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Original Research Article

Study of erectile dysfunction in patients of type 2 diabetes mellitus and its association with cardiovascular risk

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ABSTRACT

Background: 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 or macro-vascular complications. Erectile dysfunction (ED) is common not much discussed and distressing complication of diabetes. ED in type 2 may be independent marker of coronary artery disease (CAD). Aim and objectives were to assess the ED in subject of type 2 diabetes mellitus (DM). Assessment of correlation of ED with CAD.
Methods: The present cross-sectional study consisted total 180 diabetic patients. On basis of international index of erectile function (IIEF) questionnaire ED patients were assessed.
Result: Out of 180 diabetic patients 36.11% had varying degree of ED. Out of 65 ED patients, maximum frequency of moderate ED (47.69%) was found then severe ED (32.30%), mild to moderate ED (12.30%) and mild ED (7.69%). Most of the patients were in the age group of 40-50 years 35 (53.84%), 50-60 years 22 (33.4%), <40 years (9.23%) and 60-70 years 2 (3.07%) showed 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. In patient with ED was having more value of atherosclerotic cardiovascular disease (ASCVD) (9.11±4.84) than patient without ED (8.82±5.72). There was no significant ($p>0.05$) difference in term of ASCVD risk score in ED patient's ED and without ED patients.
Conclusions: Poor glycemic control was a strongest risk factor for ED.

Keywords: T2 DM, ED, ASCVD

INTRODUCTION

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 common 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 that allows adequate sexual intercourse.[1] It is estimated that ED has affected more than 150 million men worldwide and this number will reach approximately 322 million by 2025.[1,2`] Increased age and duration of diabetes have been associated with an increased risk of ED.[3] 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.[4,5] There are number of factors contributing for the ED in diabetic men such as hypertension, obesity, dyslipidaemia, smoking and autonomic neuropathy.[5] ED can present in the early stages of T2DM or sometimes diabetic patients can present as a chief complaint. The frequency of ED among diabetic men increased with age, from 60% in those aged 40-49 years to 94.95% in those aged ≥60 years. ED can therefore develop in diabetes owing to interplay between neuropathy, vasculopathy, hypogonadism, endothelial dysfunction and psychological factors.[6] The medications, patients are receiving for treatment of T2DM and their complications may influence

ED. In particular, ED has been associated with the use of β-blockers, thiazide diuretics, metformin, antidepressants, statins, fibrates and drugs used for neuropathic pain such as pregabalin, gabapentin and opiate analgesics. Depression is more common in people with diabetes and studies have shown that ED is very closely linked with depression.[7]

Association between ED and cardiovascular disease

ED in type 2 diabetes may be independent marker of CAD. A study in which the association of ED and asymptomatic CAD showed that 67% of patient had ED for a mean 38.8 months before developing symptom of CAD.[7] Endothelial dysfunction is the common link between ED and CAD. Artery size explains the onset of ED before occurrence of CAD. Coronary arteries are 3-4 mm in diameter, while the penile artery is of 1-2 mm in diameter. Endothelial dysfunction and plaque burden in small arteries may cause symptom of ED before the affect blood flow in large arteries. Depression is an independent risk factor for ED. Subnormal testosterone concentrations contribute to ED as testosterone regulates every component of erectile function. With this background, the present study was planned to access CAD risk in T2 DM patients with ED among all the male patients with age group 18 to 65 years.

METHODS

In this cross-sectional observational study 180 diabetic patients (who visited to LLR hospital attending medicine OPD) recruited which was diagnosed according to ADA revised criteria. This study was conducted from December 2019 to November 2021 in K. P. S post graduate institute of medicine, GSVM medical college, Kanpur.

Inclusion criteria

Men aged ≥18 years with clinical diagnosis of type-2 diabetes were included in the study.

Exclusion criteria

Type 1 DM, patients with HbA1C ≥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 ≥170 or ≤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 ≥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-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.

RESULTS

Table 1 shows that age showed insignificant (p>0.05) relation with ED. Prevalence of ED was 36.11% in diabetic population. Out of 65 ED patient, maximum frequency of moderate ED 47.69% was found then severe ED 32.30%, mild to moderate ED-12.30% and mild ED-7.69%. 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.

The below chart shows the distribution diabetic studied subjects on the basis of erection dysfunction. Out of 180 diabetic patient ED was present in 65 (36.11%) and ED was absent in 115 (63.89%).

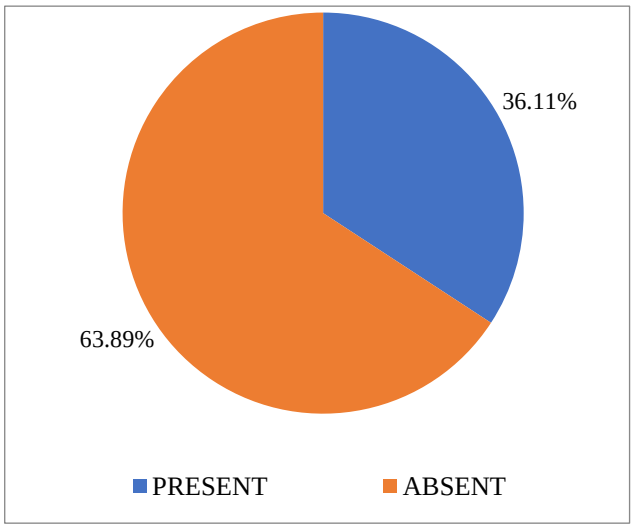

Figure 1: Erectile dysfunction.

Table 1: Sociodemographic and clinical characteristic of the study populations.

Variables	ED present, n=65, (36.11%)	ED absent, n=115, (63.88%)	Test of chi-square significance	P value	Confidence interval	
					Lower	Upper
Age (years)	49.4±6.77	50.4±7.18				
<40	6	8	0.674	0.8	-2.90	1.42
40-60	57	97				
>60	2	10				
Duration of diabetes (years)	7.35±3.08	8.24±4.54				
<5	15	40	1.41	0.002	-2.15	0.357
5-10	40	44				
>10	10	31				
Systolic BP (mm Hg)	129.23±9.14	135.07±12.43				
<139	56	75	3.025	0.003	-8.88	-1.87
≥140	9	40				
Diastolic BP (mmHg)	79.90±8.79	80.86±7.96				
<90	56	92	0.403	0.688	-3.064	2.02
>90	9	23				
BMI (kg/m^2)	24.08±2.72	23.90±2.46				
<24.9	47	87	0.59	0.556	-0.551	1.02
≥25	18	28				
FBS (mg/dl)	185.38±54.82	168.71±50.56				
<125	9	15	2.21	0.028	1.97	33.95
≥126	56	100				
PP (mg/dl)	292.47±68.32	252.42±86.11				
<200	10	49	3.37	0.001	17.42	66.56
≥200	55	66				
HbA1C (%)	8.17±3.57	8.54±2.25				
<7	5	28	0.961	0.338	-1.27	0.441
≥7	60	87				
ASCVD risk score (%)	9.11±4.84	8.82±5.72				
<5	12	31	0.47	0.636	-1.266	2.066
5-7.4	20	25				
7.5-19.9	30	46				
>20	3	13				
T. cholesterol (mg/dl)	148.10±45.87	168.98±39.55				
<170	51	62	3.19	0.002	-33.72	-7.49
≥170	14	53				
HDL (mg/dl)	50.30±9.29	56.83±13.95				
<45	19	15	3.21	0.002	10.11	-2.42
≥45	46	100				
LDL (mg/dl)	68.93±29.89	85.93±28.53	3.77	0	25.98	-8.14

Table 2: Correlation of cardiovascular risk and ED present and absent group.

ASCVD risk (%)	ED present	ED absent
Low risk (<5)	12	31
Borderline (5-7.4)	20	25
Intermediate (7.5-19.9)	30	46
High risk (>20)	3	13

Table 2 shows that 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)	12	3	6	21
Moderate ED (7-11)	8	20	3	31
Mild to moderate (12-16)	2	4	2	8
Mild (17-21)	1	3	1	5

x^2=13.96, p=0.03008, p<0.05, Df=6 significant.

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.

Table 4: Correlation between BMI (kg/m^2) and ED.

BMI (kg/m^2)	ED present	ED absent
Underweight <18.5	0	4
Normal (18.5-24.9)	47	83
Overweight (25-29.9)	18	28
Obesity class 1 (30-34.9)	0	0
Obesity class 2 (35-39.9)	0	0
Obesity class 3>40	0	0

Df=2, x^2=2.443, p=0.2948, p>0.05 significant.

Table 4 shows that BMI showed insignificant (p>0.05) relation with ED.

DISCUSSION

During the course of study, a total of 180 subjects with type 2 diabetes were interviewed. Out of which 36.11% have ED and 63.89% patients have not ED. 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. In our study most of the patients were in the age group of 40-50 years 35 (53.84%), 50-60 years 22 (33.4%), <40 years 6 (9.23%) and 60-70 years 2 (3.07%) showed ED.

Berardis et al reported that 34% of the patients reported frequent erectile problems, 24% reported occasional problems, and 42% reported no erectile problems.[8]

Seid et al the overall prevalence of ED was 69.9%, with 32.9% suffering from mild, 31.7% moderate and 5.2% severe ED.[9]

In our study frequency of moderate ED 47.69% was found maximum then severe ED 32.30%, mild to moderate ED-12.30% and mild ED-7.69%. Longer duration of diabetes had been consistently documented to increase the risk of ED a finding that is confirmed by the results of the present study.

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 was having more value of FBS, PPBS, (185.38±54.82, 292.47±68.32 respectively) than patients without ED (168.73±80.56; 252.42±86.11 respectively). In patients without ED was having more value of HbA1c (8.54±2.25) than patients with ED (8.17±3.57). There was no significant (p>0.05) difference in term of ASCVD risk score in ED patients ED and without ED patients.

In Jackson et al concluded that ED and cardiovascular disease share several risk factors that are similar and commonly coexist.[10] ED in asymptomatic man may be a marker for underlying CAD.

In Roth et al studied 1412 Israeli men and found that ED and cardiovascular disease share common risk factors and may be aggravated by medical treatment for reducing them.[11] They concluded that ED was common among patients who are at high risk for cardiovascular disease because of diabetes and or hypertension.

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 workers had also reported significant correlation between ED and 10-years coronary risk. In patient with ED was having more value of ASCVD (9.11±4.84) than patient without ED (8.82±5.72).

Limitation

Small sample size was weak points of this study. Large populations studies should be conducted to confirm the results.

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. Prevalence of ED was 36.11% in diabetic population. Duration of the diabetes showed a significant correlation (p<0.05) with ED. There was no significant (p>0.05) difference in term of ASCVD risk score in ED patients ED and without ED patients.

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REFERENCES

1. Ibrahim A, Ali M, Kiernan TJ, Stack AG. Erectile Dysfunction and Ischaemic Heart Disease. Eur Cardiol Review. 2018;13(2):98-103.

2. Solomon H, Man JW, Jackson G. Erectile dysfunction and the cardiovascular patient: endothelial dysfunction is the common denominator. Heart 2003;89:251-3.
3. Meller SM, Stilp E, Walker CN, Mena-Hurtado C. The link between vasculogenic erectile dysfunction, coronary artery disease, and peripheral artery disease: role of metabolic factors and endovascular therapy. J Invasive Cardiol. 2013;25:313-9.
4. McCulloch DK, Campbell IW, Wu FC. The prevalence of diabetic impotence. Diabetologia. 1980;18(4):279-83.
5. Sasaki H, Yamasaki H, Ogawa K. Prevalence and risk factors for erectile dysfunction in Japanese diabetics. Diabetes Res Clin Pract. 2005;70(1):81-9.
6. Malavige LS, Levy JC. Erectile dysfunction in diabetes mellitus. J Sex Med. 2009;6(5):1232-47.
7. Roy T, Lloyd CE. Epidemiology of depression and diabetes: a systematic review. J Affect Disord. 2012;142(1):S8-21.
8. De Berardis G, Pellegrini F, Franciosi M, Belfiglio M, Di Nardo B, Greenfield S et al. Quality of Care and Outcomes in Type 2 Diabetes Study Group. Identifying patients with type 2 diabetes with a higher likelihood of erectile dysfunction: the role of the interaction between clinical and psychological factors. J Urol. 2003;169(4):1422-8.
9. Seid A, Gerensea H, Tarko S. Prevalence and determinants of erectile dysfunction among diabetic patients attending in hospitals of central and north western zone of Tigray, northern Ethiopia: a cross-sectional study. BMC Endocr Disord. 2017;17-16.
10. Jackson G, Betteridge J, Dean J, Eardley I, Hall R. A systematic approach to erectile dysfunction in the cardiovascular patient: A consensus statement update 2002. Int J Clin Pract. 2002;56:631.
11. Roth A, Kalter-Leibovici O, Kerbis Y, Tenenbaum Koren E, Chen J, Sobol T. Prevalence and risk factors for erectile dysfunction in men with diabetes, hypertension or both diseases: A community survey among 1,412 Israeli men. Clin Cadiol. 2003;26:25-30.

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