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Prevalence of pre-diabetes and cardio-metabolic risk factors in first degree relatives of patients with type-II DM

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Abstract
Background: It is evident that first degree relatives (FDRs) of people with type 2 diabetes are at greater cardiovascular and diabetes risk. The present study was conducted to assess prevalence of pre-diabetes and cardio-metabolic risk factors in first degree relatives of patients with type-II diabetes mellitus.
Materials & Methods: 80 first degree relatives of patients suffering from Type 2 DM of both genders were included. Parameters such as fasting lipid profile, fasting blood sugar (FBS), post prandial blood sugar (PPBS), glycated haemoglobin (HbA1c) was recorded.
Results: Out 80 patients, males were 50 and females were 30. Age group 30-34 years had prediabetics seen in 7, 35-39 years in 10, 40-44 years in 8 and 45-49 years in 10. Diabetes was absent in 10 in age group 30-34 years, 12 in age group 35-39 years, 11 in age group 40-44 years and 12 in age group 45-49 years. The mean value in subjects with absent diabetes and present diabetes of BMI (kg/m2) was 23.5 and 26.2, FBS (mg/dl) was 92.8 and 112.4 and HbA1c (%) was 5.1 and 5.9, LDL (mg/dl) was 128.2 and 148.2, HDL (mg/dl) was 43.8 and 35.7, TG (mg/dl) was 132.5 and 152.4 respectively. The difference was significant ($P< 0.05$).
Conclusion: There was high prevalence of prediabetes and other cardio metabolic risk factors in first degree relatives of patients with type 2 DM patients.

Keywords: Diabetes, cardiovascular disease, relatives

Introduction
Diabetes refers to a group of metabolic diseases characterized by hyper glycemia resulting from defect sin insulin secretion, insulin action, or both [1]. The chronic hyperglycemia of diabetes is associated with long-term damage, dysfunction, and failure of different organs, especially the eyes, kidneys, nerves, heart, and blood vessels [2]. Diabetes encompasses a range of heterogeneous metabolic disorders characterized by the inability of the body to assimilate glucose and maintain glucose homeostasis. Diabetes has been traditionally subdivided into: Type 1 DM or Insulin-dependent DM and Type2 DM or Non-Insulin Dependent DM [3].
It is evident that first degree relatives (FDRs) of people with type 2 diabetes are at greater cardiovascular and diabetes risk. There is a high prevalence of pre-diabetes in relatives of type-2 diabetes mellitus patients observed in many western studies [4]. There are only few Indian studies done on this topic. The prevalence of Diabetes is on rise worldwide. Type 2 DM is the more prevalent form of diabetes [5]. Research indicates that in addition to the lifestyle factors, there is a significant genetic predisposition amongst the cases of Type 2 DM, as evidenced by higher risk with positive family history and concordance at in twins. Recently, it has also been realized that the Diabetes and cardiovascular diseases may have interlinked under lying mechanism, in addition to multiple common risk factors [6]. The present study was conducted to assess prevalence of pre-diabetes and cardio-metabolic risk factors in first degree relatives of patients with type-II diabetes mellitus.

Materials and Methods
The present study comprised of 80 first degree relatives of patients suffering from Type 2 DM of both genders. All were informed regarding the study and their written consent was

Obtained. Data such as name, age, gender etc. was recorded. Assessment of weight (Kg) and height (cm) and BMI was done. Waist circumference and Waist: hip ratio was also calculated. Supine blood pressure was recorded in all subjects. Other variables such as fasting lipid profile, fasting blood sugar (FBS), post prandial blood sugar (PPBS), glycated haemoglobin (HbA1c) was performed. Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table 1: Distribution of patients

Total- 80		
Gender	**Males**	**Females**
Number	50	30

Table 1 shows that out of 80 patients, males were 50 and females were 30.

Table 2: Diabetes status

Age group (years)	Diabetes absent	Diabetes present	P value
30-34	10	7	0.05
35-39	12	10	
40-44	11	8	
45-49	12	10	
Total	45	35	

Table 2, figure 1 shows that age group 30-34years had prediabetics seen in 7, 35-39 years in 10, 40-44 years in 8 and 45-49 years in 10. Diabetes was absent in 10 in age group 30-34 years, 12 in age group 35-39 years, 11 in age group 40-44 years and 12 in age group 45-49 years. The difference was significant (*P*< 0.05).

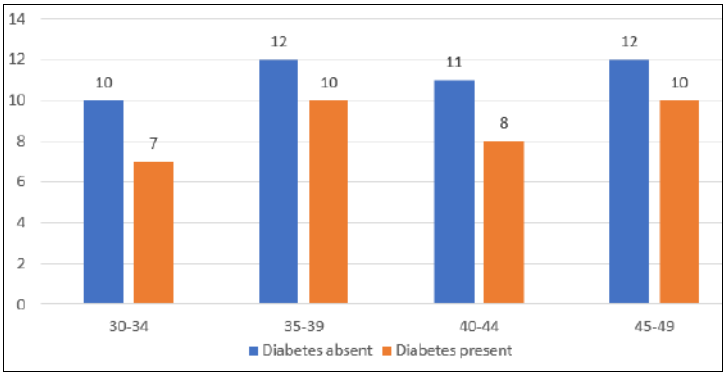

Fig 1: Diabetes status

Table 3: Comparison of parameters

Parameters	Diabetes absent	Diabetes present	P value
BMI (kg/m2)	23.5	26.2	0.05
FBS (mg/dl)	92.8	112.4	0.02
HbA1c (%)	5.1	5.9	0.94
LDL (mg/dl)	128.2	148.2	0.03
HDL (mg/dl)	43.8	35.7	0.02
TG (mg/dl)	132.5	152.4	0.05

Table 3, figure 2 shows that the mean value in subjects with absent diabetes and present diabetes of BMI (kg/m2) was 23.5 and 26.2, FBS (mg/dl) was 92.8 and 112.4 and HbA1c (%) was 5.1 and 5.9, LDL (mg/dl) was 128.2 and 148.2, HDL (mg/dl) was 43.8 and 35.7, TG (mg/dl) was 132.5 and 152.4 respectively. The difference was significant (*P*< 0.05).

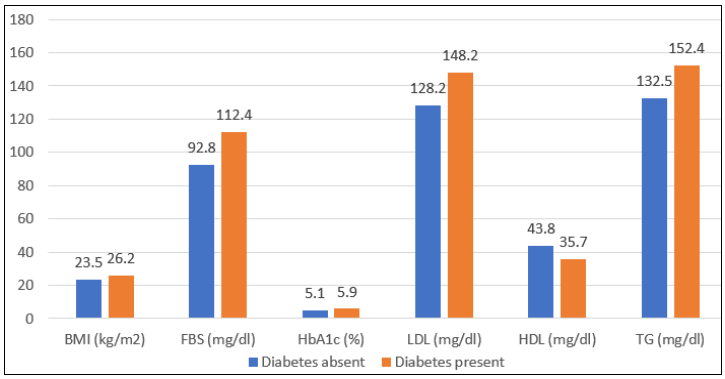

Fig 2: Assessment of parameters

Discussion

Metabolic syndrome (MetS) is an important public health problem worldwide, and its prevalence is increasing. Patients with MetS are at greater risk of cardiovascular disease and type 2 diabetes [7, 8]. According to the International Diabetes Federation, approximately 415 million people were suffering from diabetes worldwide, and this number is expected to exceed 640million by the year 2040 [9]. It is estimated that half of patients with diabetes are unaware of their disease and are thus more prone to developing diabetic complications. Type2 DM has become an observably global public health problem [10, 11]. The present study was conducted to assess prevalence of pre-diabetes and cardio-metabolic risk factors in first degree relatives of patients with type-II diabetes mellitus.

We found that out of 80 patients, males were 50 and females

were 30. Meamar *et al.* [12] evaluated the association the of MestS Z-score in first degree relatives (FDRs) of T2DM with the risk of prediabetes and type 2 diabetes in future. A prospective open cohort study was conducted between 2003-2018. At baseline, the sample comprised of 1766 FDRs of patients with T2DM who had a normal glucose tolerance test. Baseline MetS Z-scores were associated with the its latest values ($P < 0.0001$). Compared with individuals who were T2DM free at the end of follow up, those who developed T2DM had higher MetS Z-score at baseline ($P < 0.001$). In multivariable logistic regression analyses for every unit elevation in MetS Z-score at the baseline, the RR for developing future T2DM and prediabetes was in total population and female group, respectively ($P < 0.05$). The associations remained significant after adjusting the potential confounding variables. A cut off value of 0.97 and 0.94 was defined in the receiver-operator characteristic curve based on the MetS Z-score for differentiating female patients with diabetes and prediabetes from the normal population, respectively.

We found that age group 30-34 years had prediabetics seen in 7, 35-39 years in 10, 40-44 years in 8 and 45-49 years in 10. Diabetes was absent in 10 in age group 30-34 years, 12 in age group 35-39 years, 11 in age group 40-44 years and 12 in age group 45-49 years. Kishore *et al.* [13] found that the prevalence of prediabetes amongst the first- degree relatives of type 2DM was found to be 26%. The prevalence of cardio metabolic risk factors observed amongst the first-degree relatives of patients of Type 2 DM were: history of CVD in 12%, over weight by BMI in 73%, Overweight by WHR in 54%, Hypertension in 32%, Dyslipidemia in 47%. The prevalence of Prediabetes was found to be more in the first- degree relatives of diabetes patients who were overweight (by BMI) (32.88%) than those first- degree relatives with the normal weight (by BMI) (7.41%). The prevalence of Prediabetes was more in the first- degree relatives of Type 2diabetes patients who were Overweight (by WHR) (37.04%) than the first- degree relatives with the normal weight (by WHR) (13.04%). The mean BMI and WHR was higher in the first- degree relatives of Type2 diabetes patients with Prediabetes. The mean levels of LDL and TG were higher and mean HDL was lower in the first-degree relatives of Type 2 diabetes patients with Prediabetes.

Gurka *et al.* [14] have formulated sex- and race/ethnicity-specific MetS Z-score. The standardized Z-scores for each component coming together creates an overall estimate of the severity of MetS with a linear association with future risk of T2DM and offers a tool for monitoring treatment efficacy.

Conclusion

Authors found that there was high prevalence of prediabetes and other cardio metabolic risk factors in first degree relatives of patients with type 2 DM patients.

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