

Prevalence and factors associated with erectile dysfunction among men attending Mulago Hospital's urology clinic: a cross-sectional study

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Background: Erectile dysfunction (ED) is a significant public health concern, affecting men's quality of life and relationships. Despite its global burden, epidemiological data on ED in Uganda, particularly among men seeking care at specialised clinics, remain limited. This study aimed to determine ED prevalence and associated factors among men attending the urology clinic at Mulago National Referral Hospital (Mulago Hospital).

Methods: A cross-sectional study was conducted over three months at the urology clinic, enrolling 384 men aged 35–60 years. Data on socio-demographic characteristics, clinical history, and lifestyle factors were collected using a structured questionnaire. The Sexual Health Inventory for Men (SHIM) was used to assess ED severity. Logistic regression analysis was performed to identify factors associated with ED.

Results: The prevalence of ED was 65.3% (95% confidence interval [CI] 60.3 to 69.9). Multivariate analysis showed significant associations between ED and age (adjusted odds ratio (AOR) 1.023, 95% CI 1.000 to 1.054; $p = 0.05$), chronic alcohol use (AOR 2.690, 95% CI 1.565 to 4.625; $p = 0.00$), urethral stricture (AOR 3.874, 95% CI 1.44 to 10.392; $p = 0.01$), and lower urinary tract symptoms (LUTS) (AOR 2.094, 95% CI 1.250 to 3.505; $p = 0.01$).

Conclusion: ED is highly prevalent among men attending Mulago Hospital's urology clinic. These findings highlight the need for routine ED screening, early intervention, and public health strategies to address modifiable risk factors.

Keywords: erectile dysfunction, prevalence, associated factors

Introduction

Erectile dysfunction (ED) is the inability to achieve or maintain an erection sufficient for satisfactory sexual performance, or a condition in which a man is unable to get or keep an erection firm enough for satisfactory sexual intercourse.¹ ED is caused by the impaired nitric oxide (NO)-mediated relaxation of the corpus cavernosum smooth muscle, which disrupts the cyclic guanosine monophosphate signalling pathway necessary for increased arterial inflow and venous occlusion during an erection.²

The global ED burden is estimated at 100 million men, with projections of up to 322 million men in 2025.^{3,4} However, ED prevalence varies greatly globally and regionally. A systematic review by Shiferaw et al.⁵ reported a 71.5% ED prevalence in diabetic persons. Another study by Mkonyi et al.⁶ reported an ED prevalence of 20% in sub-Saharan Africa. There is also great variation in African countries. For instance, in Uganda, Claramonte et al.⁷ reported a rate of 47.8% among rural populations, whereas Mutamba et al.⁸ reported a rate of 17.6% among adult human immunodeficiency virus (HIV)-positive men in 2024. Other countries reported prevalence rates of 29.7% (Tanzania), 66% (Ghana), and 60% (Ethiopia), with estimates ranging from 43.8% in community-based studies to 57.4% among primary care patients in Nigeria.^{6,9,10}

Erectile dysfunction (ED) can severely impact men's quality of life, leading to low self-esteem, psychological distress, and increased

substance abuse, also affecting their partners.¹¹ Despite this, there is an underestimation of the ED burden due to patients' reluctance to seek care and the lack of proactive diagnoses.¹² Despite its high prevalence, ED is often underdiagnosed and undertreated. Among urological patients, it is generally more prevalent than in the general population, and its prevalence varies by type of urological condition.¹³ This prevalence is higher than that in the general population because urological patients experience disruption in the neurovascular, hormonal, or structural mechanisms critical for penile erection.^{2,14}

In Uganda, as in the rest of Africa, there are few studies on ED prevalence and its associated factors. These limit proper planning by health institutions and health authorities for resources to prevent and curb ED. It also limits the development of ED-targeted interventions.^{7,8} This study aimed to determine the prevalence and factors associated with ED among men attending the urology clinic at Mulago Hospital.

Materials and methods

We conducted a cross-sectional study to assess ED prevalence and identify associated factors among sexually active men. This design was chosen as it provides a snapshot of ED prevalence in a specific population at a single point in time, facilitating the identification of commonalities across demographic groups (e.g. age, comorbidities, and lifestyle factors) and associated factors.¹⁵

The study was conducted at the urology clinic within the Surgical Outpatient Department (SOPD) of Mulago Hospital, Uganda's largest national referral hospital. The clinic operates on Tuesdays and Wednesdays and is the only public, specialised urology clinic in Uganda, drawing patients from across the country. The SOPD serves an average of 150 patients per clinic day. The target population comprised men aged 35–60 years attending the clinic. This age range was selected to focus on a population where ED prevalence is less likely to be solely attributed to psychological factors, as often seen in younger men, and to minimise confounding factors associated with other health conditions and medications prevalent in men over 60 years.^{16,17}

The inclusion criteria were sexually active male patients, aged 35–60 years, attending the urology clinic for any consultation. The exclusion criteria were participants with cognitive impairments precluding comprehension of the study questionnaire, and men with an indwelling urethral catheter for more than three months. The sample size was calculated for both study objectives. For estimating ED prevalence, the Kish–Leslie formula for a single proportion was used:

$$N = \frac{P(1-p)Z^2}{d^2}$$

In the above formula, N is the number of respondents needed, p is the estimated proportion of patients, Z is 1.96 (the Z score corresponding to the 95% CI), and d is the maximum error the researcher is willing to allow (0.05). Based on a study by Claramonte et al.⁷ conducted in an outpatient clinic with similar conditions, the ED prevalence was 47.8% ($p = 0.478$, $q = 0.522$). The calculated sample size (N) was $N = d^2 \times Z^2 \times p \times q = 0.05^2 \times 1.96^2 \times 0.478 \times 0.522 \approx 384$ participants.

A consecutive sampling technique was employed. All eligible patients who visited the urology clinic during the study period and met the inclusion criteria were invited to participate until the desired sample size was reached. Data were checked for completeness before analysis. Records with missing values on key variables were excluded from bivariate and multivariate analyses using listwise deletion. The proportion of missing data for each variable was below 5%, which was considered acceptable for complete-case analysis.

Independent and dependent variables

The following were considered independent variables:

- Socio-demographic characteristics (age, socio-economic status, education level).
- Lifestyle factors (chronic alcohol use, smoking, drug abuse).
- Medical- and surgical-related factors (urethral stricture, benign prostatic hyperplasia [BPH], LUTS, pelvic/perineal injuries or surgeries, comorbidities like diabetes, hypertension, HIV, syphilis/gonorrhoea).

The ED status was the dependent variable, assessed by the SHIM questionnaire.¹⁸ Participants with a SHIM score of 5–21 were classified as having ED, while those with a score of 22–25 were classified as not having ED.

Data collection and analysis

Data were collected by the principal investigator (PI) and two trained male research assistants using an interviewer-administered, semi-structured questionnaire and a standardised checklist for extracting data from patient records. The questionnaire was adapted from the validated SHIM checklist. The research assistants underwent one week of training (four hours daily) on high-quality data collection and research ethics.

All eligible candidates were thoroughly informed about the study and provided informed consent by signing (or thumb printing) a consent form. The PI or a research assistant then administered the questionnaire, ensuring that the questions were clear and that the respondents provided complete responses. Clinical patient information (e.g. urethral stricture, BPH, LUTS, pelvic/perineal injuries) was extracted from patient records using a standardised checklist, while demographic information was collected during the survey.

Collected data were checked for completeness at the point of interview. Data were coded and entered into EpiData version 4.7.0.0. The data were re-checked for accuracy and completeness before entry. Cleaned data, initially managed in Microsoft Excel, were then exported to Stata version 14 for analysis. Descriptive statistics, including frequencies and proportions for categorical variables, and means and standard deviations for continuous variables, were reported. Medians and interquartile ranges were used for asymmetrical continuous variables. Data were presented in tables and graphs.

Erectile dysfunction (ED) prevalence was calculated as the total number of patients with ED divided by the total number of patients surveyed. A binary logistic regression was performed for each independent variable to assess its association with ED. Variables with a p -value < 0.2 were considered for multivariate analysis. In multivariate regression, interaction was assessed using the chunk test.⁴³ Confounding was assessed by examining variables eliminated during stepwise elimination that caused a difference $> 10\%$ between the adjusted and unadjusted odds ratios. Variables with p -values < 0.05 in the multivariate analysis were considered significantly associated with ED. Assumptions of independence, equal variance, normal distribution, and noncollinearity were checked.

Data quality control

The data collection tool was pretested on 10 patients from Mulago Hospital's urology clinic who were aged 35–60 years to determine questionnaire relevance and question clarity. This helped adapt the tool to more easily communicate fewer, clearer, relevant, and valid questions. The SHIM demonstrated good internal consistency, with a Cronbach's alpha of 0.85, consistent with established acceptable values ranging from 0.73 to 0.89.¹⁸ The research assistants were adequately trained and supervised by the PI to ensure the correct use of data collection tools and adherence to ethical principles. The PI was available for consultations whenever the research assistants needed him.

Results

Participant characteristics

The participants' average age was 43.29 years. Most were married (63.4%), Christian (85.9%), and of middle socio-economic status (78.1%). Clinically, most participants were HIV-negative (94.8%), had no history of gonorrhoea or syphilis (86.5%), and reported no chronic alcohol use (69.8%), chronic cigarette smoking (92.2%), or

Table 1: Socio-demographic, lifestyle, and clinical characteristics of participants

Variable	Categories	n (%)
Age	Mean (SD)	43.29 (9.19)
	Married	242 (63.4)
Marital status	Single	130 (34.0)
	Divorced	10 (2.6)
	Christian	330 (85.9)
Religion	Muslim	54 (14.1)
	Low ^a	76 (20.5)
Socio-economic status	Middle ^b	289 (78.1)
	High ^c	5 (1.35)
	HIV status	Negative
Positive		20 (5.2)

Gonorrhoea/syphilis	No	332 (86.5)
	Yes	52 (13.5)
History of chronic alcohol use	No	268 (69.8)
	Yes	116 (30.2)
History of cigarette smoking	No	354 (92.2)
	Yes	30 (7.8)
Illicit drug use (like opioids)	No	382 (99.5)
	Yes	2 (0.5)
Pelvic surgery	No	342 (89.1)
	Yes	42 (10.9)
Pelvic accident	No	360 (93.8)
	Yes	24 (6.3)
BPH	No	363 (94.5)
	Yes	21 (5.5)
Urethral stricture	No	337 (87.8)
	Yes	47 (12.2)
LUTS	No	256 (66.7)
	Yes	128 (33.3)
Trauma to the pelvis	No	369 (96.1)
	Yes	15 (3.9)

^a Estimated gross national income per capita below 4 236 500 UGX.

^b Estimated gross national income per capita above 4 236 500 UGX and below 51 818 500 UGX.

^c Estimated gross national income per capita above 51 818 500 UGX.

BPH – benign prostatic hyperplasia, HIV – human immunodeficiency virus, LUTS – lower urinary tract symptoms, SD – standard deviation, UGX – Ugandan shilling

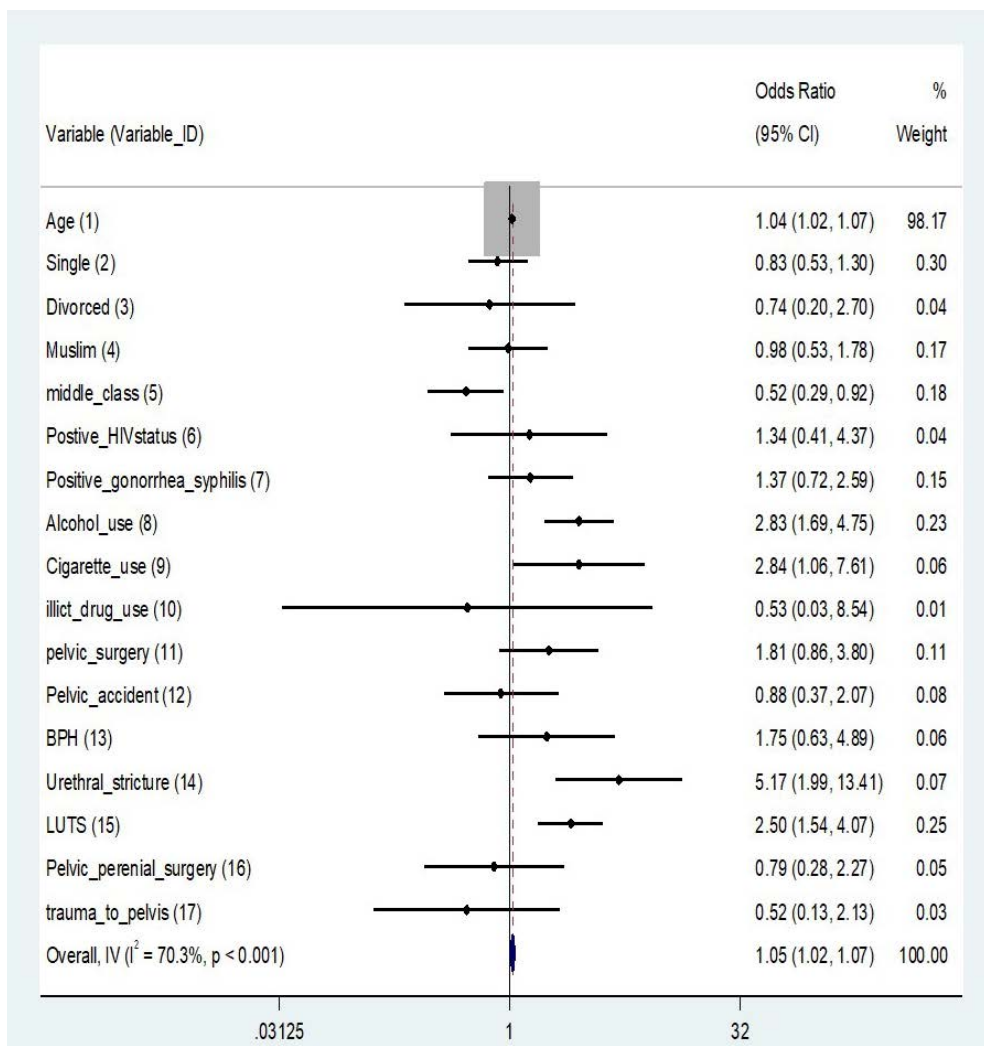


Figure 1: Forest plot of odds ratios of factors associated with erectile dysfunction in bivariate analysis

Table II: Bivariate and multivariable logistic regression models for categorical factors associated with erectile dysfunction among men attending the urology clinic at Mulago Hospital

Variable	Categories	ED		Crude odds ratio	p-value	95% CI	Multivariate analysis	
		ED present n (%)	ED absent n (%)				Adjusted odds ratio	p-value
Marital status	Married	80 (60.6)	162 (65.1)	Reference				
	Single	48 (36.4)	81 (32.5)	0.83	0.42	0.53 to 1.30		
	Divorced	4 (3.0)	6 (2.4)	0.74	0.65	0.20 to 2.70		
Religion	Christian	114 (85.7)	215 (86.0)	Reference				
	Muslim	19 (14.3)	35 (14.0)	0.98		0.53 to 1.79		
Socio-economic status	Low	18 (13.7)	58 (24.4)	Reference				
	Middle	108 (82.4)	180 (75.6)	0.52	0.03	0.29 to 0.92		
	High	5 (3.8)	0 (0.0)	Omitted due to collinearity				
HIV status	No	129 (97.0)	240 (96.0)	Reference				
	Yes	4 (3.0)	10 (4.0)	1.34	0.62	0.41 to 4.38		
Gonorrhoea/syphilis	No	118 (88.7)	213 (85.2)	Reference				
	Yes	15 (11.3)	37 (14.8)	1.37	0.34	0.72 to 2.59		
History of chronic alcohol use	No	110 (82.7)	157 (62.8)	Reference				
	Yes	23 (17.3)	93 (37.2)	2.83	0.00	1.69 to 4.75	2.69	0.00
History of chronic cigarette smoking	No	128 (96.2)	225 (90.0)	Reference				
	Yes	5 (3.8)	25 (10.0)	2.84	0.04	1.06 to 7.61	2.40	0.10
Illicit drug use	No	132 (99.3)	249 (99.6)	Reference				
	Yes	1 (0.8)	1 (0.4)	0.53	0.66	0.03 to 8.54		
Pelvic surgery	No	123 (92.5)	218 (87.2)	Reference				
	Yes	10 (7.5)	32 (12.8)	1.81	0.12	0.86 to 3.80		
BPH	No	128 (96.2)	234 (93.6)	Reference				
	Yes	5 (3.8)	16 (6.4)	1.75	0.29	0.63 to 4.89		
Urethral stricture	No	128 (96.2)	208 (83.2)	Reference				
	Yes	5 (3.8)	42 (16.8)	5.17	0.00	1.99 to 13.41	3.87	0.01
LUTS	No	105 (79.0)	150 (60.0)	Reference				
	Yes	28 (21.1)	100 (40.0)	2.50	0.00	1.54 to 4.07	2.09	0.01
Pelvic perineal surgery	No	127 (95.5)	241 (96.4)	Reference				
	Yes	6 (4.5)	9 (3.6)	0.79	0.66	0.28 to 2.27		
Trauma to the pelvis	No	129 (97.0)	246 (98.4)	Reference				
	Yes	4 (3.0)	4 (1.6)	0.52	0.37	0.13 to 2.13		
Pelvic accident	No	124 (93.2)	235 (94.0)	Reference				
	Yes	9 (6.8)	15 (6.0)	0.77	0.88	0.37 to 2.07		

BPH – benign prostatic hyperplasia, CI – confidence interval, ED – erectile dysfunction, HIV – human immunodeficiency virus, LUTS – lower urinary tract symptoms, n – frequency of events, SD – standard deviation

Table III: Bivariate and multivariable logistic regression model for continuous factors associated with erectile dysfunction among men attending the urology clinic at Mulago Hospital

Bivariate analysis				Multivariate analysis			
Variable	Mean (SD)	Crude odds ratio	p-value	95% CI	Adjusted odds ratio	p-value	95% CI
Age	43.29 (9.19)	1.04	0.00	1.02 to 1.07	1.03	0.05	1.00 to 1.05

CI – confidence interval, SD – standard deviation

illicit drug use (99.5%). Histories of pelvic surgery (10.9%), pelvic accident (6.3%), BPH (5.5%), urethral stricture (12.2%), and pelvic trauma (3.9%) were uncommon; however, 33.3% presented with LUTS (Table I). Variables from Figure 1 whose 95% CI of their odds ratios crossed the null (1) were not significant at bivariate analysis. They were not considered for multivariate analysis.

Table II shows the bivariate and multivariable logistic regression model results for the categorical factors associated with erectile dysfunction among men attending the urology clinic at Mulago Hospital, whereas table III shows the bivariate and multivariable logistic regression model results for continuous factors associated with erectile dysfunction in the same group of men at the same clinic.

Discussion

ED prevalence

The ED prevalence among men attending Mulago Hospital's urology clinic was 65.3%. Age, history of chronic alcohol use, urethral stricture, and LUTS were significantly associated with ED. In our study, ED prevalence was higher than reported in Tanzania (24%), where the International Index of Erectile Function (IIEF-5) was used as an assessment tool.¹⁹ These variations may be attributed to the assessment tools used (SHIM vs. IIEF-5), study population differences, and underlying medical conditions, such as diabetes and cardiovascular disease. Findings from other sub-Saharan African countries report similar prevalence values: 58.9% in a population-based study in southwest Nigeria, 19.8% in a cross-sectional study in Nigeria, and 81.1% in an eastern Sudan cross-sectional study among type 2 diabetic men.²⁰ In contrast, a higher prevalence (85.5%) was reported among diabetic patients in northwest Ethiopia.²¹ This is expected, as diabetes is a well-known risk factor for ED, contributing to endothelial dysfunction and nerve damage.

Factors associated with ED

Age was significantly associated with ED, and the odds of developing ED increased by 2.9% for every additional year of age. Ageing is linked to endothelial dysfunction, atherosclerosis, reduced testosterone levels, and an increased risk of comorbid conditions, such as hypertension and diabetes.^{22,23} This finding aligns with a study in Sheema District, Uganda, which found a negative correlation between age and satisfactory sexual performance among men aged above 55 years.²⁴ Similarly, studies in Nigeria and South Africa also reported significant associations between age and ED prevalence.²⁵ ED is a significant sexual and reproductive health challenge in Uganda, affecting up to 52% of sexually active men aged 18–70 years.⁴¹

Men who consumed alcohol chronically had 2.69 times higher odds of developing ED than non-drinkers. Alcohol is known to impair the release of NO, which is crucial for vasodilation and smooth muscle relaxation in penile arteries.²⁶ Moreover, alcohol affects the central nervous system, disrupting neurotransmitter release essential for sexual function.²⁷ Psychological symptoms, such as depression, often associated with alcohol consumption, further contribute to ED.²⁸ This result is consistent with a study that identified a significant association between alcohol abuse and sexual dysfunction in India, and other studies have shown a similar relationship.²⁹⁻³¹

Men with urethral stricture had 3.87 times higher odds of developing ED than those without. This is due to scarring and vascular damage caused by urethral stricture, which impairs penile blood flow necessary for an erection.³² Psychological distress associated with urethral stricture may further contribute to ED.³³ This association matches some studies also describing various other mechanisms of the pathophysiology. A review by Acharya et al.³² reached similar conclusions about the associations between urethral stricture and ED. The position of the stricture was also associated with ED in a study that reviewed the before-and-after-surgery IIEF-5 scores.³⁴

LUTS were also significantly associated with ED, with affected men having 2.09 times higher odds of experiencing ED. LUTS contribute to ED through autonomic hyperactivity and atherosclerosis in pelvic blood vessels, leading to reduced penile blood flow.^{35,36} These findings are consistent with studies in Eastern Europe and Asia, which reported a strong association between LUTS and ED.^{37,38}

Other studies identified similar and additional risk factors for ED. These include cardiovascular diseases, diabetes, LUTS, hypogonadism, and various chronic conditions.²⁸ These ED risk factors are far-reaching, including surgical causes (penile implants), which cause physiological erection failure, and surgical procedures (penile implants and vascular reconstructions), which contribute to the condition.³⁹ Nerve damage from prostate surgery, pelvic procedures, or bladder cancer treatment is also considered a potential cause.^{39,40} Conditions like atherosclerosis narrow the penile arteries, reducing blood flow. Chronic hyperglycaemia in diabetes damages endothelial cells, reducing NO production and impairing smooth muscle relaxation in the corpora cavernosa.^{2,15} Prostate cancer surgery damages the cavernous nerves during radical prostatectomy, disrupting NO release critical for initiating erections, while chronic prostatitis causes inflammation that leads to the release of cytokines (e.g. tumour necrosis factor alpha [TNF- α], interleukin-6 [IL-6]), which induce oxidative stress, impairing smooth muscle function.^{2,42} Hypertension, a chronic state of high blood pressure, damages the endothelial function, reducing vasodilation capacity. Urological conditions like BPH and incontinence often

cause anxiety or depression, exacerbating ED through sympathetic over-activation that opposes parasympathetic-driven erection.¹⁵

Recommendations

The Ministry of Health should implement awareness campaigns to educate men on ED risk factors and preventive measures. Community leaders should promote awareness regarding the detrimental effects of chronic alcohol use on sexual health. Men with urological risk factors, such as urethral stricture and LUTS, should receive counselling and appropriate medical interventions. The urology team should be trained to build a proactive team willing and able to recognise ED, in efforts to improve the quality of life for affected men.

Study limitations

The cross-sectional nature of our study prevents establishing a causal relationship between risk factors and ED. Social desirability bias may have influenced responses regarding sexual health despite assurances of confidentiality.

Conclusion

The ED prevalence among men attending Mulago Hospital's urology clinic was high, affecting approximately three out of five men. Age, chronic alcohol use, urethral stricture, and LUTS were significantly associated with ED. More attention should be given to men with these risk factors during clinical evaluations at the urology clinic.

Conflict of interest

The authors declare no conflict of interest.

Ethical approval

Ethical approval was obtained from the Makerere University College of Health Sciences School of Medicine Research Ethics Committee (reference: Mak-SOMREC-2024-927).

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