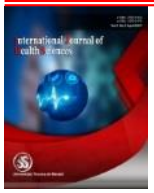

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The Prevalence of Cardiovascular Disease in Male Patients with Type 2 Diabetes Mellitus and Erectile Dysfunction, along with an Assessment of Shared Cardiovascular Risk Factors

Emad Sakran Niema [a], Rawayh Muslim Albaghlany [b], Abbas Ali Mansour [c]

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Corresponding Author [b]

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Abstract

Background: In men with Type 2 Diabetes Mellitus (T2DM), erectile dysfunction (ED) is correlated with increased rates of cardiovascular events when compared to men with T2DM who do not experience ED. This association suggests the presence of underlying health issues that require timely intervention. The objective of this study was to examine the cardiovascular risk in men with T2DM and ED. Identifying these risk factors may facilitate preventive measures to improve clinical outcomes in this high-risk population. Methods: Study Population: 124 patients were evaluated at the Faiha Diabetes and Endocrine Centre (FDEMC) from March 2024 to March 2025. Inclusion Criteria: Males diagnosed with Type 2 Diabetes Mellitus (T2DM) who also exhibit erectile dysfunction (ED) as determined by the International Index of Erectile Dysfunction (IIED). Grouping: Participants were categorized into two groups based on their cardiovascular disease (CVD) status. Analysis: A comparative analysis of the two groups was conducted concerning age, the presence of neuropathy, tobacco usage, and alcohol consumption. Results: Prevalence of CVD: CVD was present in 51.6 % of the total sample. In both groups, the mean qualification years, duration of diabetes, BMI, cholesterol levels, prevalence of hypertension, and use of drugs affecting ED were similar. Patients in the CVD group were older, smoked, used alcohol, and had CVD more frequently. In males with T2DM and ED, increased ischemic heart disease, stroke, and peripheral vascular complications were all significantly increased. Conclusion: Our analysis indicates a direct association between ED and CVD in males with T2DM, suggesting a more complex relationship in which ED may function as a contributing indicator of more advanced disease. Understanding this relationship is crucial for early intervention and improved health outcomes. These findings may facilitate the development of targeted treatment strategies for this patient population.

[a] Faiha Specialized Diabetes, Endocrine and Metabolism Center (FDEMC), University of Basrah, Iraq
[b] Department of Medical Microbiology, College of Dentistry, University of Basrah, Iraq & Faiha Specialized Diabetes, Endocrine, and Metabolism Center (FDEMC), University of Basrah, Iraq
[c] Faiha Specialized Diabetes, Endocrine, and Metabolism Center (FDEMC), University of Basrah, Iraq

Contents

1 Introduction

Type 2 diabetes mellitus (T2DM) is a multifactorial metabolic disorder characterized by a diminished capacity of the body to utilize insulin effectively, resulting in chronic hyperglycemia (Eckel et al., 2021). Cardiovascular disease (CVD) represents one of the predominant comorbidities associated with T2DM and is a significant contributor to morbidity and mortality among affected individuals. Concurrently, an increasing body of literature indicates a potential association between erectile dysfunction (ED), commonly defined as a persistent inability to achieve or maintain an erection adequate for satisfactory sexual performance, and undiagnosed T2DM. Furthermore, ED may serve as an early warning sign of vascular disease (Saffati et al., 2025).

Endothelial dysfunction has been recognized as a critical pathophysiological link among T2DM, ED, and CVD. This dysfunction contributes to the impairment of nitric oxide (NO)- mediated vasodilation and promotes pathological inflammatory processes within the vasculature (Dilixiati et al., 2024). Hyperglycemia induced glycation of endothelial proteins further exacerbates the production of excessive reactive oxygen species (ROS) and diminishes NO bioavailability, thereby aggravating arterial stiffness, hypertension, and atherogenesis (Fakhruddin et al., 2017). These alterations in vascular endothelium and smooth muscle result in a reduction of arterial inflow within the penile circulation, ultimately leading to erectile dysfunction (Burnett, 2006). Importantly, vascular compromise may occur long before flow-limiting plaques become visible in the arteries that feed the penis, indicating that ED may sometimes precede clinical symptoms of ischemic CVD (Kessler et al., 2019).

Epidemiological studies show a higher prevalence of ED of 35% to 50% among T2DM men (Oyelade et al., 2016) and, thus, a disproportionate prevalence of ED in men with T2DM compared to the general male population. In addition, the severity of ED increases with age and with relevant comorbidities such as hypertension, dyslipidemia, obesity, and smoking (Corona et al., 2020). Indeed, ED does seem to share several risk factors with coronary artery disease, and some investigators have suggested it be considered a Coronary Artery Disease (CAD) risk equivalent, much like peripheral artery disease (Khanna et al., 2022). Hence, men who have both T2DM and ED constitute a high-risk subgroup in whom the clinical recognition of ED may represent a valuable opportunity for investigation of underlying or looming cardiovascular morbidities (Terentes-Printzios et al., 2022).

Although there is a recognized correspondence of risk factors and mechanisms, there are queries regarding the actual incidence of CVD in men suffering from T2DM and ED and whether modifiable and non-modifiable risk factors may together exacerbate vascular injury in this subcategory. The study aimed to assess the prevalence of CVD among males with T2DM and ED.

2 Materials and Methods

Study design and population

A cross-sectional study was conducted at Faiha Specialized Diabetes, Endocrine, and Metabolism Center (FDEMC) in Basrah, Southern Iraq. The study involved 124 male participants aged 18 years and older, all of whom had been diagnosed with T2DM and ED. All participants were married and underwent standard clinical evaluations. The study protocol received authorization from the local institutional review board (IRB), and written informed consent was taken from each participant before their inclusion in the study. All procedures and applications were conducted in compliance with the Declaration of Helsinki.

Data collection

A standardized two-part questionnaire was administered to participants. The first section collected demographic and clinical data, including age, marital status, educational attainment, body mass index (BMI), alcohol consumption (defined as ≥21 units per week for individuals classified as alcoholics), and smoking status. Current smokers were identified as individuals who reported smoking ≥1 cigarette per day in the past year, while ex-smokers were those who had abstained from smoking for more than three months, and non-smokers reported no history of tobacco use. Diabetes-related parameters included the duration of diabetes, glycemic control (assessed via glycated hemoglobin [HbA1c]), the use of antihyperglycemic medications, other relevant treatments, and the presence of comorbidities such as peripheral vascular disease (PVD) and ischemic heart disease (IHD).

The second section focused on ED status. The five-item International Index of Erectile Function (IIEF) was utilized to assess ED. The IIEF evaluates five domains of male sexual function (erectile function, orgasmic function, sexual desire, intercourse satisfaction, and overall satisfaction). A total score of <14 served as the cutoff for defining ED. In this study, ED was defined as the self-reported inability to achieve or maintain an erection sufficient for satisfactory sexual performance.

Clinical assessments

The study's comprehensive clinical assessment was essential for accurately characterizing the comorbidity profile and clarifying cardiovascular risk factors in men with T2D and ED. Hypertension was evaluated following established clinical guidelines, defined as a blood pressure measurement of ≥130/80 mmHg, averaged from two readings taken two minutes apart. At the same time, the patient is seated, or by the current utilization of antihypertensive medications. Peripheral Vascular Disease (PVD) was diagnosed based on clinical history indicating intermittent claudication and/or the absence of foot pulses. Ischemic Heart Disease (IHD) was identified through a documented history of admission to a coronary care unit; elevated cardiac biomarkers; electrocardiographic findings indicative of Q-wave myocardial infarction or left bundle branch block; echocardiographic evidence of segmental wall motion abnormalities; angiographic confirmation of coronary artery disease; or a history of percutaneous coronary intervention or coronary artery bypass grafting. Cerebrovascular disease is diagnosed when a sudden neurological deficit persists for 24 hours or longer, with or without accompanying confirmatory neuroimaging changes. Macrovascular disease was considered present if the patient exhibited any of the following conditions: PVD, ischemic heart disease (IHD), or cerebrovascular disease. Peripheral neuropathy is characterized by the presence of neuropathic symptoms and/or abnormal results from vibration testing conducted with a 128-Hz tuning fork applied to the distal phalanx of the first toe or by diminished pinprick sensation assessed using sterile neurological examination pins (Neurotips).

Laboratory measurements

Blood samples were collected for routine biochemical analyses. Glycated hemoglobin (HbA1c) levels were quantified using high-performance liquid chromatography (HPLC) and expressed as a percentage. The treating physician conducted further assessments, including lipid profiles and renal function tests, as necessary per established clinical protocols.

3 Results and Discussions

3.1 Results

124 male patients diagnosed with T2DM were enrolled during routine visits to the Faiha Diabetes and Endocrine Centre (FDEMC). Each patient underwent thorough demographic and clinical evaluations, including age, educational attainment (measured in years of formal schooling), body mass index (BMI), smoking and alcohol consumption habits, cardiovascular risk factors, glycemic control, current medications, and diabetes-related complications. ED was identified using the short form of the International Index of Erectile Function (IIEF).

In the cohort of patients with ED, the mean (± SD) age was 58.62 ± 10.35 years, and the mean duration of formal education was 10.04 ± 8.51 years. Current smoking was reported by 26.6% of patients, while 3.2% reported current alcohol consumption. Overall, 51.6% had a history of one or more cardiovascular diseases (CVD), including stroke (16.1%), ischemic heart disease (37.9%), and peripheral vascular disease (9.7%). The mean duration of diabetes was 11.03 ± 8.62 years, with 60.5% of participants receiving insulin therapy. Hypertension was documented in 56.5% of patients, while peripheral neuropathy was observed in 86.3%. Additionally, 3.2% had undergone lower-limb amputation, and 10.5% presented with diabetic foot ulcers. The mean HbA1c level was 10.19 ± 1.92%. Further clinical and biochemical characteristics of these 124 patients are summarized in **Table 1**.

Table 1
Basic characteristics of 124 patients with T2DM and ED

Variable	**Value**
Age (years), mean ± SD	58.62 ± 10.35
Educational attainment (years), mean ± SD	10.04 ± 8.51
Smoking Status, n (%)	
Current smoker	33 (26.6%)
Ex-smoker	37 (29.8%)
Never smoked	54 (43.5%)
Alcohol Consumption, n (%)	
Current drinker	4 (3.2%)
Ex-drinker	51 (41.1%)
Never consumed alcohol	69 (55.6%)
Diabetes Characteristics	
Duration of diabetes (years), mean ± SD	11.03 ± 8.62
Insulin use, n (%)	75 (60.5%)
Cardiovascular Disease (CVD), n (%)	
Any cardiovascular disease	64 (51.6%)
Ischemic heart disease (IHD)	47 (37.9%)
Cerebrovascular accident (stroke)	20 (16.1%)
Peripheral vascular disease (PVD)	12 (9.7%)
Hypertension	70 (56.5%)
Diabetes Complications, n (%)	
Peripheral neuropathy	107 (86.3%)
Lower limb amputation	4 (3.2%)
Diabetic foot ulcers	13 (10.5%)
Anthropometric & Laboratory Measures, mean ± SD	
Body Mass Index (BMI, kg/m^2)	26.83 ± 3.94
Fasting plasma glucose (mg/dL)	162.94 ± 45.97
Random plasma glucose (mg/dL)	252.08 ± 63.21
Glycated hemoglobin (HbA1c, %)	10.19 ± 1.92

Variable	Value
Lipid Profile, mean ± SD	
Total cholesterol (mg/dL)	191.11 ± 39.34
Triglycerides (mg/dL)	162.77 ± 58.73
LDL-cholesterol (mg/dL)	114.20 ± 32.32
HDL-cholesterol (mg/dL)	46.55 ± 10.10
VLDL-cholesterol (mg/dL)	31.54 ± 10.28
Medication Use, n (%)	
ACE inhibitors/ARBs	29 (23.4%)
Beta-blockers	66 (53.1%)
Calcium channel blockers	6 (4.8%)
Tricyclic antidepressants	4 (3.2%)
More than one medication	21 (16.9%)

Evaluating the impact of CVD on this group study was done by dividing 124 patients with ED into two groups based on documented histories of CVD. No significant differences were observed between the two groups regarding educational attainment, duration of diabetes, presence or absence of hypertension, insulin utilization, lipid profiles, BMI, or medications known to influence erectile function. In contrast, the mean age was significantly higher among participants with CVD. Additionally, neuropathy, smoking, and alcohol consumption were more prevalent in the CVD group. These comparative data are presented in **Table 2**.

Table 2
Clinical and demographic characteristics of patients with T2DM and ED, stratified by the presence of CVD

Variable	With CVD (n=64)	Without CVD (n=60)	P-value
Age (years)			
Mean ± SD	62.60 ± 10.12	54.95 ± 9.35	<0.001
≥ 50 years, n (%)	54 (84.4%)	38 (63.3%)	0.013
< 50 years, n (%)	10 (15.6%)	22 (36.7%)	0.007
Educational Qualification (years)	10.34 ± 11.19	9.73 ± 4.15	0.692
Duration of Diabetes (years)	11.17 ± 9.47	10.88 ± 7.69	0.853
Smoking Status, n (%)			
Current smoker	17 (51.5%)	16 (48.5%)	0.042
Ex-smoker	25 (67.6%)	12 (32.4%)	0.157
Non-smoker	22 (40.7%)	32 (59.3%)	0.040
Alcohol Consumption, n (%)			
Current drinker	3 (75.0%)	1 (25.0%)	0.021
Ex-drinker	33 (64.7%)	18 (35.3%)	0.061
Non-drinker	28 (40.6%)	41 (59.4%)	0.020
Insulin Use, n (%)	38 (50.7%)	37 (49.3%)	0.794
Hypertension, n (%)	39 (55.7%)	31 (44.3%)	0.298
Peripheral neuropathy, n (%)	59 (55.1%)	48 (44.9%)	0.049
Biochemical Measures (Mean ± SD)			
Fasting Blood Sugar (mg/dL)	158.68 ± 46.75	167.48 ± 45.07	0.602
Random Blood Sugar (mg/dL)	251.00 ± 64.07	253.23 ± 62.80	0.646
HbA1c (%)	10.04 ± 1.89	10.36 ± 1.95	0.342
Total Cholesterol (mg/dL)	193.46 ± 38.71	188.60 ± 40.17	0.863
Triglycerides (mg/dL)	157.57 ± 43.15	168.31 ± 71.70	0.067
LDL-C (mg/dL)	117.41 ± 32.97	110.78 ± 31.52	0.930
HDL-C (mg/dL)	46.95 ± 9.23	46.13 ± 11.01	0.071

Variable	With CVD (n=64)	Without CVD (n=60)	P-value
VLDL-C (mg/dL)	31.46 ± 9.30	31.62 ± 11.30	0.350
BMI (kg/m^2)	26.98 ± 3.85	26.68 ± 4.05	0.664
Medications affecting ED, n (%)	37 (56.1%)	29 (43.9%)	0.290

3.2 Discussion

The presented study evaluated a cohort of 124 male participants diagnosed with T2DM who also exhibited ED, as measured by IIEF. This psychometrically validated instrument evaluates multiple domains of male sexual functionality, including erectile capability, orgasmic response, sexual desire, coital activity, and comprehensive satisfaction (Bivalacqua et al., 2022). Our study revealed a prominent frequency of CVD in this diabetic demographic suffering from ED, explicitly stressing the occurrence of coronary heart disease (CHD). This result corroborates earlier investigations that have recognized a relationship between ED and heightened vulnerability to cardiovascular conditions, along with additional comorbidities, including hypertension, dyslipidemia, and obesity (Bozkurt et al., 2016). Jackson and associates have acknowledged the notable overlap between ED and CVD, connecting this occurrence to shared risk elements, hence suggesting that ED in diabetic men without obvious signs may indicate a potential risk for coronary artery disease (Jackson et al., 2002).

ED is increasingly recognized as a condition associated with several critical health issues, including diabetes, hypertension, and dyslipidemia (Dilixiati et al., 2024), and has been expanded to encompass systemic atherosclerosis. Importantly, ED may present before the onset of vascular abnormalities in significant regions, notably within the coronary and cerebrovascular systems (Tarnutzer et al., 2017). A comprehensive study conducted by Blumentals et al., which utilized a large managed-care database from the United States, demonstrated that men with ED were nearly twice as likely to experience an acute myocardial infarction compared to those without ED (odds ratio = 1.99; 95% CI, 1.17–3.38), even after controlling for confounding variables such as age, smoking status, obesity, and the use of cardiovascular medications (Blumentals et al., 2004).

Moreover, substantial empirical research demonstrates that several markers of underlying atherosclerosis, especially a raised coronary artery calcium (CAC) score, correlate with the incidence of ED. While our research sample did not encompass CAC evaluation, a multitude of studies have substantiated the substantial association between ED and cardiovascular risk determinants (Hamur et al., 2015).

The typical age of those who had T2DM and ED was nearly 58 years (57.62 ± 10.35), and they showed relatively low educational success (10.04 ± 8.51 years of education). However, a minor proportion (3.2%) disclosed current consumption of alcoholic beverages, and over a quarter (26.6%) identified as active smokers, a variable that may exacerbate vascular complications. A notable section of the examined demographic (51.6%) encountered at least one cardiovascular event, with stroke representing 16.1%, ischemic heart disease at 37.9%, and peripheral vascular disease at 9.7%, while 56.5% exhibited indications of hypertension. Ongoing hyperglycemia was evident, as shown by an average HbA1c of 10.19 ± 1.92% after a mean duration of 11.03 ± 8.62 years of diabetes management, with a significant 60.5% being reliant on insulin. Manifestations of complex diabetes-related health issues were observable in the heightened frequencies of peripheral nerve complications (86.3%), the incidence of foot injuries (10.5%), and the occurrence of lower limb amputations (3.2%). Collectively, these observations underscore the intricate relationship between inadequate glycemic regulation, cardiovascular ailments, and neuropathy in the etiology of ED, highlighting the necessity for an integrative management approach that includes lifestyle modifications, patient education, and thorough medical intervention.

In our evaluation of patients considering whether they have CVD, we determined that those with CVD were notably older. Advancing age surfaced as one of the most robust indicators of erectile dysfunction (ED) (Handelsman et al., 2015). This analysis uncovered a significant growth in the incidence of erectile dysfunction as individuals transitioned from their fifties (27%) to their sixties (50%) (Quilter et al., 2017). Such age-associated escalations in diabetic-related ED have been persistently documented in the literature. Kinsey and his associates discovered through a demographic investigation that ED affected less than 2% of males under the age of 40, with the rate escalating to 6.7% by 55 and hitting 24% by 70 (Hegazy et al., 2016). Collectively, one in ten men in that study reported experiencing erectile dysfunction.

Following the Massachusetts Male Aging Study (MMAS), an investigation discovered further factors associated with CVD, notably tobacco consumption and a heightened body mass index (BMI), each of which illustrates a significant link to erectile dysfunction (ED) (Pizzol et al., 2020). The results indicated that cigarette smoking nearly augmented the probability of experiencing moderate to severe ED by a factor of two (Vovk et al., 2018). Significantly, the usage of cigars and involuntary exposure to tobacco smoke were also associated with ED, even after adjusting for traditional risk factors such as age and the Framingham risk score (Marma & Lloyd-Jones, 2009). Within our examined cohort, we similarly observed a substantial association between tobacco consumption and the prevalence of CVD among individuals diagnosed with ED. In the Massachusetts Male Aging Study (O'Donnell et al., 2004), a marked relationship was found between erectile dysfunction and heart-related diseases, coupled with typical risk factors, including high blood pressure, dyslipidemia, and lower quantities of HDL cholesterol (Zhang et al., 2024). Although numerous studies have documented an elevated prevalence of ED among individuals afflicted with hypertension, certain investigations have not succeeded in substantiating this correlation. When a relationship is discerned, it may be attributed to the consequences of hypertension, atherosclerosis, or the pharmacological interventions prescribed for hypertension. Nevertheless, in our research, neither hypertension nor its corresponding treatment exhibited a significant association with the status of ED.

Neuropathy and macrovascular pathology represent significant determinants of enduring erectile dysfunction (ED). The fundamental pathophysiological mechanisms implicated encompass cavernosal arterial insufficiency, corporal veno-occlusive dysfunction (CVOD), and autonomic dysregulation (Burnett, 2003). Numerous investigations have suggested that macrovascular pathology and sensorimotor neuropathy independently augment the probability of ED fourfold and fivefold, respectively. Our results substantiate this corpus of evidence, illustrating a noteworthy correlation between peripheral neuropathy and cardiovascular disease (CVD) in individuals experiencing ED. While insufficient glycemic management is linked to erectile dysfunction in both types of diabetes, our analysis did not reveal a statistically relevant difference in mean HbA1c values among those with and without cardiovascular conditions. Moreover, alcohol consumption, recognized as a modifiable risk factor, has not been uniformly linked to ED in previous research; however, it was notably elevated in the CVD cohort within our sample. Furthermore, the body mass index and lipid profiles did not have significant discrepancies between the two populations.

The interrelated dynamics of T2DM, ED, and CVD are profoundly shaped by the endothelium, acting as a crucial defender of the vascular structure. Deterioration of endothelial function, characterized by diminished vasodilatory capability and heightened inflammatory responses, is prevalent among individuals afflicted with T2DM and cardiovascular ailments (Pacinella et al., 2022). Maintaining the framework of blood vessels relies heavily on endothelial cells, which create nitric oxide (NO) through the enzymatic activity of endothelial nitric oxide synthase (eNOS) (Förstermann & Li, 2011). This biochemical mechanism facilitates the relaxation of smooth muscle, particularly within the smaller arteries that are responsible for engorging the penis with blood. Nevertheless, enduring high glucose levels related to T2DM promote excessive glycation of endothelial proteins, leading to raised amounts of reactive oxygen species (ROS) and a related decline in nitric oxide availability. The decrease in NO bioavailability compromises penile vasodilation, a process that is imperative for the attainment of erection. These facts indicate that endothelial dysfunction is related to multiple diabetes-linked issues, like retinopathy, nephropathy, and atherosclerosis, which notably increase the risk of CVD (Rübsam et al., 2018). When considering CVD, poor nitric oxide (NO) synthesis aggravates arterial stiffness, high blood pressure, and the emergence of atheromatous deposits, increasing the chances of harmful cardiovascular events [**Figure 1**].

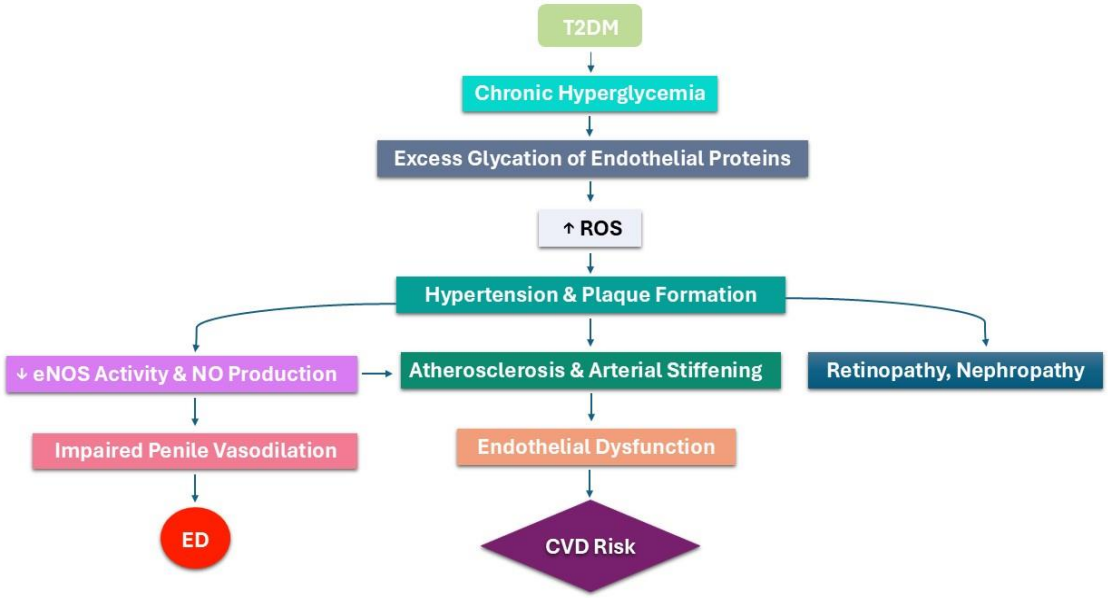

Figure 1. Pathological pathway between T2DM, Endothelial Dysfunction, and ED leading to CVD Risk

Ultimately, this research may substantiate the notion that ED is not exclusively a concern for individuals with diabetes; instead, it may also indicate broader issues associated with vascular health. Identifying ED as a potential precursor of atherosclerosis underscores the significance of early cardiovascular assessment and intervention in high-risk populations. Future research efforts involving larger longitudinal cohorts and employing advanced imaging modalities (e.g., coronary artery calcium scores, endothelial function assessments) may elucidate the interconnected mechanisms underlying these conditions and facilitate the development of tailored prevention and treatment strategies.

4 Conclusion

We identified a high prevalence of CVD among male patients who were newly diagnosed with T2DM and ED. Common cardiovascular risk factors in this population include advanced age, peripheral neuropathy, tobacco use, and alcohol consumption. These findings underscore the necessity for comprehensive cardiovascular screening and management of risk factors in men with diabetic ED. While certain high-risk genetic markers are non-modifiable, they can be monitored, and modifiable lifestyle factors, including smoking cessation, moderation of alcohol intake, and optimal control of blood glucose and blood pressure, can collectively contribute to reducing the risk of CVD in this high-risk population. Future investigations ought to prioritize the examination of larger cohorts and mechanistic assessments of endothelial dysfunction to clarify the interconnected pathophysiological mechanisms and enhance preventive approaches.

Competing Interest
The authors have no conflicts of interest concerning the content of this article.

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Authors' contribution

Emad Sakran Niema: Data collection, processing, data analysis, interpretation, and writing of the initial manuscript.
Rawayh Muslim Albaghlany: Research, literature review, analysis, writing, review, editing.
Abbas Ali Mansour: Conceptualization, control, critical review, writing, review & editing, and supervision

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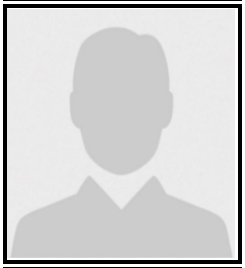
Appendix

Question	Options
Q1: How often were you able to get an erection during sexual activity? Q2: When you had erections with sexual stimulation, how often were your erections hard enough for penetration?	0 = No sexual activity, 1 = Almost never/never, 2 = A few times, 3 = Sometimes, 4 = Most times, 5 = Almost always/always
Q3: When you attempted sexual intercourse, how often were you able to penetrate (enter) your partner? Q4: During sexual intercourse, how often were you able to maintain your erection after you had penetrated (entered) your partner?	0 = Did not attempt intercourse, 1 = Almost never/never, 2 = A few times, 3 = Sometimes, 4 = Most times, 5 = Almost always/always
Q5: During sexual intercourse, how difficult was it to maintain your erection to completion of intercourse?	0 = Did not attempt intercourse, 1 = Extremely difficult, 2 = Very difficult, 3 = Difficult, 4 = Slightly difficult, 5 = Not difficult
Q6: How many times have you attempted sexual intercourse?	0 = No attempts, 1 = One to two attempts, 2 = Three to four attempts, 3 = Five to six attempts, 4 = Seven to ten attempts, 5 = Eleven+ attempts
Q7: When you attempted sexual intercourse, how often was it satisfactory for you?	0 = Did not attempt intercourse, 1 = Almost never/never, 2 = A few times, 3 = Sometimes, 4 = Most times, 5 = Almost always/always
Q8: How much have you enjoyed sexual intercourse?	0 = No intercourse, 1 = No enjoyment, 2 = Not very enjoyable, 3 = Fairly enjoyable, 4 = Highly enjoyable, 5 = Very highly enjoyable
Q9: When you had sexual stimulation or intercourse, how often did you ejaculate? Q10: When you had sexual stimulation or intercourse, how often did you have the feeling of orgasm or climax?	0 = No sexual stimulation/intercourse, 1 = Almost never/never, 2 = A few times, 3 = Sometimes, 4 = Most times, 5 = Almost always/always
Q11: How often have you felt sexual desire?	1 = Almost never/never, 2 = A few times, 3 = Sometimes, 4 = Most times, 5 = Almost always/always
Q12: How would you rate your level of sexual desire?	1 = Very low/none at all, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high
Q13: How satisfied have you been with your overall sex life? Q14: How satisfied have you been with your sexual relationship with your partner?	1 = Very dissatisfied, 2 = Moderately dissatisfied, 3 = About equally satisfied and dissatisfied, 4 = Moderately satisfied, 5 = Very satisfied
Q15: How do you rate your confidence that you could get and keep an erection?	1 = Very low, 2 = Low, 3 = Moderate, 4 = High, 5 = Very high

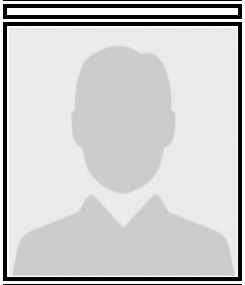
Figure legend

Figure 1. Pathological pathway between T2DM, Endothelial Dysfunction, and ED leading to CVD Risk. Chronic hyperglycemia in T2D leads to the glycation of endothelial proteins, thus increasing the levels of ROS and ultimately resulting in endothelial dysfunction. This dysfunction represents a common underlying issue in these interconnected diseases.

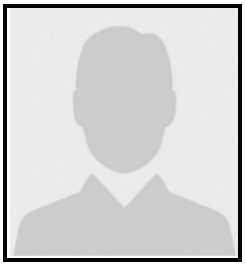
Biography of Authors



Emad Sakran Niema
Faiha Specialized Diabetes, Endocrine and Metabolism Center (FDEMC), University of Basrah, Iraq.
Email: eishmz100@yahoo.com



Rawayh Muslim Albaghlany
Department of Medical Microbiology, College of Dentistry, University of Basrah, Iraq & Faiha Specialized Diabetes, Endocrine, and Metabolism Center (FDEMC), University of Basrah, Iraq.
Email: rawayh.albaghlany@uobasrah.edu.iq



Abbas Ali Mansour
Faiha Specialized Diabetes, Endocrine, and Metabolism Center (FDEMC), University of Basrah, Iraq.
Email: abbas.mansour@fdemc.iq