

Sudan Medical Specialization Board

Council of Internal Med\cine

Prevalence and Risk Factors of Erectile Dysfunction Among Male Patients with Diabetes at Al-Jemaih Diabetes Center, Northern State, Sudan, August 2026–January 2027

A Proposal of Thesis Submitted in Partial Fulfillment of the Requirements for the Medical Doctorate in Internal Medicine

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Table of Abbreviations

Abbreviation	Full term
AOR	Adjusted Odds Ratio
BMI	Body Mass Index
CI	Confidence Interval
ED	Erectile Dysfunction
HbA1c	Hemoglobin A1c
IIEF	International Index of Erectile Function
IIEF-5	Five-item International Index of Erectile Function
OR	Odds Ratio
P	P-value / Probability value
RR	Relative Risk
SPSS	Statistical Package for the Social Sciences
T2DM	Type 2 Diabetes Mellitus

Chapter One

Introduction, Literature review, Problem statement, Justification, Research question, and objectives

1.1 INTRODUCTION AND BACKGROUND

Erectile dysfunction (ED) is the persistent inability to achieve or maintain a penile erection sufficient for satisfactory sexual activity. It is a common male sexual disorder and has particular clinical importance in patients with diabetes because it may reflect vascular, neurological, metabolic, hormonal, and psychological complications of chronic hyperglycaemia. The burden of diabetes continues to increase worldwide. According to the 11th edition of the International Diabetes Federation Diabetes Atlas, an estimated 589 million adults aged 20–79 years were living with diabetes in 2024, representing 11.11% of the global adult population. The number is projected to rise to approximately 853 million by 2050. Diabetes prevalence in 2024 was slightly higher among men than women, at 11.55% versus 10.68% [1].

ED occurs substantially more often in men with diabetes than in men without diabetes. A systematic review and meta-analysis of 145 studies involving 88,577 men reported an overall ED prevalence of 52.5% among men with diabetes. Prevalence differed by diabetes type, reaching 37.5% among men with type 1 diabetes and 66.3% among those with type 2 diabetes. Compared with men without diabetes, diabetic men had 3.62 times higher odds of ED [2]. A more recent umbrella review that included 108,030 male diabetic patients estimated a pooled global prevalence of 65.8%, while the pooled prevalence in Africa was 62.9% [3]. These findings indicate that ED affects approximately one-half to two-thirds of diabetic men, although estimates vary according to population characteristics, diabetes type, disease duration, and the instrument used to assess erectile function.

Evidence from Sudan suggests an even higher burden. A cross-sectional study conducted among 334 men with type 2 diabetes in eastern Sudan reported ED in 271 participants, giving a prevalence of 81.1% [4]. According to severity categories, 24.3% had severe ED, 15.6% had moderate ED, 22.5% had mild-to-moderate ED, and 13.9% had mild ED. In the same study, 77.8% of participants had uncontrolled diabetes. Increasing age, longer duration of diabetes, higher cholesterol levels, and poor glycaemic control were independently associated with ED; poor glycaemic control was associated with more than threefold higher odds of ED (AOR 3.38, 95% CI 1.70–6.71) [4]. However, published Sudanese data remain limited, and evidence from Northern State is particularly scarce.

The relationship between diabetes and ED is biologically complex. Normal penile erection depends on intact neural stimulation, endothelial function, nitric oxide release, smooth-muscle relaxation, and sufficient arterial inflow to the corpora cavernosa. Chronic hyperglycaemia promotes oxidative stress, formation of advanced glycation end-products, endothelial injury, and reduced nitric oxide bioavailability. Diabetes can also produce autonomic and peripheral neuropathy and structural changes

within penile vascular and smooth-muscle tissue. These abnormalities impair vasodilatation and cavernosal blood filling and may progressively reduce erectile function [5]. Coexisting hypertension, dyslipidaemia, obesity, cardiovascular disease, and other components of metabolic syndrome can further worsen endothelial and vascular dysfunction.

Several demographic, clinical, and lifestyle factors have been associated with ED in men with diabetes. A 2024 systematic review and meta-analysis of 58 studies involving 66,925 patients found significant associations with age, smoking, higher HbA1c, longer duration of diabetes, diabetic neuropathy, retinopathy, diabetic foot, cardiovascular disease, hypertension, nephropathy, vascular disease, depression, metabolic syndrome, and diuretic treatment [6]. Some of the strongest associations were reported for diabetic foot (OR 3.96), neuropathy (OR 3.47), retinopathy (OR 3.01), vascular disease (OR 2.75), and nephropathy (OR 2.67) [6]. These findings suggest that ED frequently occurs in the setting of established microvascular or macrovascular diabetic complications rather than as an isolated sexual complaint.

ED also has potential value as a marker of systemic vascular disease. A meta-analysis of 12 prospective cohort studies involving 36,744 men found that ED was associated with higher subsequent risks of cardiovascular disease (RR 1.48), coronary heart disease (RR 1.46), stroke (RR 1.35), and all-cause mortality (RR 1.19) [7]. Therefore, identifying ED in diabetic patients may provide an opportunity to assess broader cardiovascular and metabolic risk in addition to addressing sexual health.

Standardized assessment is essential because ED may be underreported during routine clinical encounters. The five-item International Index of Erectile Function (IIEF-5) is a brief, validated instrument developed as an abbreviated version of the original 15-item questionnaire to identify the presence and severity of ED. The five items were selected based on their ability to distinguish between men with and without ED and their relevance to the clinical definition of the condition. The instrument primarily assesses two aspects of male sexual function: erectile function and satisfaction with sexual intercourse. It evaluates sexual function during the preceding four weeks, making it suitable for clinical practice and epidemiological research. In its original validation study involving 1,152 men, the instrument demonstrated substantial agreement with clinical classification of ED, with a weighted kappa of 0.82 [8].

The five components assess different but related aspects of erectile performance. The first component evaluates erectile confidence, referring to the man's confidence in his ability to obtain and maintain an erection. The second assesses erection firmness and penetration ability, determining how often erections are sufficiently firm to permit vaginal penetration. The third evaluates maintenance of

erection after penetration, reflecting the ability to sustain an erection once sexual intercourse has begun. The fourth assesses difficulty in maintaining an erection until completion of intercourse, while the fifth evaluates satisfaction with sexual intercourse. Together, these components assess the ability to achieve an erection, maintain it during intercourse, and achieve satisfactory sexual performance [8].

Each component contributes to a total score ranging from 5 to 25, with higher scores indicating better erectile function. A total score of ≤21 indicates the presence of ED, while scores of 22–25 indicate normal erectile function. Severity is classified as severe ED (5–7), moderate ED (8–11), mild-to-moderate ED (12–16), mild ED (17–21), and no ED (22–25). In the original validation study, the cutoff score of 21 demonstrated a sensitivity of 98% and specificity of 88% for distinguishing men with ED from those without ED [8,9].

1.2 LITERATURE REVIEW

This literature review summarizes published evidence on the prevalence and associated risk factors of ED among men with diabetes. It presents findings from Sudanese, regional, and international studies, with emphasis on reported prevalence, ED severity, and demographic, metabolic, clinical, and lifestyle factors associated with ED:

1.2.1 Local Studies

Omar et al. conducted a cross-sectional study to determine the prevalence and associated factors of ED among men with T2DM in eastern Sudan. The study included 334 participants with a median age of 55.0 years and a median diabetes duration of 7.0 years. Of the participants, 260 (77.8%) had uncontrolled diabetes. Based on IIEF-5 assessment, 271 (81.1%) had ED. Regarding severity, 81 (24.3%) had severe ED, 52 (15.6%) had moderate ED, 75 (22.5%) had mild-to-moderate ED, and 63 (18.9%) had mild ED. Multivariable logistic regression showed that increasing age (AOR=1.07, 95% CI: 1.01–1.14), longer diabetes duration (AOR=1.26, 95% CI: 1.06–1.51), and higher cholesterol levels (AOR=3.53, 95% CI: 1.75–7.11) were associated with ED. Poor glycaemic control was also significantly associated with ED (AOR=3.38, 95% CI: 1.70–6.71; P<0.001) [10].

1.2.2 Regional Studies

Seid et al. conducted a hospital-based multicenter cross-sectional study to determine the prevalence and determinants of ED among diabetic men attending five hospitals in the Central and Northwestern Zones of Tigray, northern Ethiopia. The study included 249 participants with a mean age of 43.39 years and a mean diabetes duration of 6.22 years. The overall prevalence of ED was 69.9%, with 32.9% having mild, 31.7% moderate, and 5.2% severe ED. Multivariable logistic regression showed that older age was strongly associated with ED (AOR=15.01, 95% CI: 3.21–70.17), while longer diabetes duration was associated with approximately fourfold higher odds (AOR=3.77, 95% CI: 1.29–11.05). Lower monthly income was also independently associated with ED (AOR=0.29, 95% CI: 0.13–0.62). BMI, comorbidities, glycaemic control, and alcohol consumption showed no significant associations. Despite the high prevalence, 97% of participants had not previously been screened or treated for ED [11].

Olarinoye et al. conducted a study to determine the prevalence and determinants of ED among men with T2DM in Ilorin, Nigeria. The study included 77 adult men with a mean age of 56.8 years, of

whom 96.1% were married. Although only 44 (56.4%) participants voluntarily reported a history of ED, systematic assessment using the IIEF-5 identified ED in 74% of participants, demonstrating a substantially higher prevalence than spontaneous self-reporting. Moderate-to-severe ED was present in 39 (51%) participants. Among the clinical factors examined, increasing age was significantly associated with ED (P=0.04), while longer duration of diabetes was also significantly associated with ED (P=0.04). Other assessed clinical variables did not demonstrate statistically significant correlations. The study showed that ED was highly prevalent among Nigerian men with T2DM and that systematic assessment using the IIEF-5 identified considerably more affected patients than relying on voluntary reporting of erectile problems [12].

Ghanem et al. conducted a cross-sectional study to determine the prevalence and associated factors of ED among adult men with T2DM attending the Diabetes Outpatient Clinic at Alexandria Main University Hospital, Egypt. The study included 150 men aged 40–60 years, and erectile function was assessed using the validated Arabic version of the IIEF-5. The prevalence of ED was 80%. IIEF-5 scores showed significant negative correlations with increasing age, longer duration of diabetes, higher fasting blood glucose, and higher urinary albumin-to-creatinine ratio, indicating poorer erectile function with increasing values of these factors. In contrast, total serum testosterone showed a significant positive correlation with IIEF-5 scores. Multiple linear regression analysis identified total testosterone, urinary albumin-to-creatinine ratio, age, and fasting blood glucose as independent predictors of IIEF-5 scores. The findings indicated a high prevalence of ED among Egyptian men with T2DM, with poor glycaemic control and albuminuria identified as important associated factors [13].

AlMogbel conducted a cross-sectional study to determine the prevalence of ED and other sexual dysfunctions among Saudi men with T2DM and to assess their relationships with diabetes duration and glycaemic control. The study included 376 male patients, and sexual function was assessed using the IIEF, while glycaemic control was evaluated using HbA1c. ED was reported in 83% of participants, indicating a high burden among Saudi men with T2DM. The presence of ED was significantly associated with increasing age and longer duration of diabetes. Socioeconomic factors, including family income, occupation, and educational level, were also significantly associated with ED. In contrast, glycaemic control was not significantly associated with ED in the studied population. The study also evaluated other domains of sexual function, including intercourse satisfaction, orgasmic function, sexual desire, and overall satisfaction. The findings demonstrated that ED was highly prevalent and became more frequent with increasing age and duration of diabetes [14].

Al-Hunayan et al. conducted a cross-sectional study to determine the prevalence and predictors of ED among men newly diagnosed with T2DM attending a diabetes centre in Kuwait. The study included 323 men, and erectile function was assessed through face-to-face interviews using the IIEF-5, with a score of <21 used to identify ED. The prevalence of ED was 31%, indicating that approximately one-third of patients already had ED at the time of T2DM diagnosis. Significant differences between men with and without ED were observed for smoking status, duration of smoking, hypertension, educational level, BMI, and HbA1c. Multivariable logistic regression analysis identified increasing age as the most important independent predictor of ED. The findings demonstrated that ED may be present from the time T2DM is diagnosed and that several cardiovascular, metabolic, and lifestyle characteristics are associated with its occurrence [15].

1.2.3 International Studies

Yang et al. conducted a multicenter study to determine the prevalence and associated factors of ED among Chinese men with T2DM and to evaluate the efficacy and safety of sildenafil citrate among affected patients. Participants were recruited from 42 outpatient diabetes clinics, and erectile function was assessed using the IIEF-5. A total of 5,477 men were evaluated, of whom 75.2% had ED. Increasing age, longer duration of diabetes, and HbA1c >6.5% were independently and significantly associated with both the presence and severity of ED. Among participants with ED, 389 received sildenafil citrate, with significant improvement in erectile function following treatment based on IIEF-5 and Global Efficacy Questionnaire assessments. The study demonstrated a high prevalence of ED among Chinese men with T2DM and identified age, duration of diabetes, and inadequate glycaemic control as significant independent factors associated with its occurrence and severity [16].

Nutalapati et al. conducted an observational study to evaluate the prevalence and independent predictors of ED among men with T2DM attending a tertiary care centre in South India. The study included 720 men aged 30–70 years, with a mean age of 58.4 ± 7.8 years, and erectile function was assessed using the IIEF-5. Overall, 68.6% of participants had ED, of whom 54.6% had moderate-to-severe ED. Poor glycaemic control (HbA1c ≥7%) was present in 55.8% of participants. Men with ED had a significantly longer duration of diabetes than those without ED (8.1 ± 4.9 vs. 4.4 ± 3.5 years; P<0.001). Multivariable analysis identified longer diabetes duration, poor glycaemic control, hypertension, peripheral arterial disease, and testosterone deficiency as independent predictors of ED (P<0.05). The findings demonstrated a high prevalence of ED and identified several metabolic and vascular factors associated with its occurrence [17].

Giugliano et al. conducted a study to determine the prevalence and correlates of ED among men with T2DM attending diabetes outpatient clinics. Of 611 eligible men, 555 (90.8%) aged 35–70 years were included in the analysis, and erectile function was assessed using the IIEF-5. Approximately 60% had some degree of ED, including 9.0% mild, 11.2% mild-to-moderate, 16.9% moderate, and 22.9% severe ED. The prevalence of severe ED increased with advancing age. Higher HbA1c levels were associated with ED, as were metabolic syndrome, hypertension, atherogenic dyslipidaemia, and depression. In contrast, higher levels of physical activity were associated with a lower prevalence of ED; men with greater physical activity were approximately 10% less likely to have ED than those with the lowest activity levels. The findings demonstrated associations between ED and several metabolic and lifestyle factors among men with T2DM [18].

Fedele et al. conducted a large cross-sectional study to determine the prevalence and risk factors of ED among diabetic men attending 178 diabetes centers across Italy. The study included 9,868 men aged 20–69 years, of whom 3,534 (35.8%) reported ED. Prevalence increased markedly with age, from 4.6% among men aged 20–29 years to 45.5% among those aged ≥60 years (P=0.0001). Compared with diabetes duration ≤5 years, the odds of ED increased with a duration of 6–10 years (OR=1.3) and 11–30 years (OR=2.0). Compared with good metabolic control, fair and poor control were associated with higher odds of ED (OR=1.7 and 2.3, respectively). Arterial disease, retinopathy, nephropathy, and neuropathy were associated with increased ED risk. Current smokers also had higher odds of ED than never-smokers (OR=1.5, 95% CI: 1.3–1.6) [19].

The reviewed studies demonstrated a high but variable prevalence of ED among men with diabetes. Reported prevalence was 81.1% in eastern Sudan [10], 69.9% in Ethiopia [11], 74% in Nigeria [12], 80% in Egypt [13], 83% in Saudi Arabia [14], 31% among newly diagnosed patients in Kuwait [15], 75.2% in China [16], 68.6% in South India [17], approximately 60% in an Italian study [18], and 35.8% in a large Italian multicenter study [19].

Age and diabetes duration were the most consistently reported associated factors. In eastern Sudan, increasing age (AOR=1.07, 95% CI: 1.01–1.14) and diabetes duration (AOR=1.26, 95% CI: 1.06–1.51) were associated with ED [10]. In Ethiopia, the corresponding AORs were 15.01 for older age and 3.77 for longer diabetes duration [11]. Poor glycaemic control was associated with ED in Sudan (AOR=3.38, 95% CI: 1.70–6.71) [10], China [16], and India [17], while no significant association was reported in Ethiopia [11] or Saudi Arabia [14]. Other associated factors included high cholesterol

(AOR=3.53) in Sudan [10], hypertension and peripheral arterial disease in India [17], and smoking (OR=1.5) in Italy [19].

Despite an ED prevalence of 81.1% reported in eastern Sudan [10], published evidence from Sudan remains limited, with no comparable study identified from Northern State. The present study will therefore provide local estimates of ED prevalence and associated factors among male diabetic patients attending Al-Jemaih Diabetes Center using the IIEF-5.

1.3 PROBLEM STATEMENT

ED is a common complication of diabetes, with a global prevalence of 52.5% among diabetic men and 66.3% among those with T2DM [2]. In eastern Sudan, ED was reported in 81.1% of men with T2DM, including 24.3% with severe and 15.6% with moderate ED [10]. Increasing age, longer diabetes duration, higher cholesterol, and poor glycaemic control were significantly associated with ED [10].

Despite its high prevalence, ED may remain undetected because patients may not spontaneously report sexual problems. In Nigeria, 56.4% of diabetic men reported ED voluntarily, while IIEF-5 assessment identified ED in 74% [12]. Published Sudanese evidence remains limited, and there are no comparable data from Northern State. Therefore, the prevalence, severity, and associated risk factors of ED among male diabetic patients attending Al-Jemaih Diabetes Center remain unclear.

1.4 JUSTIFICATION

The high prevalence of ED among diabetic men and its association with metabolic, vascular, and diabetes-related factors justify its assessment in routine diabetes care. Local data from Northern State are lacking despite an ED prevalence of 81.1% reported in eastern Sudan [10].

This study will determine the prevalence and severity of ED using the IIEF-5 and identify associated demographic, clinical, metabolic, and lifestyle factors among male diabetic patients attending Al-Jemaih Diabetes Center. The findings will provide baseline data for Northern State and may support earlier identification and management of ED among diabetic patients.

1.5 RESEARCH QUESTION

What is the prevalence of ED and what factors are associated with ED among male patients with diabetes attending Al-Jemaih Diabetes Center, Northern State, Sudan, from August 2026 to January 2027?

1.6 OBJECTIVES

1.6.1 General Objective

To determine the prevalence and associated risk factors of ED among male patients with diabetes attending Al-Jemaih Diabetes Center, Northern State, Sudan, from August 2026 to January 2027.

1.6.2 Specific Objectives

1. To determine the prevalence of ED among male patients with diabetes using the IIEF-5.
2. To determine the severity of ED according to IIEF-5 scores.
3. To assess the association between ED and sociodemographic factors, including age, marital status, education, and occupation.
4. To assess the association between ED and diabetes-related factors, including diabetes type, duration, glycaemic control, treatment, and diabetic complications.
5. To assess the association between ED and clinical and lifestyle factors, including BMI, hypertension, dyslipidaemia, smoking, and physical activity.

Chapter Two

Materials and Methods

2. MATERIALS AND METHODS

2.1 Study Design

A descriptive cross-sectional hospital-based study will be conducted.

2.2 Study Area and Setting

The study will be conducted at Al-Jemaih Diabetes Center, Northern State, Sudan. The center provides outpatient care and follow-up services for patients with diabetes, including clinical assessment, monitoring of glycaemic control, treatment, and management of diabetes-related complications.

2.3 Study Period

The study will be conducted from August 2026 to January 2027.

2.4 Study Population

The study population will include adult male patients with diabetes attending Al-Jemaih Diabetes Center during the study period.

2.5 Inclusion Criteria

Male patients will be eligible if they:

- Are aged ≥18 years.
- Have a confirmed diagnosis of diabetes.
- Attend Al-Jemaih Diabetes Center during the study period.

2.6 Exclusion Criteria

Patients will be excluded if they:

- Are critically ill at the time of data collection.
- Have a known major psychiatric or cognitive disorder that interferes with reliable questionnaire completion.
- Decline to participate.

2.7 Sample Size

The sample size will be calculated using the single population proportion formula:

$$n = Z^2p(1 - p) / d^2$$

Where:

n = required sample size

Z = 1.96 at a 95% confidence level

p = expected prevalence of ED = 81.1% (0.811), based on the previous study conducted among men with T2DM in eastern Sudan [10]

d = margin of error = 5% (0.05)

$$\boldsymbol{n = \frac{(1.96)^2 \times 0.811 \times (1 - 0.811)}{(0.05)^2}}$$

$$\boldsymbol{n = 235.6}$$

The minimum required sample size will therefore be 236 participants.

2.8 Sampling Technique

A systematic random sampling technique will be used.

2.9 Data Collection Methods and Tools

Data will be collected using a structured interviewer-administered questionnaire consisting of sections covering sociodemographic characteristics, diabetes-related characteristics, clinical factors, lifestyle factors, and erectile function.

ED will be assessed using the IIEF-5. The instrument contains five questions assessing erectile confidence, erection firmness, maintenance of erection after penetration, difficulty maintaining erection until completion of intercourse, and intercourse satisfaction. The total score ranges from 5 to 25, with lower scores indicating poorer erectile function.

Participants will be classified according to their total IIEF-5 score as follows:

- 22–25: No ED
- 17–21: Mild ED
- 12–16: Mild-to-moderate ED
- 8–11: Moderate ED
- 5–7: Severe ED

For prevalence estimation and binary analysis, participants with an IIEF-5 score of ≤21 will be classified as having ED, while those scoring 22–25 will be classified as not having ED [8].

Relevant clinical information, including diabetes duration, treatment, glycaemic control, comorbidities, diabetic complications, and available recent laboratory results, will be obtained from participant interviews and medical records where available.

2.10 Study Variables

Variable Type	Variables
Dependent variables	ED status (present/absent), ED severity according to IIEF-5
Sociodemographic variables	Age, marital status, educational level, occupation
Diabetes-related variables	Type of diabetes, duration of diabetes, treatment modality, glycaemic control
Clinical variables	BMI, hypertension, dyslipidaemia, diabetic complications
Lifestyle variables	Smoking status, physical activity

2.11 Data Analysis Plan

Data will be entered, cleaned, coded, and analyzed using SPSS version 26.0. Categorical variables will be summarized using frequencies and percentages. Continuous variables will be summarized using mean and standard deviation for normally distributed data or median and interquartile range for non-normally distributed data.

The prevalence of ED will be calculated as the number of participants with an IIEF-5 score ≤21 divided by the total number of participants assessed and expressed as a percentage. The distribution of ED according to severity categories will also be reported.

Associations between ED and categorical independent variables will initially be assessed using the chi-square test or Fisher's exact test when appropriate. Continuous variables will be compared between participants with and without ED using the independent-samples t-test or an appropriate non-parametric test.

Binary logistic regression will be performed to identify factors independently associated with ED. Variables considered clinically relevant or showing an association in the initial analysis will be entered into the multivariable model. P-value <0.05 will be considered statistically significant.

2.12 Ethical Considerations

Ethical approval will be obtained from the relevant ethical committee of the Sudan Medical Specialization Board and permission will be obtained from the administration of Al-Jemaih Diabetes Center before data collection.

Eligible participants will receive an explanation of the study objectives and procedures, and informed consent will be obtained before participation. Participation will be voluntary, and participants will have the right to refuse or withdraw without affecting their medical care.

Because the questionnaire addresses sensitive sexual information, interviews will be conducted in a private setting. No participant names will be entered into the study database. Data will be coded and maintained confidentially and will be used solely for research purposes.

2.13 Time Frame

Activity	Aug 2026	Sep 2026	Oct 2026	Nov 2026	Dec 2026	Jan 2027
Proposal preparation		✓				
Ethical approval and hospital permission		✓				
Preparation of data collection tools		✓				
Data collection		✓	✓	✓	✓	✓
Data entry and cleaning						✓
Data analysis						✓
Report writing						✓
Final revision and submission						✓

2.14 Budget

Item	Estimated Cost (SDG)
Printing of proposal and questionnaires	30,000
Stationery (papers, files, pens)	20,000
Data entry and statistical analysis	50,000
Communication (phone calls for follow-up)	30,000
Transportation during data collection	50,000
Printing and binding of final thesis copies	30,000
Internet and data services	20,000
Miscellaneous expenses	20,000
Total Estimated Budget	**250,000 SDG**

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APPENDIX

APPENDIX (1)
CONSENT

<u>نموذج الموافقة المستنيرة للمشاركة في البحث</u>

نموذج الموافقة المستنيرة للمشاركة في البحث

عنوان البحث:

معدل انتشار وعوامل خطورة ضعف الانتصاب لدى مرضى السكري الذكور بمركز الجميح للسكري، الولاية الشمالية، السودان، أغسطس 2026 – يناير 2027

الباحث :د. أشرف أحمد صالح مختار

عزيزي المشارك،

ندعوك للمشاركة في هذه الدراسة التي تهدف إلى معرفة مدى انتشار ضعف الانتصاب والعوامل المرتبطة به لدى مرضى السكري الذكور بمركز الجميح للسكري. ستتم المشاركة من خلال الإجابة عن مجموعة من الأسئلة المتعلقة بمرض السكري، والحالة الصحية، ونمط الحياة، والوظيفة الجنسية.

مشاركتك في هذه الدراسة **طوعية تماماً**، ويحق لك رفض المشاركة أو الانسحاب في أي وقت دون أن يؤثر ذلك على الرعاية أو الخدمات الطبية المقدمة لك.

تتضمن الاستبانة بعض الأسئلة الشخصية المتعلقة بالوظيفة الجنسية. ستُجرى المقابلة في مكان يحافظ على خصوصيتك، وستُعامل جميع المعلومات التي تقدمها **بسرية تامة** .لن يُكتب اسمك في استمارة جمع البيانات، ولن تُستخدم المعلومات إلا لأغراض البحث العلمي.

لا توجد تكلفة مالية للمشاركة في هذه الدراسة، ولن تحصل على مقابل مالي نظير المشاركة. قد لا تكون هناك فائدة مباشرة لك، إلا أن نتائج الدراسة قد تساعد في تحسين التعرف على ضعف الانتصاب والعوامل المرتبطة به لدى مرضى السكري.

إقرار المشارك بالموافقة:

لقد قرأت المعلومات المذكورة أعلاه أو تم شرحها لي بصورة واضحة، وفهمت هدف الدراسة وطبيعة مشاركتي فيها. وقد أُتيحت لي الفرصة لطرح الأسئلة والحصول على الإجابات المناسبة. وبناءً على ذلك، أوافق بمحض إرادتي على المشاركة في هذه الدراسة.

اسم المشارك_____ **:**

التوقيع/البصمة_____ **:**

التاريخ_____ / _____ / _____ **:**

APPENDIX (2)

Questionnaire

Study Title: Prevalence and Risk Factors of Erectile Dysfunction Among Male Patients with Diabetes at Al-Jemaih Diabetes Center, Northern State, Sudan, August 2026–January 2027

Participant Code: _____

Date: ____ / ____ / _____

Section A: Sociodemographic Characteristics

1. **Age:** _____ years
2. **Marital status:**
    - ( ) Married
    - ( ) Single
    - ( ) Divorced
    - ( ) Widowed
3. **Educational level:**
    - ( ) No formal education
    - ( ) Primary
    - ( ) Secondary
    - ( ) University or above
4. **Occupation:**
    - ( ) Employed
    - ( ) Self-employed
    - ( ) Unemployed
    - ( ) Retired
5. **BMI:**
    - ( ) Underweight (<18.5 kg/m²)
    - ( ) Normal weight (18.5–24.9 kg/m²)
    - ( ) Overweight (25.0–29.9 kg/m²)
    - ( ) Obesity (≥30.0 kg/m²)

Section B: Diabetes-Related Characteristics

6. **Type of diabetes:**
    - ( ) Type 1
    - ( ) Type 2
7. **Duration of diabetes:** _____ years
8. **Current diabetes treatment:**
    - ( ) Oral medications only
    - ( ) Insulin only
    - ( ) Oral medications and insulin
    - ( ) Lifestyle measures only
9. **Most recent HbA1c:** _____ %
10. **Glycaemic control:**
    - ( ) Controlled (HbA1c <7%)
    - ( ) Uncontrolled (HbA1c ≥7%)
    - ( ) HbA1c not available

Section C: Clinical Characteristics and Diabetic Complications

11. **Hypertension:**

- ( ) Yes
- ( ) No

12. **Dyslipidaemia:**

- ( ) Yes
- ( ) No

13. **Diagnosed diabetic complications:**
    More than one answer may be selected.

- Peripheral neuropathy
- Retinopathy
- Nephropathy
- Diabetic foot

- Cardiovascular disease
- Peripheral arterial disease
- None

Section D: Lifestyle Factors

14. **Smoking status:**

- ( ) Current smoker
- ( ) Former smoker
- ( ) Never smoked

15. **Do you perform regular physical activity?**

- ( ) Yes
- ( ) No

16. **If yes, how many days per week?**

- ( ) 1–2 days
- ( ) 3–4 days
- ( ) ≥5 days

Section E: IIEF-5

Instructions: The following questions assess erectile function during the **past four weeks**. Select one response for each question.

17. **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

18. **When you had erections with sexual stimulation, how often were your erections hard enough for penetration?**

- ( ) 1 — Almost never or never
- ( ) 2 — A few times
- ( ) 3 — Sometimes
- ( ) 4 — Most times
- ( ) 5 — Almost always or always

19. **During sexual intercourse, how often were you able to maintain your erection after penetration?**

- ( ) 1 — Almost never or never
- ( ) 2 — A few times
- ( ) 3 — Sometimes
- ( ) 4 — Most times
- ( ) 5 — Almost always or always

20. **During sexual intercourse, how difficult was it to maintain your erection until completion of intercourse?**

- ( ) 1 — Extremely difficult
- ( ) 2 — Very difficult
- ( ) 3 — Difficult
- ( ) 4 — Slightly difficult
- ( ) 5 — Not difficult

21. **When you attempted sexual intercourse, how often was it satisfactory for you?**

- ( ) 1 — Almost never or never
- ( ) 2 — A few times
- ( ) 3 — Sometimes
- ( ) 4 — Most times
- ( ) 5 — Almost always or always

Total IIEF-5 score: _____ / 25

Classification:

- 22–25: No ED
- 17–21: Mild ED
- 12–16: Mild-to-moderate ED
- 8–11: Moderate ED
- 5–7: Severe ED