A Study To Access CAD Risk In T2 DM Patients With Erectile Dysfunction: An Observational Study

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ABSTRACT
Aim: The present study was planned to access CAD risk in T2 DM patients with erectile dysfunction.
Methods: In this cross-sectional observational study 100 diabetic patients (who visited to hospital attending medicine OPD) recruited which was diagnosed according to ADA revised criteria.
Results: Out of 100 diabetic patient ED (Erectile Dysfunction) was present in 36 (36%) and ED was absent in 64 (64%). Maximum frequency of moderate ED 43% was found then severe ED 33%, mild to moderate ED-17% and mild ED-7%. The age showed insignificant ($p>0.05$) relation with ED. Prevalence of ED was 36% in diabetic population. Duration of the diabetes, FB(Fasting Blood Sugar) and PPBS(Post prandial Blood Sugar) showed a significant correlation ($p<0.05$) with ED. Age, HbA1C, ASCVD (Atherosclerotic Cardiovascular disease) risk showed insignificant ($p>0.05$) relation with ED. Chi square statistical analysis revealed a significant relation ($p<0.05$) between presence of severe V in relation with age. Maximum patients aged 46-55 years in moderate ED, severe ED found maximum in 35-45 years age group. BMI showed insignificant ($p>0.05$) relation with ED.
Conclusion: Poor glycemic control is a risk factor for ED. Fasting blood sugar and postprandial blood sugar showed significant ($p<0.05$) relation with ED. HbA1c show an insignificant correlation ($p>0.05$) with ED. Duration of diabetes have been associated with an increased risk of ED.

Keywords: T2 DM, ED, ASCVD

1. INTRODUCTION

The incidence of diabetes mellitus (DM) is rising globally. Specifically, global prevalence in 2019 was estimated to be 9.3% (463 million people) and is expected to increase to 10.2% and 10.9% by 2030 and 2045, respectively. The majority (90%) of patients with DM have type 2 DM. Moreover, the estimated number of people aged 20–79 years who will be vulnerable to the disease is expected to rise to 700 million by 2045.[1,2] Erectile dysfunction (ED) is one of the

most common complications among patients with DM, but it remains underestimated in this group. ED is the inability to achieve and sustain an erection sufficient to perform satisfactory sexual intercourse.[3] Some African countries have reported a higher prevalence of ED.[4,5] ED is a multifactorial and complex disorder that is associated with certain risk factors in patients with DM, such as poor glycemic control, longer duration of DM, obesity, older age, smoking, alcohol consumption, housebound bedridden status, and sedentary work.[4,6,7] Likewise, rural and urban residence status has an influence on ED among patients with DM.[8-10] Generally, ED contributes to a poorer quality of life in patients with DM.[11]

The common complication of diabetes is erectile dysfunction with an estimated prevalence of 20-85% (ranging from mild to complete ED) which occurs at an earlier age than in non diabetic men.[12] In the Massachusetts male ageing study, men with treated diabetes had a 28% age adjusted prevalence of complete ED (no erection), almost three times higher than the prevalence of complete ED observed in the entire sample of men (10%). It also showed the extremely deleterious epidemiological link between coronary artery disease, diabetes and ED.[14] Increased age and duration of diabetes have been associated with an increased risk of ED.[15] DM type 2 (T2DM) is strongly associated with the development of ED, prevalence of ED of 35-90% in those with diabetes in different populations.[15,16] The medications, patients are receiving for treatment of T2DM and their complications may influence ED.

The present study was planned to access CAD risk in T2 DM patients with erectile dysfunction.

2. MATERIALS AND METHODS

In this cross-sectional observational study 100 diabetic patients (who visited to hospital attending medicine OPD) were recruited which were diagnosed according to ADA revised criteria. This study was conducted for the period of two years from may 2021to may 2023 in the department of urology in Maharani Laxmi Bai Medical College, Jhansi, Uttar Pradesh, India

Inclusion criteria
1. Men aged >18 years with clinical diagnosis of type-2 diabetes were included in the study.
Exclusion criteria
2. Type 1 DM, patients with HbA1C $\geq$13% at screening visit, a recent history of diabetic ketoacidosis, patients with angina during intercourse, unstable angina, any other evidence of recently diagnosed CAD, congestive heart failure, arrhythmia, poorly controlled blood pressure (systolic $\geq$170 or $\leq$90 mmHg) diastolic or orthostatic hypotension, a history of stroke/central nervous system injury or spinal-cord trauma within 6 months of study onset, hormonal deficiency or hypogonadism/decrease testosterone, pelvic trauma/pelvic surgery, severe depression with DASS score $\geq$21, peripheral vascular disease, significant renal and hepatic dysfunction (chronic kidney disease, chronic liver disease), severe anaemia with haemoglobin less than 6 gm/dl were to be excluded, premature ejaculation, drugs history of - beta blockers/diuretics/ angiotensin enzyme inhibitor/tricyclic anti-depressant (TCA) were excluded from the study.

Assessment tool
IIEF-5 The possible scores for the IIEF-5 range from 5 to 25 and ED was classified into 5 categories based on the scores: severe (5-7), moderate (8-11), mild to moderate (12-16), mild (17- 21) and no ED (22-25).

ASCVD risk calculator
ASCVD risk is categorized as: low risk (<5%), border line risk (5% to 7.4%), intermediate risk (7.5% to 19.9%), high risk (>20%).

Statistical analysis

The data thus obtained will be assessed, analysed and compared to find out difference in two groups with the help of chi-square test. Data of response in all three arms will be compared using chi square test. P value reports were two tailed and level of confidence of 0.05 was used to assess statistical significance.

3. RESULTS

Table 1: Distribution of Erectile dysfunction

Erectile dysfunction	N%
Absent	64 (64)
Present	36 (36)
Frequency of erectile dysfunction	
Mild	7 (7)
Mild to moderate	17 (17)
Moderate	43 (43)
Severe	33 (33)

Out of 100 diabetic patient ED was present in 36 (36%) and ED was absent in 64 (64%). Maximumfrequency of moderate ED 43% was found then severe ED 33%, mild to moderate ED-17% and mild ED-7%.

Table 2: Sociodemographic and clinical characteristic of the study populations

Variables	ED present,n=36	ED absent,n=64	P value
Age (years)	48.2±6.74	51.9±7.23	0.500
Duration of diabetes (years)	7.35±3.08	8.24±4.54	0.003
Systolic BP (mm Hg)	128.32±9.21	136.04±12.58	0.002
Diastolic BP (mmHg)	78.70±8.72	80.84±7.94	0.640
BMI (kg/m^2)	25.05±2.48	24.76±2.36	0.540
FBS (mg/dl)	182.28±52.48	166.79±50.58	0.029
PP (mg/dl)	292.48±68.32	252.48±86.14	0.001
HbA1C (%)	8.22±3.58	8.40±2.32	0.320
ASCVD risk score (%)	9.21±4.46	8.62±5.65	0.620
T. cholesterol (mg/dl)	146.24±44.76	165.75±36.24	0.003

HDL (mg/dl)	52.28±9.39	55.75±14.76	0.002
LDL (mg/dl)	66.34±28.72	84.36±26.44	0.0489

The age showed insignificant (p>0.05) relation with ED. Prevalence of ED was 36% in diabetic population. Duration of the diabetes, FBS and PPBS showed a significant correlation (p<0.05) with ED. Age, HbA1C, ASCVD risk showed insignificant (p>0.05) relation with ED. ASCVD risk showed insignificant (p>0.05) relation with ED.

Table 3: ED severity by age group in type 2 diabetic men

ED severity	35-45 year	46-55 year	56-65 year	Total
Severe ED (1-7)	8	3	4	15
Moderate ED (7-11)	2	6	2	10
Mild to moderate (12-16)	1	4	1	6
Mild (17-21)	1	3	1	5

Chi square statistical analysis revealed a significant relation (p<0.05) between presence of severity in relation with age. Maximum patients aged 46-55 years in moderate ED, severe ED found maximum in 35-45 years age group.

Table 4: Correlation between BMI (kg/m2) and ED

BMI (kg/m^2)	ED present	ED absent
Underweight <18.5	0	4
Normal (18.5-24.9)	26	46
Overweight (25-29.9)	10	14
Obesity class 1 (30-34.9)	0	0
Obesity class 2 (35-39.9)	0	0
Obesity class 3>40	0	0

BMI showed insignificant (p>0.05) relation with ED.

4. DISCUSSION

Diabetes is a chronic metabolic disorder that is characterized by high level of blood glucose levels, which over a period of time can lead to micro-vascular (including retinopathy, neuropathy and nephropathy) or macro-vascular (including cardiovascular disease) complications. ED is a commonly not much discussed and distressing complication of diabetes. ED is defined as the persistent (at least 6 months) inability to achieve and maintain penile erection sufficient to allow adequate sexual intercourse.[17] It is estimated that ED has affected more than 150 million men worldwide and this number will reach approximately 322 million by 2025.[18,19]

Out of 100 diabetic patient ED was present in 36 (36%) and ED was absent in 64 (64%). The age showed insignificant (p>0.05) relation with ED. Prevalence of ED was 36% in diabetic population.Schiavi et al,[19] studied 40 diabetic men, free from other illness or drugs that could affect sexual capacity and 40 age-matched healthy control subjects. ED was present in 77% of patients. Sundaram et al,[20] reported that in diabetic patients, the prevalence of ED was 66%. Ledda et al,[21] reported that ED was very common among diabetic patients. They had ED at an earlier age and prevalence was 75%. Sassayam et al,[22] studied 6112 Japanese male patients from 447 outpatient clinics and found that 81% had some degree of ED. Kloner[23] observed that the prevalence of ED in diabetic patients was about 75%. Sasaki et al,[24] reported prevalence of 90% in 1118 male diabetic patients. Prevalence rate was double than that of nondiabetic individuals. Among the socio-demographic variables, age was found to be statistically significant and majority of cases were found in 40-60 years of age in the present study. Influence of age on prevalence of ED is well established in both normal as well as T2DM men. Berardis et al reported that 34% of the patients reported frequent erectile problems, 24% reported occasional problems, and 42% reported no erectile problems.[25] Seid et al established that the overall prevalence of ED was 69.9%, with 32.9% suffering from mild, 31.7% moderate and 5.2% severe ED.[26]

Duration of the diabetes, FBS and PPBS showed a significant correlation (p<0.05) with ED. Age, HbA1C, ASCVD risk showed insignificant (p>0.05) relation with ED. Maximum frequency of moderate ED 43% was found followed by severe ED 33%, mild to moderate ED-17% and mild ED-7%. Chi square statistical analysis revealed a significant relation (p<0.05) between presence of severity in relation with age. Maximum patients aged 46-55 years in moderate ED, severe ED found maximum in 35-45 years age group. BMI showed insignificant (p>0.05) relation with ED. Chronic hyperglycaemia represents the major biochemical abnormality in the diabetic patient and was supposed to have a role in both microvascular and macrovascular diabetic complications. However, there was still disagreement about the role of glycaemic control as a risk factor for ED in diabetic men. Some observational studies had shown that a poor glycaemic control (HbA1c>7),as reflected by higher values of glycated haemoglobin A1c (HbA1c), was associated with higher risk of ED, whereas other studies did not find an association. The reasons for these divergent results were not evident.

In our study in patients with ED were having more value of FBS, PPBS than patients without ED. In patients without ED were having more value of HbA1c than patients with ED. There was no significant (p>0.05) difference in term of ASCVD risk score in ED patients ED and without ED patients. Jackson et al concluded that ED and cardiovascular disease share several risk factors that are similar and commonly coexist.[27] ED in asymptomatic man may be a marker for underlying CAD. In our study, it was also observed that diabetic patients without ED had less coronary risk as compared to patients with ED but severity of ED did not correlate significantly with 10-years coronary risk. Various other studies had also reported significant correlation between ED and 10-years coronary risk. Patients with ED was having more value of ASCVD than patient without ED. BMI showed insignificant (p>0.05) relation with ED.

5. CONCLUSION

Inadequate glycemic control is a recognized risk factor for erectile dysfunction. There was a significant (p<0.05) correlation observed between fasting blood sugar and postprandial blood sugar levels with erectile dysfunction (ED). The relationship between HbA1c and ED was found to be statistically insignificant (p>0.05). There is a positive correlation between the duration of diabetes and an elevated susceptibility to erectile dysfunction (ED). The

prevalence of erectile dysfunction (ED) among individuals with diabetes was found to be 34%. The duration of diabetes exhibited a statistically significant correlation (p<0.05) with erectile dysfunction (ED). There was no statistically significant difference (p>0.05) observed in the ASCVD risk score between patients with erectile dysfunction (ED) and those without ED.

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