

Erectile Dysfunction: An Underestimated Presentation in Patients with Diabetes Mellitus

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ABSTRACT

Introduction: Erectile dysfunction (ED) is a common complication of diabetes mellitus. ED, like other sexual disorders, is often under-reported and under-diagnosed, as talking about sex is considered a taboo in our society. **Methodology:** All the male patients with diabetes mellitus (with or without active complaints of ED) attending Medicine or Psychiatry OPD of the institute during the study period were enrolled in the study. They were investigated for their body-mass index (BMI), blood sugar and lipid profile; and were assessed on HAM-D, General Health Questionnaire-30, IIEF, sex myth checklist and QOL Instrument for Indian Diabetes Patients (QOLID). **Result and Discussion:** In the present study, a total of 138 diabetic patients were assessed, and those with severe ED were found to have poor glycemic control, worse lipid profile, higher body mass index, later age of onset, and longer duration of untreated diabetes as compared to non-ED patients. ED patients also scored higher on depression rating scale, had poorer general health and quality of life (QOL). Early attention to ED in diabetic patients can improve general health and QOL of the sufferers. **Conclusion:** DM patients with poor glycemic control and advanced age have a higher propensity of developing severe ED, which further deteriorates the already compromised health & QOL.

Key words: *Diabetes mellitus, erectile dysfunction, male*

INTRODUCTION

Erectile dysfunction (ED) is a common condition among diabetic men^[1] and previous researches show a prevalence of 20%–85%; occurring with a greater frequency and at an earlier age compared to general population.^[2-4] However, since many men are too embarrassed and reluctant to admit having ED or to talk to a doctor about the issue, precise estimates are difficult to have.


The origin of ED in diabetic men is multi-factorial, and its main underlying contributors may be grouped

under neurological, vasogenic and psychogenic causes. Neuronal- and endothelial-derived nitric oxide is the principle mediator of corporal smooth muscle relaxation and consequent penile erection, whose impairment in diabetes mellitus (DM) might lead to ED.^[5] Previous studies have shown conflicting results regarding the association of poor glycemic control with ED.^[4,6,7] However, hypertension, obesity, metabolic syndrome, atherogenic dyslipidemia, autonomic neuropathy and drugs that are commonly given to diabetic

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patients (i.e., antihypertensive agents) have consistently shown a higher risk for ED^[8] in diabetic men.

Ten to thirty percent of ED cases may be purely psychogenic.^[9] Depression is a common psychiatric condition seen in diabetics, and previous studies show that presence of one increases the risk of development of other,^[10-12] with the likely bi-directional causal relationship.^[13] While depression might be an important contributor to psychogenic ED in diabetic men; psychological factors may also aggravate ED by directly inhibiting spinal centers and causing excessive sympathetic outflow, or increasing peripheral catecholamine levels leading to decreased cavernous smooth muscle relaxation.^[9]

ED in the presence of normal sexual desire leads to increase in mental stress, disordered interpersonal relationship, and interference with sexual life. Thus, ED may be a major determinant of quality of life (QOL) in DM. Previous studies have mainly focused on patient evaluation and partner satisfaction, and little attention has been given to QOL.^[4] In an international study, it was seen that diabetic men with ED have more severe dysfunction and worse QOL than nondiabetic men with ED.^[1] However, given the attitude of Indian society to sexuality; effect of ED on QOL in DM warrants attention. The primary aim of the study was to assess the prevalence of ED among diabetic men and to compare the DM patients with severe ED with those having a normal erection on various sociodemographic and clinical correlates.

MATERIALS AND METHODS

The study was conducted in male diabetic patients attending outpatient Departments of Medicine and Psychiatry of a Medical College in northern India from February 2015 to May 2015. It was a cross-sectional study and all the consecutive male patients fulfilling the inclusion criteria of duration of diabetes of at least 1 year were enrolled in the study after taking written informed consent. History of pelvic trauma, pelvic surgery (hernia, hydrocele etc.), psychiatric disorder (in acute phase or in treatment phase) and debilitating disease (tuberculosis, AIDS, etc.) were our exclusion criteria. Those who had the unfavorable penile anatomy for a sexual act (such as hypospadias and peyronie plaques) and neurogenic disorders (spinal cord injury, multiple sclerosis, etc.) were also excluded from the study.

Patients were assessed using predesigned semi-structured sociodemographic parameters. Participants with severe ED (those who scored 10 or less points in erectile function domain of International Index of Erectile Function [IIEF]) were considered as ED cases, those

who scored more than 25 had no ED and were non-ED cases and participants with mild to moderate ED were excluded from the study to ensure that participants are better representative of their respective groups (as DM patients are more likely to have severe ED)^[14] and comparison of various clinical correlates and parameters is better. Mild to moderate cases of ED can be due to various unidentified reasons including psychological and so they were excluded to be more precise in our selection of only those patients who have ED due to DM. A detailed history was taken regarding age, socioeconomic status, personal and family history of diabetes, any past psychiatric illness, hypertension, duration of diabetes and type of medication currently taking for diabetes. General physical, systemic and mental state examinations were done, and body mass index (BMI) was recorded. Patients were thoroughly investigated for blood sugar (fasting and postprandial), HbA1c, lipid profile (serum triglyceride [TG], low-density lipoprotein [LDL], very LDL [VLDL], high-density lipoprotein [HDL]), blood urea, serum creatinine, serum bilirubin, SGOT, and SGPT. Apart from this all the subjects were assessed using the following scales at the time of interview: Hamilton rating scale for depression (HAM-D),^[15] General Health Questionnaire (GHQ)-30,^[16] IIEF,^[17] sex myth checklist (SMCL),^[18] QOL Instrument for Indian Diabetic Patients (QOLID).^[19]

RESULTS

We surveyed a total of 184 male diabetic patients who had presented to medicine or psychiatry OPD during the study. Those 46 participants who had scored 11–25 in IIEF scoring were excluded from the study and remaining 138 were subsequently evaluated. 56.5% (78/138) of them were suffering from severe ED. Maximum number of participants (54.3% [75/138]) falls in 40–59 years of age group, but most of the patients with severe ED are of 50–69 years of age, which account for 58.9% (46/78) of total patients with severe ED. 76.08% (105/138) of the participants were on oral hypoglycemic agents and remaining 23.9% (33/138) were on insulin therapy. Nearly 15.2% (21/138) of the patients have previously consulted a quack or faith healers.

BMI of ED cases was found to be higher than non-ED patients. Random blood sugar, fasting blood sugar (FBS) and postprandial blood sugar (PPBS) of severe ED patients were higher than patients without ED which is in accordance with the poorer HbA1c levels in ED patients. Lipid profiles of DM patients with and without ED were also significantly different, with higher values of serum TG, LDL, and VLDL in ED cases. Serum HDL levels in two groups showed no significant difference. A mean HAM-D score of ED cases was significantly more than non-ED cases. All the

patients were also assessed by GHQ-30 and ED cases clearly had poorer general health than non-ED patients.

DISCUSSION

In the present study, we have recruited a total of 184 male DM patients, and 67.4% (124/184) of the participants were found to be suffering from ED and 42.4% from severe ED. This is in accordance with the previous research^[2,3] on diabetic patients. Garg *et al.*,^[20] reported 78%, Sundaram *et al.*^[21] 66%, Schiavi *et al.*^[22] 77% and Kloner^[23] 75% prevalence of ED in DM patients. In the present study, we found a significant association between the prevalence of severe ED and age of the participant. Prevalence increases from 10.3% in patients <40 years of age, 54.6% in 40–59 years age and 100% in patients of more than 60 years of age [Table 1]. In our participant’s duration of untreated DM in severe ED patients was significantly more than non-ED patients [Table 2] as reported by several previous studies.^[20,24,25] It is because as the age

of the patient progresses and duration of DM increases various complications of DM and age related changes in body sets in.^[20] In the present study, we have also seen that age at which diabetes was first diagnosed was significantly higher in ED cases than non-ED casets [Table 2]. It was probably because patients with ED have a general tendency to ignore their symptoms, and delay treatment seeking because of ignorance, embarrassment, and lack of information.^[26]

Our data show that poor glyceemic control, as indicated by increased FBS, PPBS, and HbA1c, was more commonly seen in ED cases [Table 2]. In a study done by Weinberg *et al.*,^[27] a poor glyceemic control was associated with a heightened risk of ED and was considered an independent risk factor for ED by Awad *et al.*^[28] However, many of the previous studies showed conflicting result in this regard.^[6,7] Advanced glycation end products (AGEs) have been implicated in the pathogenesis of DM, which are created through a nonenzymatic reaction between reducing sugars and free amino groups of proteins, lipids, or nucleic acids.^[29] AGEs modifies the extracellular matrix and intercellular adhesion, which favors its deposition in penile connective tissue. AGEs form covalent bonds with collagen, which leads to vascular wall thickening and decreased elasticity that strongly contributes to dysfunction of cavernous tissue. This formation of AGEs in DM shows a positive correlation with advancing age and poor glyceemic control.^[30,31] Studies have also shown that in DM patients, a blood sugar O-GlcNAc (associated with hyperglycemia) inhibits the enzyme that starts the chain of vascular events leading to an erection.^[20]

Table 1: Sociodemographic profile

Age	Frequency	Percent	Erectile dysfunction	
			Severe ED	Absent
18-29	7	5.1	0	7
30-39	22	15.9	3	19
40-49	47	34.1	16	31
50-59	28	20.3	25	3
60-69	21	15.2	21	0
>70	13	9.4	13	0
Total	138	100.0	78	60

ED – Erectile dysfunction

Table 2: Comparison of the sociodemographic and clinical parameters among the erectile dysfunction and nonerectile dysfunction patients

Characteristics	Erectile dysfunction (mean±SD)		t	P
	Severe ED (78)	Absent (60)		
Age of patient when diabetes diagnosed (years)	53.3077±8.13	39.2000±7.25	10.582	0.000*
Total diabetes duration since diagnosed (months)	70.6795±14.95	23.7333±6.70	22.619	0.000*
Duration of untreated diabetes since diagnosed (months)	34.0641±8.51	6.3000±3.74	23.545	0.000*
BMI	30.7437±2.19	27.6631±1.55	9.635	0.000*
Systolic BP	136.8974±15.98	135.2333±13.94	0.640	0.523
Diastolic BP	86.4359±10.09	87.7000±8.16	-0.791	0.430
Current glyceemic control RBS (g/dl)	217.7308±14.33	167.0833±39.36	10.502	0.000*
FBS	133.4231±4.50	114.6167±11.44	13.244	0.000*
PPBS	233.8077±21.02	172.1667±14.26	19.509	0.000*
HbA1c	8.0141±0.37	7.2500±0.33	12.453	0.000*
Lipid profile (TG)	141.3974±22.18	119.8500±7.80	7.184	0.000*
Lipid profile (LDL)	74.2692±12.86	64.7667±4.62	5.455	0.000*
Lipid profile (VLDL)	63.7692±9.73	54.8667±3.15	6.811	0.000*
Lipid profile (HDL)	66.7051±11.06	64.4667±5.60	1.432	0.155
Blood urea	25.5641±3.34	26.5667±2.56	-1.927	0.056
Serum creatinine	0.9872±0.81	0.9400±0.13	0.444	0.657

FBS – Fasting blood sugar; PPBS – Postprandial blood sugar; RBS – Random blood sugar; BP – Blood pressure; BMI – Body mass index; TG – Triglyceride; LDL – Low density lipoprotein; HDL – High density lipoprotein; VLDL – Very low density lipoprotein; SD – Standard deviation; ED – Erectile dysfunction

We have also seen that among our participants, BMI of ED cases was significantly higher than non-ED cases [Table 2], as reported by Viswanathan *et al.*^[32] and Al-Hunayan *et al.*^[33] in their studies. Previous studies on diabetic patients had shown that lipid profile is more commonly deranged in DM patients with ED.^[20] In our participants, lipid profile was within normal range in both the groups, but those with severe ED were on the higher side of the normal range, and difference in two groups was found to be statistically significant except for plasma HDL.

It has been well established that depression is more prevalent among the diabetic patients as compared to general population.^[34-37] In our study, the severity of HAM-D score of ED cases was found to be significantly more than non-ED cases [Table 3], which shows that ED is an independent risk factor for depression or could be the other way round. Depression is frequently associated with impairment in erectile function, diminished libido and sexual activity^[38,39] Thase *et al.* demonstrated that in depressed patients nocturnal penile tumescence (NPT) time and penile rigidity are significantly reduced than nondepressed controls and confirmed these findings in a repeat study with a new group of patients.^[38,39] Steiger *et al.* found that complete lack of NPT was reversed after antidepressant therapy in depressed patients.^[40] These findings suggest that in some of the depressed patients there is a neurophysiologic link between ED and depression.

GHQ-30 scoring of the participants with ED was found to be significantly higher than those without any impairment in erection, showing that ED deteriorates the general health of diabetes patients [Table 3]. De Berardis

Table 3: Comparison of Hamilton Rating Scale for Depression, General Health Questionnaire-30, Quality of Life Instrument for Indian Diabetes patients, sex myth check list scores between erectile dysfunction and nonerectile dysfunction patients

Characteristics	Erectile dysfunction		t- value	P- value
	Severe ED (78) (Mean ± SD)	Absent (60) (Mean ± SD)		
HAM-D	19.064±6.01	12.667±5.59	6.382	0.000*
GHQ-30	54.3718±9.55	30.6000±2.90	18.599	0.000*
QOLID				
Role limitation	16.8333±1.70	23.9000±0.91	-29.087	0.000*
Physical endurance	17.9487±1.48	24.2667±1.16	-27.162	0.000*
General health	8.0513±0.91	10.3000±1.21	-12.453	0.000*
Treatment satisfaction	12.5641±1.30	14.9833±0.87	-12.379	0.000*
Symptoms bothersome	9.692±9.12	10.933±1.03	-1.048	0.297
Financial worries	14.2564±1.19	14.2000±1.17	0.276	0.783
Emotional mental health	14.8333±0.88	15.9500±0.90	-7.241	0.000*
Diet satisfaction	7.6667±0.73	8.7500±0.62	-9.155	0.000*
SMCL (total score)	16.5128±16.09	15.2500±1.74	0.605	0.547

SMCL – Sex myth check list; QOLID – Quality of Life Instrument for Indian Diabetes patients; GHQ-30 – General Health Questionnaire-30; HAM-D – Hamilton Rating Scale for Depression

et al. showed that ED in type 2 diabetes is related to health status perception.^[41] QOL of all the participants was assessed using QOLID and in most domains, ED cases have poorer quality, except for “financial worries” and “symptoms bothersome” in which the two groups shows no significant difference. Various other workers have also reported that ED patients have reduced QOL, high level of depressive and anxiety symptoms which might be due to lowered self-esteem, the effect on marriage and relationship and other co-morbidities.^[41,42] There was no significant difference in the prevalence and pattern of sexual myths among the ED and non-ED cases.

CONCLUSION

In the present study, we found that diabetic males with severe ED have a significantly higher age and poorer glycemic control. Age at which DM was first diagnosed and duration of untreated DM was significantly more in ED cases, due to their general tendency to ignore their symptoms and delay treatment seeking, and is a possible explanation of poorer glycemic control in ED cases. Depression in ED cases is more severe than non-ED cases. Development of ED in DM patients is primarily due to vascular and neurologic factors although psychological factors also play an appreciable role and should not be completely neglected. General health and QOL of DM patients is usually poor than general population which is further deteriorated by the presence of ED. As ED is quite commonly seen in diabetic patients, treating physician must keep an eye on patients at risk and educate them properly so that they can discuss the problem with their physicians and the progress of this serious disabling disorder, responsible for deteriorating the general health and QOL of diabetic patients, can be halted at early stages.

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Conflicts of interest

There are no conflicts of interest.

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