

throughout the day the percentage of hemoglobin which glycosylated (HbA1C) is used as indicator of long term glycemic control in research trials and clinical care of patients [7].

Poor glycemic control means elevated blood glucose levels and glycosylated hemoglobin which may range from 200-500 mg/dl and 9-15 % respectively according to diabetic atlas.

In this study we have estimated the association of glycemic control and lipid profile and their influence on the health of the individuals in terms of symptomatology. Hence, having taken all the above into consideration the aim of this study is to critically evaluate whether glycemic control and lipid profile is associated with the problems (polyuria, polydipsia, neuropathy nephropathy, retinopathy etc.) faced by diabetic patients.

MATERIAL AND METHODOLOGY:

A hospital based observational study was conducted from 2.2.2016 to 3.10.2017 in the out patients department, surgical and medical wards of Bahawal Victoria Hospital (B.V.H), Bahawalpur. Sample population of the study 218. The people who were diabetic and willing for interview were included in our study. People with emergency conditions and unwilling for interview were excluded. Included in our exclusion criteria. The questionnaire included questions regarding the lifestyle of diabetic patients which evaluated their knowledge, attitude and practices regarding their disease. Questions regarding the topic under study were asked from the patients after taking consent. Specifically, the patients were asked about the presence of polyuria, polydipsia, diabetic neuropathy, ongoing vision or hearing problems, cardiovascular problems, etc. After the completion of one questionnaire from an individual patient, 4-5 cc of (random) blood sample was withdrawn from the arm of patient which was subsequently tested for HbA1C levels and lipid profile. The blood sample collected in the syringe was transferred to a vial. For lipid profile testing, sample was centrifuged in pathology department of B.V.H Bahawalpur. After attainment of all the readings, the data was analyzed by Spss software (version-23). The study was ethically approved by department of medical education of B.V.H, Bahawalpur.

RESULTS:

Amongst the 218 patients included in the study, there were 113 male patients and 105 female patients. In the study a staggering number of patient which we interviewed were illiterate (182) while a small

number of participants had some form of primary or secondary education. Participants were mostly obese (64%), while some (36%) suffered from malnourishment as well.

A majority (72.7%) of the patients had normal or near normal blood pressures, in the range of 120/80 mmHg – 125/85 mmHg. (72.7%); while 36 patients suffered from high blood pressure (140/95 mmHg).

Most of the patients included in our study suffered from type 2 diabetes (74.5%), while only 54 patients were suffering from type 1 diabetes (24.5%). Most of them already had family history of diabetes (57.3%).

The study emphasizes upon the glycemic index and the problems faced on daily basis by a diabetic patient. A large number of participants complained about lethargic feeling most of the time (54.1%) in addition to difficulty in memorizing things and a cognitive decline (47.3%). Apart from malaise and lethargy most of the time some of the patients reported moderate degree of generalized pain in body (47.7%), followed by mild degree of pain

(38.6%). General outlook and health of the patients was found to be fair (60.5%) according to our study criteria, while some had very poor general health.

The classical signs of diabetes mellitus i.e. polydipsia, polyuria and polyphagia were found in the study subjects with 168 subjects complaining of polydipsia (76.4%), 97 patients complaining of increased hunger (44.1%) and 161 (73.2%) patients complaining of complaining of increased urination.

Study subjects had mostly had a problem of persistent headache (55%) and a lot of the participants found it hard to sleep at night (66.4%).

Diaphoresis was commonly experienced by subjects and most of them complained of drenching their bed sheets in sweat when trying to sleep at night.(51.4%)

Although exercise forms a vital preventative measure against diabetes type 2, it was heart rending to come to know that a very less number of individuals actually knew the importance of exercise in their daily lives (87.3%).

Table-1: Extent of glycemic control among diabetics

HbA1cCat		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	good control	47	21.4	21.4	21.4
	moderate control	57	25.9	25.9	47.3
	poor control	116	52.7	52.7	100.0
	Total	220	100.0	100.0	

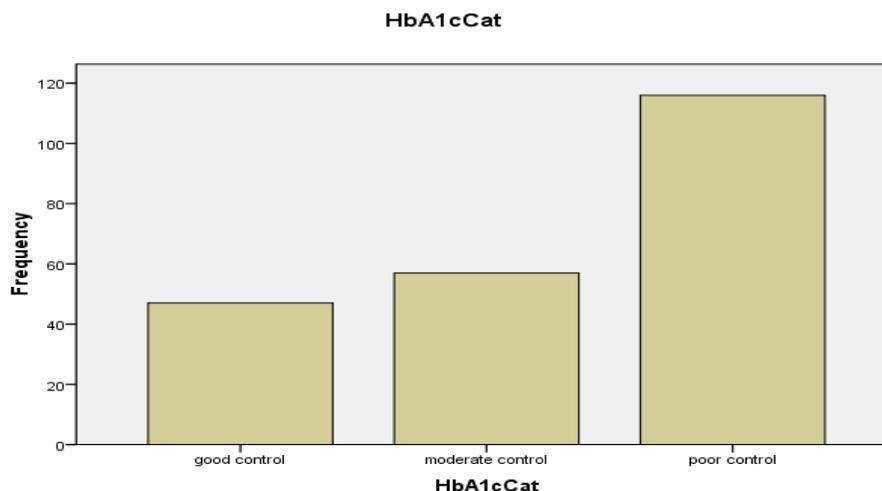
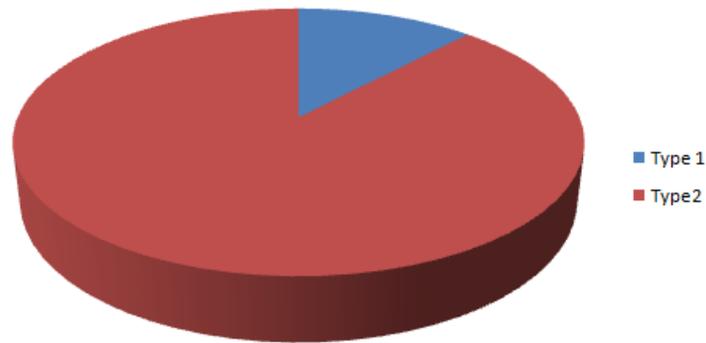


Fig 1: Spectrum of varying diabetic control among diabetic patients

Table-2: Heart disease and type of Diabetes mellitus (Cross tabulation)

Any heart disease	Type of Diabetes mellitus		Total
	Type 1	Type 2	
No	42	76	118
Yes	12	88	100
Total	54	164	218

Heart Disease**Table-3: Statistics of HbA1c value**

Valid	218
Missing	0
Mean	10.4789
Std. Deviation	3.57504

Table-4: Patients with no diabetic retinopathy and with diabetic retinopathy

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No problem	77	35.0	35.0
	A little bit	70	31.8	66.8
	Much	73	33.2	100.0
	Total	220	100.0	100.0

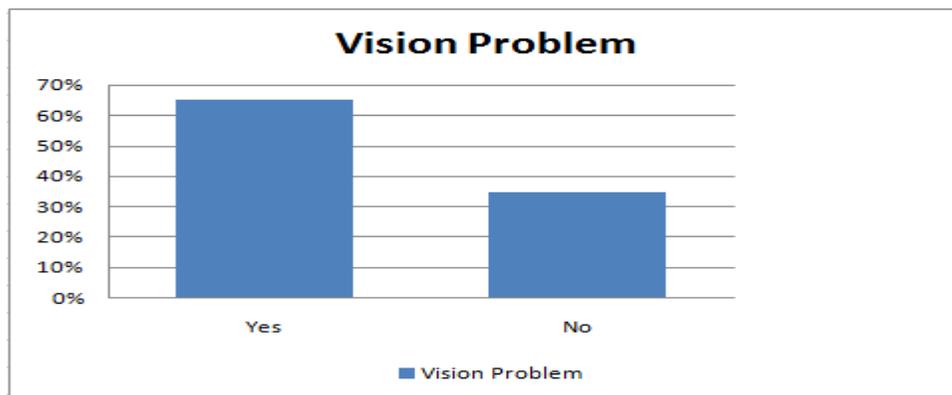


Fig.3: Percentage of diabetics having vision problems

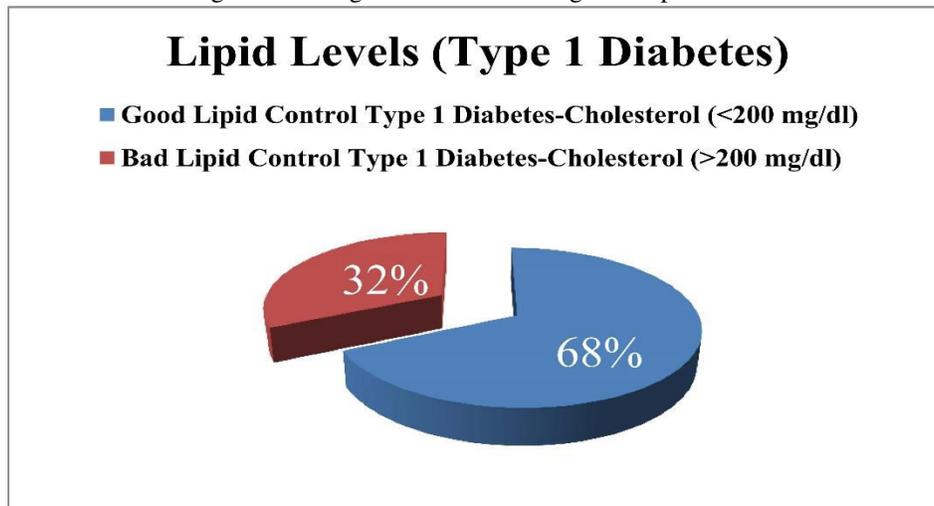


Fig.4: Lipid control in type 1 Diabetics

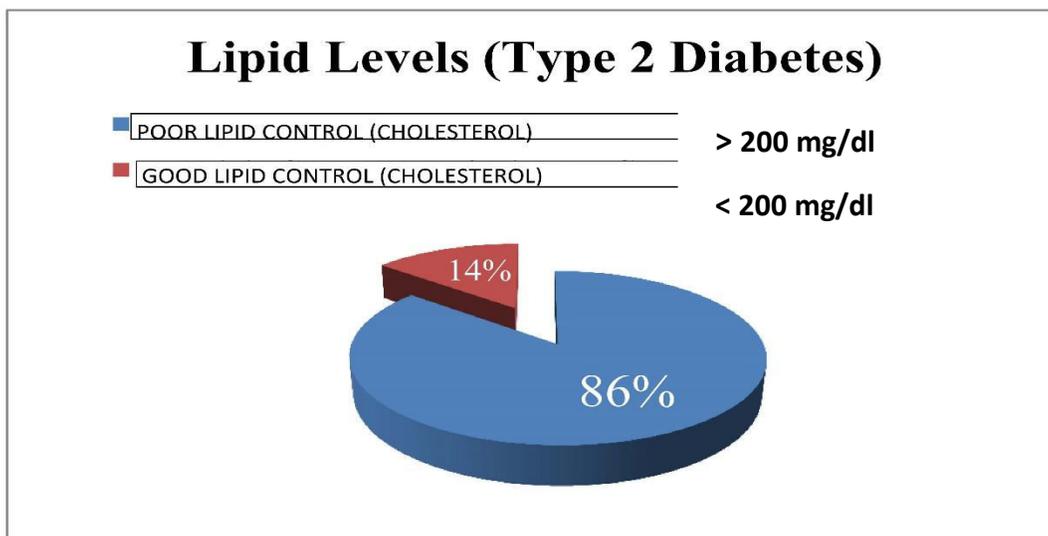


Fig.4: Lipid control in type 2 Diabetics

DISCUSSION:

Diabetic patients should have basic knowledge of the treatment of diabetes mellitus, how to manage it and what is necessary to achieve this. Basic knowledge of diabetes is considered a prerequisite for self-care management. Every diabetic patient should, at a least, know about the disease condition, complications, treatment options and dietary adjustment. This concept is supported by earlier studies, which suggested that patients with chronic diseases who are well aware of their disease state and are active participants in their health care have better health outcomes in every aspect.

Santos et al [11] reported that glycemic control does not correlate with knowledge of diabetes. They suggested that theoretical understanding of diabetes

is not by itself significantly associated with appropriate glycemic control. In a similar study conducted on Brazilian adolescents the results of the average HbA1c are as follows:

The HbA1c level in subjects in the present study was $9.3 \pm 2.3\%$ (mean \pm SD), ranging from 5.8 to 16.1%. Of the subjects, 65 (76.5%) had HbA1c levels $>7.5\%$, and 20 (23.5%) $\leq 7.5\%$. while the mean HbA1c value for our subjects in study came out to be 10.4 ± 3.5 . In a similar study conducted in UK the results were almost near to our study.

In our study, Uncontrolled diabetes mellitus included vision problems such as retinopathy (in 33.2%) of individuals and most of the had undergone cataract surgery. In a similar study conducted in Ethiopia the

results were 40.1%, which were more than our study.

According to our study, polydipsia, polyuria and polyphagia were found in the study subjects with 168 subjects complaining of polydipsia (76.4%) 97 patients complained of increased hunger (44.1%) and 161 (73.2%) patients complaining of complaining of increased urination .In a similar study conducted in India, the results were almost same as our study was.

Diabetes has been shown to be associated with grave complications such as neuropathy, retinopathy, nephropathy and mild to moderate cardiac problems. In a similar study conducted in Colorado school of medicine it has been shown that diabetes is associated with significant cardiovascular complications such as hypertension, cardiomyopathy and peripheral vascular disease. This correlates well with the results of our study in which 12 patients of type 1 diabetes and 88 patients of type 2 diabetes had significant cardiovascular complications.

In our study, most of the patients complained of drenching their bed sheets in sweat when trying to sleep at night.(51.4%).In a similar study conducted in India, the results were slightly variable.it was about 43.5%.

Exercise and active lifestyle modifications play a crucial role in the control of dyslipidemia and subsequently in the control of diabetes. As in the non-diabetic population, epidemiological studies have shown that increased LDL and non-HDL cholesterol levels and decreased HDL cholesterol levels are associated with an increased risk of cardiovascular disease in patients with diabetes [1, 8]. In our study it has been clearly elicited that exercise has a positive effect in the reducing the harmful effects of type 2 diabetes mellitus and in controlling dyslipidemia.

CONCLUSION:

Our research highlights the fact that the patients who adopted healthy lifestyle, practiced some form of physical exercise and did precautionary measures showed good diabetic control and delayed complications of the disease. Proper control and treatment of DM, along with aggressive treatment of associated CV risk factors is central to curbing the growing prevalence and progression of diabetes mellitus Additional research is needed to better understand the The complications were early and more pronounced in those who were illiterate, non-compliant and had low socioeconomic status. The

control was satisfactory in those who were educated and compliant. Hence, patient's perception, knowledge attitude and practices towards the disease all influence the ultimate impact in aggravating or diminishing the deleterious effects of diabetes mellitus. Proper patient counselling session should be arranged in order to increase their awareness about the disease and hence achieve a better glycemic control.

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