



## Original Article

### Profile of type-2 diabetes mellitus with and without complications

Authors

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#### Abstract

**Objective:** To describe the profile of type-2 diabetes patients.

**Methods:** This was a cross-sectional study conducted in tertiary care hospital. A total of 50 cases of diabetes with and without complication with 35-75 years of age were included in the study. The data was collected in a proforma which includes IPD/OPD no. various socio-economic parameters like name, age, sex, occupation, religion as well as detailed medical examinations and laboratory investigations.

**Results:** Overall, 40% of the cases had any one of the complications. The complication was higher among 51-60 years (57.1%) than 41-50 (42.3), >60 (36.4%) and <40 (16.7%) years. The complication was higher among males (44%) compared with females (36%). The level all the biochemical parameters were significantly ( $p < 0.05$ ) higher among the cases of complications compared with without complications.

**Conclusions:** It is concluded from the results of this study that the rate of complications are higher in case of poor glycaemic control as compared to good glycaemic control in type 2 diabetes mellitus patients.

**Keywords:** Type-2 diabetes, Complications, Glycaemic control.

#### Introduction

Diabetes mellitus is characterized by hyperglycemia, glycosuria, hyperlipidemia, negative nitrogen balance and sometimes ketonemia (Powers, 2008). Major consequence of hyperglycemia is excessive non enzymatic glycosylation of various body proteins including hemoglobin, albumin, collagen and elastin. Apart from hyperglycemia, DM is also characterized by oxidative stress, inflammation and insulin resistance. Chronic hyperglycemia

from any cause can lead to a number of complications like cardiovascular, renal, neurological or ocular pathology, intercurrent infection and lower extremity complications. After adjusting for age, the death rate of people with T2DM is about twice as high as their non-diabetic peers. Nearly 50-80% of all diabetics die of cardiovascular disease, stroke, or renal failure (Agewall et al, 1997).

Type 2 diabetes accounts for about 90-95% of all diagnosed cases of diabetes. Type 2 diabetes

is characterized by insulin resistance and ongoing decline in  $\beta$ -cell function, glucose levels likely will worsen over time and treatment must be dynamic as therapeutic requirements increase with longer duration of disease. Type 2 diabetes develops in individuals who fail to compensate for insulin resistance by increasing pancreatic insulin secretion. Then, insulin deficiency results from pancreatic  $\beta$ -cell dysfunction and death (Cnop, 2008).

Complications of type 2 diabetes include acute and chronic complications. The acute complications comprise diabetic ketoacidosis, hyperosmolar hyperglycemic non ketotic coma, lactic acidosis and hypoglycemia. The chronic complications include diabetic retinopathy, diabetic neuropathy and cardiovascular disease (Yassin et al., 2011).

Glycated hemoglobin (HbA1c) is a routinely used marker for long-term glycemic control as an indicator for the mean blood glucose level. HbA1c predicts the risk for the development of diabetic complications in diabetes patients. Apart from classical risk factors like dyslipidemia, elevated HbA1c has now been regarded as an independent risk factor for CVD in subjects with or without diabetes. Estimated risk of CVD has shown to be increased by 18% for each 1% increase in absolute HbA1c value in diabetic population (Selvin et al, 2005).

The present study was designed to describe the profile of type-2 diabetes patients.

### Materials and Methods

This was a cross-sectional study conducted in tertiary care hospital. A total of 50 cases of diabetes with and without complication with 35-75 years of age were included in the study. Patients with chronic alcoholics, smokers, juvenile Diabetes/ H/Type 1 Diabetes, Gestational Diabetes, adverse Renal & Liver Disease and acute & chronic inflammatory disease & Malignancy were excluded from the study.

Ethical approval was obtained before starting the study. Written consent was obtained from the participants after they were given an explanation of the study details. The data was collected in a proforma which includes IPD/OPD no. various socio-economic parameters like name, age, sex, occupation, religion as well as detailed medical examinations and laboratory investigations.

Under aseptic conditions 10ml of venous blood was collected. Out of this, 1 ml was collected in EDTA bulb after overnight fasting for estimation of HbA1c and remaining sample is allowed to centrifuged (3,000 rpm, for 20 min at 4deg.C) to obtain serum that was also stored at 80<sup>0</sup>C for further biochemical measurements. Urine was also collected in clean container for microalbumin& routine, microscopic test. Standard methods were used to measure the biochemical parameters.

### Statistical Analysis

Data were entered in a Microsoft Excel spreadsheet. All the entries were checked for any keyboard error. Data available were analysed by simple statistical means like percentage, mean and total number. All data processing was done using SPSS 16.0 version. The mean and SD was estimated for each of the lipid parameters. The comparison between complication and without complication of cases was carried out by using the student "t-test". Chi-square test was used to compare categorical variables between complication and without complication. The p-value was set at 0.05.

### Results

Overall, 40% of the cases had any one of the complications. The complication was higher among 51-60 years (57.1%) than 41-50 (42.3), >60 (36.4%) and <40 (16.7%) years. The complication was higher among males (44%) compared with females (36%) (Table-1).

The level all the biochemical parameters were significantly ( $p < 0.05$ ) higher among the cases of complications compared with without complications (Table-2).

**Table-1:** Age and gender distribution of cases according to complications

	No. of patients	With complication		Without complication	
		No.	%	No.	%
<b>Age in years</b>					
<40	6	1	16.7	5	83.3
41-50	26	11	42.3	15	57.7
51-60	7	4	57.1	3	42.9
>60	11	4	36.4	7	63.6
Total	50	20	40.0	30	60.0
<b>Gender</b>					
Male	25	11	44.0	14	56.0
Female	25	9	36.0	16	64.0

p=0.50

**Table-2:** Comparison of biochemical parameters according to complications

	With complication (n=20)	Without complication (n=30)	p-value
FBS	175.85±81.50	86.53±15.83	0.0001*
PPBS	270.35±81.97	133.43±26.64	0.0001*
TC	208.95±49.97	153.07±20.96	0.0001*
TG	219.75±98.42	114.30±44.09	0.0001*
HDL	45.30±12.01	39.63±5.61	0.02*
LDL	119.80±49.90	90.73±18.97	0.006*
VLDL	43.82±19.68	22.70±8.82	0.0001*
HbA1C	9.21±1.93	6.31±0.43	0.0001*

\*Significant

## Discussion

ADA (American Diabetic association) has reported that well controlled type 2 diabetics have a mixed hyperlipidemia with high triglycerides, low HDL-C and high LDL-C levels (Perez et al, 2006). On the other hand, in poorly controlled type 2 diabetics have a mixed dyslipidemia resulting in high cholesterol and triglyceride level. It has also been reported that controlling dyslipidemia and good glycemic control delays atherosclerosis and prevent CHD (Alagozlu et al, 2005).

In the present study, there was no association between age and gender with diabetes with and without complication. However, increased level of HbA1c and lipid level was observed between with complication and without complication. Most of the studies have not compared this, so that findings of this study cannot be compared with other studies. Khan et al. (2007) reported the impact of glycemic control on various lipid parameters and observed the significant alterations in all lipid parameters with regard to glycemic control. The severity of dyslipidemia

increases in patients with higher HbA1c value. Elevated levels of HbA1c and dyslipidemia are independent risk factors of cardiovascular diseases and hence, diabetic patients.

## Conclusion

It is concluded from the results of this study that the rate of complications are higher in case of poor glycaemic control as compared to good glycaemic control in type 2 diabetes mellitus patients.

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