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Original Research Article

Prevalence of diabetes mellitus and its associated risk factors in a tertiary care center, Rajasthan, India

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Abstract

Background: Diabetes mellitus (DM) is a chronic, debilitating disease constitutes a global health threat and burden, especially in developing countries. The objective of the study was to assess the prevalence of diabetes mellitus type-2 and its associated risk factors.
Methods: This cross sectional study carried out in department of medicine, a tertiary care center, Rajasthan. Data on blood glucose levels, and anthropometric, demographic and clinical history data were obtained.
Results: Prevalence of Diabetes mellitus was 20.9%. Majority of the participant were female (54.6%) 41-50 year age group.The significant risk factors of diabetes was found family history of diabetes, obesity, tobacco chewing, dyslipidemia and hypertension (p<0.05). Higher prevalence reported in middle socio-economic group urban population.
Conclusions: There is a need to increase awareness of type–2 diabetes mellitus in the general population. Health education should be given in terms of risk factors of diabetes.

Keywords: Diabetes mellitus, risk factors, prevalence, obesity, hypertension

Introduction

Diabetes mellitus (DM) is a metabolic disorder resulting from a defect in insulin secretion, insulin action, or both. Insulin deficiency in turn leads to chronic hyperglycaemia with disturbances of carbohydrate, fat, and protein metabolism [1].The prevalence of diabetes is swiftly increasing over the globe at an alarming rate. According to the International Federation of Diabetes, 415 million adults around the world are suffering from diabetes, and it is estimated that the numbers will reach around 642 million by 2040 [2].Diabetes Mellitus is emerging as a major health-care challenge for India. It is the major cause for mortality and morbidity among the people, affecting mainly those in the developing countries [3].India stands second in sharing the global burden of diabetes with a prevalence of 72.9 million adults with diabetes [4]. Ageingpopulations, familial history, Obesity, lifestyle changes due to urbanization, high familial aggregation, unhealthy behavior are the rapid cultural and social changes and insulin resistance were found to be the major contributing factors to the onset of T2DM [5-6].The increase in Western dietary habits including animal fats, complex

carbohydrates, and less fiber content has led the Indian population to a predisposition to diabetes by impaired glucose tolerance [7].DM is associated with acute complications, such as diabetic keto-acidosis, a hyperglycaemic state, hypoglycaemia, thrombosis and electrolyte disturbance. Chronic complications like: diabetic retinopathy, neuropathy, nephropathy and coronary artery disease. Therefore, premature morbidity, mortality, reduced life expectancy and the financial burden of DM result in a public health problem [8-10].
The early identification of at-risk individuals and appropriate intervention to increase physical activity & changes in dietary habits could to a great extent help in preventing/ delay the onset of Diabetes Mellitus and thus reduce the burden due to its associated complications in India. There is also a need to improve knowledge and awareness about Diabetes Mellitus in Rural as well as Urban areas through various IEC activities.

Aims and objectives

1. To determine the prevalence of diabetes mellitus type-2 among ≥ 18 years age and above in Dungarpur, Rajasthan
2. To study the association of various risk factors with diabetes mellitus type-2

Methods

This is a prospective cross sectional study carried out in the department of the medicine, government medical college, Dungarpur, Rajasthan. Patients age 18 years and above attending medicine OPD during the study period 1st January to 31st December 2020 were enrolled in our study.

Inclusion criteria

1. All individuals (male and female) more than equal to 18 years.
2. All those who gave consent to participate

Exclusion criteria

1. Individuals less than 18 years of age
2. Pregnant women
3. Those who did not give consent to participate in study

Informed consent of participants was taken from all the study participantsdetailed data such as age, gender, education, occupation, family history of diabetes, socio-economic status, history of alcohol consumption, smoking, body mass index (BMI) was collected.History on regular intake of medication was also taken from participants.
Type 2 diabetes mellitus was diagnosed by fasting blood sugar (FBS), post prandial blood glucose (PPBS) and glycosylated hemoglobin (HbA1c). The diagnosis of DM was based on the American Diabetes Association diabetes mellitus classification criteria with fasting blood glucose of ≥126 mg/dl being considered as positive for DM.impaired fasting glucose (Prediabetes), FBG: > 110 mg/dl to <126 mg/dl.
Various other investigations like: lipid profile, serum creatinine, ECG, CBC, thyroid profile, foot examination and ophthalmic examination was also done for detecting diabetic complications or associated comorbidities.
Data was entered into Microsoft Excel and analyzed using SPSS software version 20. Pearson's Chi Square test was applied. P value< 0.05 was considered significant.

Results

In the present study the total study participant was 1040, out of these 218 (20.9%) were diagnosed as type -2 diabetes mellitus, 38 (3.7%) was Prediabetic and rest 784 (75.4%) were Normoglycemic [Figure 1].

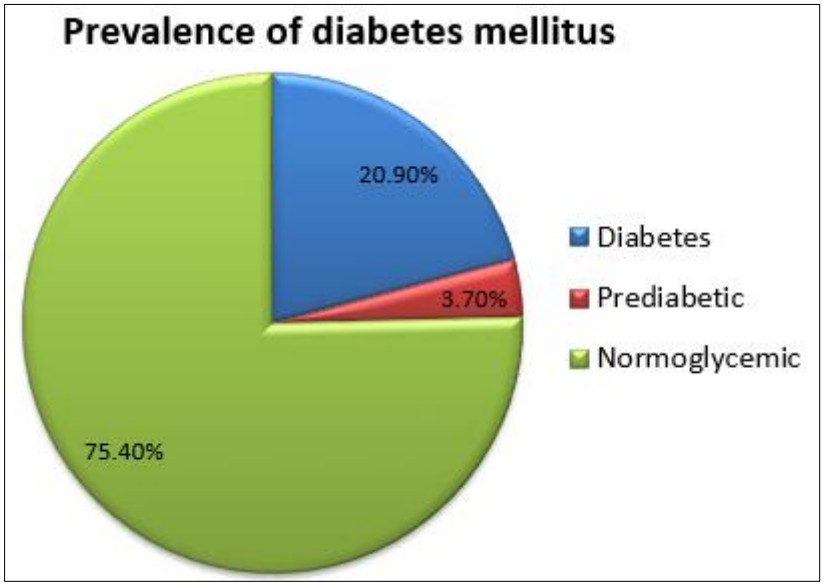

Fig 1: Prevalence of Type 2 diabetes mellitus

The association of non-modifiable risk factors with diabetes is shown in Table 1. Prevalence of type 2 diabetes mellitus was slightly higher (54.6%) in female participant as compared to male. Highest prevalence of DM (26.6%) was seen in the age group between 41- 50 years, followed by (23.4%) among 51-60 years of age. Majority of the diabetic patients (73.9%) residing at urban areas. 78.9% diabetic participants were literate.Among socio-economic status, highest prevalence of diabetes mellitus (42.2%) was found in middle socio-economic group. Most of them (55.5%) were associated with the family history of diabetes mellitus.

Table 1: Non modifiable risk factors and prevalence of diabetes

Non modifiable risk factors		Non diabetic (N=822)	Diabetic (N=218)	P- value
Age (in years)	18-30	177 (21.5%)	34 (15.6%)	0.182
	31-40	201 (24.5%)	48 (22%)	
	41-50	184 (22.4%)	58 (26.6%)	
	51-60	158 (19.2%)	51 (23.4%)	
	>60 years	102 (12.4%)	27 (12.4%)	
Gender	Male	389 (47.3%)	99 (45.4%)	0.615
	Female	433 (52.7%)	119 (54.6%)	
Place of residence	Urban	579 (70.4%)	161 (73.9%)	0.322
	Rural	243 (29.6%)	57 (26.1%)	
Education	Illiterate	175 (21.3%)	46 (21.1%)	0.951
	Literate	647 (78.7%)	172 (78.9%)	
Socio-economic status	Low	204 (24.8%)	45 (20.6%)	0.424
	Middle	322 (39.2%)	92 (42.2%)	
	High	296 (36%)	81 (37.2%)	
Family history of diabetes	Absent	688 (83.7%)	121 (55.5%)	<.0001
	Present	134 (16.3%)	97 (44.5%)	

Prevalence of diabetes was higher among the subjects with obesity (36.2%), central obesity

(69.7%), sedentary life style (54.1%), dyslipidemia (51.8%) and hypertension (59.2%) Around 55.5% of the subjects were non vegetarians [Table 2]. Among the modifiable risk factors, obesity, hypertension and dyslipidemia were strongly associated with the prevalence of diabetes (p<0.001).

Table 2: Modifiable risk factors and prevalence of diabetes

Modifiable risk factors		Non diabetic (N=822)	Diabetic (N=218)	P- value
Body Max Index (Kg/M^2)	Normal (<25)	412 (50.1%)	74 (34%)	<0.0001
	Over weight (25-30)	231 (28.1%)	65 (29.8%)	
	Obese (>30)	179 (21.8%)	79 (36.2%)	
Waist Hip ratio	Normal	545 (66.3%)	152 (69.7%)	0.339
	High	277 (33.7%)	66 (30.3%)	
Diet	Lacto-vegetarian	419 (51%)	97 (44.5%)	0.089
	Non vegetarian	403 (49%)	121 (55.5%)	
Hypertension	Present	128 (15.6%)	129 (59.2%)	<.0001
	Absent	694 (84.4%)	89 (40.8%)	
Dyslipidemia	Present	186 (22.6%)	113 (51.8%)	<.0001
	Absent	636 (77.4%)	105 (48.2%)	
Physical activity	Sedentary	380 (46.2%)	118 (54.1%)	0.054
	Moderate	316 (38.5%)	65 (29.8%)	
	Vigorous	126 (15.3%)	35 (16.1%)	
Smoking	Smoker	364 (44.3%)	132 (60.6%)	<0.001
	Non smoker	458 (55.7%)	86 (39.4%)	
Alcoholism	Alcoholic	333 (40.5%)	77 (35.3%)	0.163
	Non alcoholic	489 (59.5%)	141 (64.7%)	

Discussion

Prevalence of diabetes mellitus was found 20.9%, our finding were consistent with many other studies: Zuhara *etal.*[11], IR Musa *et al.*[12].Volaco A, *et al.*[13]and Eltom MA *et al.*[14], reported prevalence of DM was 22.4%, 20.8%, 18.7% and 19.1% respectively, in contrast to that Gupta,*et al.*[15] and Akhtar SN [16] reported quite lower prevalence of diabetes 5.7% and 7.1% respectively.

Prevalence of DM was higher in females (54.6%) than males (45.4%) in our study,Similar result was shown by Ahmad *et al.*[17], Talukder *et al.*[18] and Tripathy JP *et al.*[19] reported female predominance in their study. Whereas Chen *et al.*[20] and Amar S *et al.*[21] found prevalence of DM was more in male than female.

Present study found most of the diabetic participant were 41-50 years age group, concordance to the Al-Mawali A *et al.*[22]. Prevalence of diabetes increasing with the age, Tanoey J *et al.*[23].

Current study observed that majority of the diabetic participant was consumed vegetarian diet, accordance to the G P Arora *et al.*[24].Among the diabetic subjects 78.9% were literate and 21.1% were illiterate and the association of Diabetes Mellitus and literacy was statistically not significant (P>0.05), concordance finding also reported byNithesh KK *et al.*[25]and Xia *et al.*[26].

In our study most of the diabetic participant (73.9%) residing at urban areas, accordance to the Niti S *et al.*[27] and Gupta A *et al.*[28].

In present study the prevalence of type 2 Diabetes mellitus was high among sedentary subjects. Comparable with the Abebe SM *et al.*[29] and Menon *et al.*[30].Different studies showed that a physically active lifestyle is associated with a lower incidence of type-2 diabetes.

Significant association of type 2 diabetes mellitus with the smoking, hypertension, High

levels of triglycerides and total cholesterol, in agreement with previous studies:Sanjeevaiah A *et al*.[31], Singh M *et al*.[32] and Mansour A *et al*.[33].
In present study family history of diabetes was significantly higher among diabetics than non-diabetics in the study and it was found to be statistically significant, similar finding also reported by Amar singher *et al*.[34] and Shriraam V *et al*.[35].
In present study out of total type 2 DM subjects, 66% were overweight with body mass index more than 25 and the association between Body mass index and type 2 DM was statistically significant ($p<0.05$). Present study findings were consistent with study done by Nyenwe *et al*.[36].

Conclusion

This study shows that the prevalence of diabetes is high in the subjects having sedentary lifestyle, those who are overweighed, hypertensive, dyslipidemia and smokers. Prevalence was also higher in females, middle socio-economic group, urban areas and family history of diabetes mellitus. Diabetes Mellitus can be prevented by adopting healthy lifestyle, regular exercise and maintaining normal bodyweight.There is a need to increase awareness of type – 2 diabetes mellitus in the general population. Health education should be given in terms of risk factors of diabetes

Conflict of interest: None

Source of funding: None

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