

Factors for Erectile Dysfunction in Patients of Diabetes Mellitus Type II

Mujtaba Shah¹, Nasrullah Aamer², Rajkumar³, Abdul Rabb Bhutto⁴, Ali Karim⁵, Nadeem Memon⁶

¹ Senior Registrar, Department of Medicine, Liaquat University of Medical & Health Sciences, Jamshoro Pakistan
Contribution in the study

² Professor, Department of Medicine, Peoples University of Medical & Health Sciences for Women, Nawabshah Pakistan
Contribution in the study

³ Assistant Professor, Department of Medicine, Bhattai Dental and Medical College MPK, Pakistan
Contribution in the study

⁴ Associate Professor, Department of Medicine, Al-Tibri Medical College Hospital, Hyderabad Pakistan
Contribution in the study

⁵ Lecturer, Department of Biochemistry, Liaquat University of Medical & Health Sciences, Jamshoro Pakistan
Contribution in the study

⁶ Associate Professor, Department of Medicine, Muhammad Medical & Dental College, Mirpurkhas Pakistan
Contribution in the study

CORRESPONDING AUTHOR

Dr. Mujtaba Shah

Senior Registrar, Department of Medicine, Liaquat University of Medical & Health Sciences, Jamshoro Pakistan
Email: mujtaba82shah@gmail.com

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ABSTRACT

Background: Erectile dysfunction (ED), commonly referred to as impotence, is the inability to achieve or maintain an erection sufficient for sexual activity. In patients with diabetes, the prevalence of ED is notably higher compared to the general population. The relationship between diabetes and erectile dysfunction is complex and multifactorial, involving both physiological and psychological factors. **Objective:** To evaluate the occurrence and various risk factors associated with erectile dysfunction in individuals living with diabetes mellitus type II. **Study Design:** Cross-sectional study. **Settings:** Medicine Department of Peoples University of Medical and Health Sciences, Nawabshah Pakistan. **Duration:** 06 months from January 2021 June 2021. **Methods:** Adult males aged between 30 and 70 years, medically diagnosed with diabetes mellitus, willing and able to provide informed consent for participation in the study and able to communicate effectively in the language used for data collection were included. Clinical measurements, including glycated hemoglobin (HbA1c) levels, blood pressure, and BMI levels, were obtained following standard protocols. Sexual Health Inventory for Men (SHIM) was used to assess the severity of erectile dysfunction. All the information was collected via study proforma. Data analysis was done by using SPSS version. **Results:** The patients' average age was 47.88±10.41 years, with an average duration of diabetes of 11.92±9.37 years and a mean HbA1c level of 10.05±2.34%. Out of all, 62.70% had erectile dysfunction among diabetes cases, subsequently, 29.40% exhibited mild erectile dysfunction, while 15.70% displayed moderate erectile dysfunction, and 17.60% were identified with severe erectile dysfunction. The severity of erectile dysfunction was significantly linked to factors such as advancing age, longer disease duration, physical activity, smoking, presence of peripheral neuropathy, and use of oral medications ($p < 0.05$). Moreover, more pronounced erectile dysfunction was observed in individuals who were overweight, obese, or had elevated HbA1c levels, although these associations were near to significant (>0.05). **Conclusion:** Erectile dysfunction among patients of diabetes was observed to be high 62.70%. Furthermore, it is revealed that the severity of erectile dysfunction was significantly influenced by multiple factors, including advancing age, extended disease duration, physical inactivity, smoking history, presence of peripheral neuropathy, overweight and use of oral medications.

Keywords: Diabetes mellitus, Erectile dysfunction, Age, Physical activity, Smoking, Peripheral neuropathy, Medications.

INTRODUCTION

Erectile dysfunction among males is a frequently overlooked complication of diabetes mellitus.¹ This issue is progressively emerging as a substantial public health concern in both developing and developed nations.¹ Erectile Dysfunction (ED) stands as a prominent

societal issue, causing notable discomfort among men.² Despite the rising challenges in its treatment, having insight into the factors contributing to its emergence is vital for prevention and proper treatment. Furthermore, ED negatively impacts individuals' quality of life and correlates with feelings of depression, heightened anxiety, and diminished self-esteem in those affected.^{2,3}

On a worldwide scale, it is projected that approximately 322 million adult males will experience Erectile Dysfunction (ED) by the year 2025.¹

It is presently recognized as the most dependable indicator of complications related to organs and the vascular complication.^{1,4} Certain recorded accounts have outlined the primary factors that elevate the risk of Erectile Dysfunction (ED) in individuals with diabetes.⁵ These factors encompass neuropathy, insufficient blood circulation, suboptimal management of blood sugar, high blood pressure, diminished testosterone levels, and lifestyle aspects like smoking, alcohol consumption, and physical inactivity. Additionally, it's noteworthy that the incidence of ED undergoes a concerning rise in tandem with advancing age.^{5,6} Individuals afflicted by chronic medical conditions are more prone to experiencing sexual dysfunction (SD) due to disturbances in physiological processes, adverse effects of medications, emotional upheaval, or a convergence of these elements.^{7,8}

The intricate manner in which diabetes contributes to SD encompasses various factors, including psychological triggers, alterations in blood flow, nerve-related issues, hormonal imbalances, and the deterioration of smooth muscle within the corpus cavernosum.^{7,8} Within the United States, the prevalence of Erectile Dysfunction (ED) among individuals with diabetes was recorded at 51.3%.^{9,10} Therefore, the discovery of an ED prevalence exceeding 80% within the general population of Pakistan is indeed a cause for concern.⁹ Taking into account this substantial occurrence of ED over a decade ago, it becomes imperative to delve into the prevalence of ED and the factors connected to it in our own population.

METHODS

This cross-sectional study was done at Medicine Department of Peoples University of Medical and Health Sciences, Nawabshah Pakistan. Study duration was six months from January 2021 June 2021.

All the adult males aged between 30 and 70 years, medically diagnosed with diabetes mellitus, willing and able to provide informed consent for participation in the study and able to communicate effectively in the language used for data collection were included.

Individuals with diabetes who have a history of major psychiatric disorders that could significantly affect their ability to participate in the study, patients with severe cognitive impairment or inability to understand and respond to the questionnaires, history of major medical conditions (e.g., severe cardiovascular disease, chronic kidney disease, end-stage liver disease) that could independently impact sexual function and current use of medications specifically prescribed for the treatment of

erectile dysfunction due to potential confounding effects were excluded.

Complete medical history and informed consent were done. Upon obtaining informed consent, participants' demographic information, medical history, and diabetes management details were recorded. Clinical measurements, including glycated hemoglobin (HbA1c) levels, blood pressure, and BMI levels, were obtained following standard protocols. Sexual Health Inventory for Men (SHIM) was used to assess the severity of erectile dysfunction.^{11,12} All the information was collected via study proforma. Data analysis was done by using SPSS version 20.

RESULTS

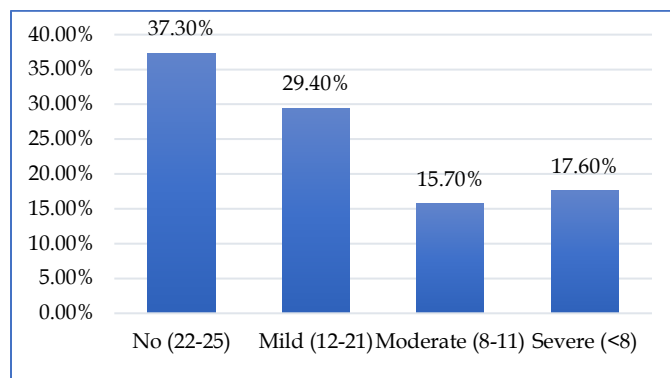
A total of 51 cases of diabetes were examined concerning erectile dysfunction. The patients' average age was 47.88 ± 10.41 years, with an average duration of diabetes of 11.92 ± 9.37 years and a mean HbA1c level of $10.05 \pm 2.34\%$. Among all cases, 21.6% were classified as overweight, 5.9% as obese, and 72.5% as having a normal body weight. A history of sufficient physical activity was noted in 62.7% of cases, while 25.5% had a history of smoking. Peripheral neuropathy was present in 41.2% of instances. With respect to diabetes treatment, 49.0% of cases were being treated with oral medications, 33.3% with insulin therapy, and 17.6% were undergoing a combined treatment regimen of both insulin and oral medications.

Table 1: Descriptive statistics demographic variables (n=51)

Variables		Statistics	
Mean age		47.88 ± 10.41 years	
Duration of diabetes		11.92 ± 09.37 years	
Mean HbA1c		10.05 ± 02.34%	
BMI	Normal	37	72.5%
	Over weight	11	21.6%
	Obese	3	5.9%
Occupation	Shopkeeper	6	11.8%
	Labor	9	17.6%
	Farmer	10	19.6%
	Driver	8	15.7%
	GVT Job	11	21.6%
	Student	4	07.8%
	Doctor	3	05.9%
Physical activity	Yes	32	62.7%
	No	19	37.3%
History of smoking	Yes	13	25.5%
	No	38	74.5%
Peripheral neuropathy	Yes	21	41.2%
	No	30	58.8%
Treatment of diabetes	Medicine	25	49.0%
	Insulin	17	33.3%
	Both	9	17.6%

Out of all study subjects, 62.70% had erectile dysfunction. Subsequently, 29.40% exhibited mild erectile dysfunction, while 15.70% displayed moderate erectile dysfunction, and 17.60% were identified with severe erectile dysfunction. Figure 1

Figure 1: Severity of erectile dysfunction n=51



The degree of erectile dysfunction showed a notable correlation with increased age, prolonged disease duration, engagement in physical activity, smoking history, presence of peripheral neuropathy, and utilization of oral medications (p < 0.05). Severity of erectile dysfunction was higher in overweight, obese and those with raised HbA1c level, while p-values were near to significant (>0.05). Table 2

Table 2: Severity of erectile dysfunction according to different factors (n=51)

Factors		Severity of erectile dysfunction (SHIM score)					p-value
		No (22-25)	Mild (12-21)	Moderate (8-11)	Severe (<8)	Total	
Age groups	≤30 years	8 (15.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	8 (15.7%)	0.0001
	31-40 years	4 (7.8%)	2 (3.9%)	1 (2.0%)	0 (0.0%)	7 (13.7%)	
	40-50 years	3 (5.9%)	5 (9.8%)	0 (0.0%)	0 (0.0%)	8 (15.7%)	
	51-60 years	3 (5.9%)	6 (11.8%)	4 (7.8%)	3 (5.9%)	16 (31.4%)	
	>60 years	1 (2.0%)	2 (3.9%)	3 (5.9%)	6 (11.8%)	12 (23.5%)	
Duration of diabetes	≤5 years	13 (25.5%)	5 (9.8%)	1 (2.0%)	0 (0.0%)	19 (37.3%)	0.002
	6-10 years	4 (7.8%)	6 (11.8%)	2 (3.9%)	2 (3.9%)	14 (27.5%)	
	11-15 years	2 (3.9%)	1 (2.0%)	0 (0.0%)	1 (2.0%)	4 (7.8%)	
	15-20 years	0 (0.0%)	1 (2.0%)	0 (0.0%)	2 (3.9%)	3 (5.9%)	
	>20 years	0 (0.0%)	2 (3.9%)	5 (9.8%)	4 (7.8%)	11 (21.6%)	
HbA1c	6.5-10.0%	13 (25.5%)	9 (17.6%)	3 (5.9%)	2 (3.9%)	27 (52.9%)	0.078
	10.1-15.0%	6 (11.8%)	6 (11.8%)	4 (7.8%)	7 (13.7%)	23 (45.1%)	
	>15.0%	0 (0.0%)	0 (0.0%)	1 (2.0%)	0 (0.0%)	1 (2.0%)	
BMI	Normal	17 (33.3%)	10 (19.6%)	5 (9.8%)	5 (9.8%)	37 (72.5%)	0.072
	Over weight	2 (3.9%)	5 (9.8%)	1 (2.0%)	3 (5.9%)	11 (21.6%)	
	Obese	0 (0.0%)	0 (0.0%)	2 (3.9%)	1 (2.0%)	3 (5.9%)	
Physical activity	Yes	19 (37.3%)	10 (19.6%)	2 (3.9%)	1 (2.0%)	32 (62.7%)	0.0001
	No	0 (0.0%)	5 (9.8%)	6 (11.8%)	8 (15.7%)	19 (37.3%)	
History of smoking	Yes	0 (0.0%)	7 (13.7%)	2 (3.9%)	4 (7.8%)	13 (25.5%)	0.008
	No	19 (37.3%)	8 (15.7%)	6 (11.8%)	5 (9.8%)	38 (74.5%)	
Peripheral neuropathy	Yes	1 (2.0%)	4 (7.8%)	8 (15.7%)	8 (15.7%)	21 (41.2%)	0.001
	No	18 (35.3%)	11 (21.6%)	0 (0.0%)	1 (2.0%)	30 (58.8%)	
Types of diabetes treatment	Medicine	5 (9.8%)	12 (23.5%)	4 (7.8%)	4 (7.8%)	25 (49.0%)	0.0001
	Insulin	14 (27.5%)	2 (3.9%)	1 (2.0%)	0 (0.0%)	17 (33.3%)	
	Both	0 (0.0%)	1 (2.0%)	3 (5.9%)	5 (9.8%)	9 (17.6%)	

DISCUSSION

Erectile dysfunction (ED) stands as a significant concern among patients diagnosed with diabetes, affecting both their physical and psychological well-being. This study investigates the occurrence of ED in individuals with diabetes, aiming to determine the underlying factors contributing to its prevalence and severity. The study analyzed 51 diabetes cases in relation to erectile dysfunction. The patients had an average age was 47.88±10.41 years, an average diabetes duration was 11.92±9.37 years, and a mean HbA1c level was 10.05±2.34%. Consistently Ahmed I et al¹³ reported that

the patient’s average age was 43.1 ± 8.160 year. In another study by Khattak MB et al¹⁴ reported that the average age of the patients was 52.75 ± 10.367 years.

In this study 62.70% had erectile dysfunction, subsequently, 29.40% exhibited mild erectile dysfunction, while 15.70% displayed moderate erectile dysfunction, and 17.60% were identified with severe erectile dysfunction. These findings were supported by the Khattak MB et al¹⁴ as the total occurrence rate of erectile dysfunction (ED) amounted to 65.1%, and out of these 95 individuals affected by ED, 6.8% cases had mild ED, 10.3% had moderate ED, 26% encountered a more

pronounced moderate level, and 21.9% suffered from severe ED, while 34.9% observed without erectile dysfunction. Our findings were also supported by the Ahmed I *et al*¹³ regarding its frequency and severity. In the line of this series Hurisa AD *et al*¹⁵ also reported that the 9.7% cases had mild ED, 16.6% cases had mild to moderate ED, 12.0% had moderate and 22.3% cases had severe ED, while 39.4% cases were normal. ED's prevalence among patients with diabetes presents a substantial challenge, often leading to diminished quality of life, strained relationships, and increased psychological distress. Different factors influencing ED in diabetes cases, encompassing both physiological and lifestyle elements. It examines how age and disease duration intertwine, potentially exacerbating the risk of ED due to the cumulative impact of diabetes-related complications. Moreover, lifestyle factors such as physical activity and smoking come to the forefront as determinants of ED severity, highlighting the role of self-care practices in mitigating this condition.

In this study the degree of erectile dysfunction showed a notable correlation with increased age, prolonged disease duration, engagement in physical activity, smoking history, presence of peripheral neuropathy, and utilization of oral medications ($p < 0.05$). Moreover, the severity of erectile dysfunction was higher in overweight, obese and those with raised HbA1c level, while p-values were near to significant (>0.05). Our findings were correlated with study by Khattak MB *et al*¹⁴ as the age of patients, duration of diabetes, high blood pressure, smoking habits, hyperlipidemia and the presence of a medical history involving coronary artery and kidney disease were all found to be individually linked to erectile dysfunction in diabetic patients ($p < 0.05$). In the correlation of our findings Getie Mekonnen E *et al*⁷ observed that advanced age, limited engagement in physical activity, extended duration of living with diabetes, presence of diabetic complications, co-existing medical conditions, dissatisfaction with the couple relationship, and inadequate metabolic control all contributed to an elevated likelihood of experiencing sexual dysfunction. In the study by Nisahan B *et al*¹⁶ concluded that the several factors play a role in causing erectile dysfunction in men with diabetes, including overweight, smoking habits, high blood pressure, lipid profile abnormalities and autonomic neuropathy. On the other hand, Alenezi TM *et al*¹⁷ and Enoma A *et al*¹⁸ also found few comparable factors among diabetic individuals with erectile dysfunction. Advancing age is closely associated with a higher likelihood of experiencing erectile dysfunction. As men age, physiological changes occur in the vascular system, leading to reduced blood flow to the penile tissues, which is essential for achieving and maintaining an erection. Additionally, hormonal changes and the cumulative

effects of chronic conditions like diabetes can further exacerbate age-related factors contributing to ED. Prolonged exposure to high glucose levels increases the risk of endothelial dysfunction and impaired neural signaling, both of which are fundamental to normal erectile function. Smoking damages blood vessels, reduces blood flow, and contributes to the development of atherosclerosis, all of which can hinder the ability to achieve and sustain an erection. Smoking-induced vascular damage is particularly detrimental to the penile arteries, further exacerbating the ED risk in diabetic men. furthermore, regular physical activity is associated with improved cardiovascular health and blood flow, which are essential for a healthy erectile response. Sedentary behavior and a lack of exercise can contribute to poor blood circulation, leading to decreased penile blood flow and impaired erectile function. This study investigating the occurrence rate and factors contributing to erectile dysfunction (ED) in patients with diabetes has provided valuable insights, yet it is essential to acknowledge its limitations. One of the primary limitations is the relatively limited sample size, which may impact the generalizability of the findings to a broader diabetic population. A larger and more diverse sample would bolster the external validity of the results and allow for a more comprehensive understanding of the multifaceted interactions between diabetes and ED.

CONCLUSION

Erectile dysfunction among patients of diabetes was observed to be high 62.70%. Furthermore, it is revealed that the severity of erectile dysfunction was significantly influenced by multiple factors, including advancing age, extended disease duration, physical inactivity, smoking history, presence of peripheral neuropathy, overweight and use of oral medications. Recognizing and addressing these factors within diabetes management and care strategies can significantly enhance patients' sexual health and overall quality of life.

LIMITATIONS

One important limitation was the limited sample size used in the study. The relatively small number of participants might constrain the generalizability of the findings to a larger diabetic population. Patients may have been hesitant or reluctant to provide accurate and candid information regarding their sexual experiences, behaviors, and concerns. This could introduce response bias and result in underreporting or misrepresentation of relevant data.

SUGGESTIONS / RECOMMENDATIONS

To address the gaps identified, researchers should consider larger and more diverse samples, longitudinal designs, objective measurements, and comprehensive

assessments of relevant factors. Additionally, conducting intervention studies to assess the impact of targeted lifestyle modifications on ED in diabetic patients could provide actionable insights for clinical practice.

CONFLICT OF INTEREST / DISCLOSURE

None.

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