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Prevalence and Associated Factors of Erectile Dysfunction in Chronic Kidney Disease Patients in Douala, Cameroon

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Abstract

Background and hypothesis: Chronic kidney disease (CKD) is a major public health concern, with erectile dysfunction (ED) being a common complication that significantly impacts patients' quality of life. In Cameroon, knowledge regarding the prevalence and associated factors of ED among chronic haemodialysis patients remains limited. The objective of this study was to determine the prevalence and associated factors of erectile dysfunction among chronic haemodialysis patients followed up at the General Hospital of Douala. **Method:** We conducted a cross-sectional study in the Haemodialysis Unit of the General Hospital of Douala over a 6-month period, recruiting 79 male patients. Erectile dysfunction was assessed using the International Index of Erectile Function (IIEF-5) score. Univariate and multivariate logistic regression analyses were used to identify factors associated with erectile dysfunction. **Results:** Among the participants, 37% (21) had moderate ED, 37% (21) had mild ED, and 21% (12) had severe ED. Factors associated with ED included diabetes (aOR = 9.7, p = 0.002), stress (aOR = 1.67, p < 0.001), and marital problems (aOR = 1.76, p = 0.01). **Conclusion:** This study highlights a high prevalence of erectile dysfunction among chronic haemodialysis patients, with associated factors such as diabetes, stress, and marital problems. We recommend that nephrologists systematically screen for erectile dysfunction in these patients and adopt a multidisciplinary management approach, including psychological and urological follow-up as well as rigorous management of comorbidities, to improve their quality of life.

Keywords

Prevalence, Associated Factors, Erectile Dysfunction, IIEF-5

1. Introduction

Chronic kidney disease (CKD) is a progressive, irreversible impairment of renal function lasting at least three months, leading to metabolic waste accumulation [1]. CKD is a global public health concern, affecting approximately 10% of the population, with regional prevalence ranging from 8% to 16% [2]. In Africa, CKD prevalence may reach up to 13% of adults [3]. In Cameroon, rising CKD prevalence is estimated between 12.8% [4] and 15% [5], driven by increasing risk factors such as hypertension and diabetes [6].

Chronic kidney disease (CKD) impacts multiple organ systems, including sexual function, with erectile dysfunction (ED) affecting 50% to 70% of CKD patients and causing psychological and relational challenges [7] [8]. ED in CKD involves vascular, neurological, and hormonal mechanisms [9]. CKD is also a significant risk factor for mortality, with global five-year mortality rates around 15% [10]. In Africa, CKD-related mortality can reach 25%, often due to cardiovascular complications [6]. In Cameroon, CKD patients face a heightened risk of death due to comorbidities [11] [12].

Current knowledge on the prevalence and associated factors of erectile dysfunction (ED) among chronic haemodialysis patients in Cameroon is limited, with few studies providing insufficient guidance for patient management. This highlights the need for in-depth research to better understand the epidemiology of ED in this population. Assessing ED prevalence and associated factors in Cameroonian CKD patients could enhance the scientific literature, inform prevention and treatment strategies, and improve quality of life. Such research aims to raise awareness among healthcare professionals about the importance of a holistic approach to CKD management, addressing often-overlooked psychological and sexual health aspects. This study focused on determining the prevalence and associated factors of ED in chronic haemodialysis patients at the General Hospital of Douala.

2. Materials and Methods

2.1. Study Design, Period, and Location

A cross-sectional study was conducted from March to September 2024 in the Haemodialysis Unit of the General Hospital of Douala, one of Cameroon's leading public healthcare facilities. Located in the country's economic capital, the hospital, established in 1950, addresses the healthcare needs of the Littoral region and beyond. With several hundred beds, it offers a wide range of medical and surgical services through specialised departments, including internal medicine, surgery, paediatrics, obstetrics, and haemodialysis, as well as intensive care and emergency units.

2.2. Study Population

The study targeted patients with chronic kidney disease. Included in our study were male patients with chronic kidney disease (CKD) confirmed by a nephrologist, who were sexually active, undergoing haemodialysis, followed up at the Haemodialysis Unit of the General Hospital of Douala, and who freely and willingly agreed to participate in the study by providing their informed consent. Patients who refused to provide consent to participate in the study were not included. We excluded patients who withdrew their consent for personal reasons.

2.3. Data Collection

Data were collected through a structured questionnaire and patient records during 10 - 15-minute interviews after explaining the study's purpose to participants. The questionnaire comprised three sections: sociodemographic data (age, marital status, education level, and occupation), comorbidities and lifestyle behaviours (diabetes, hypertension, stress, marital problems, alcohol and tobacco use, and physical activity), and erectile dysfunction assessment using the International Index of Erectile Function (IIEF-5).

Assessment of Erectile Dysfunction Using the International Index of Erectile Function (IIEF5)

Erectile dysfunction (ED) was assessed using the International Index of Erectile Function (IIEF-5), a validated questionnaire for detecting ED in various clinical populations [13]. The IIEF-5 includes five questions on erection, sexual satisfaction, and confidence, scored from 1 to 5, with total scores ranging from 5 to 25; lower scores indicate greater ED severity [14]. Patients were categorised as follows: 22 - 25 (normal function), 17 - 21 (mild ED), 11 - 16 (moderate ED), and 5 - 10 (severe ED). This method enabled quick, reliable ED assessment, identifying patients needing further care, as recommended by Cappelleri *et al*. [15].

2.4. Statistical Analysis

Data were entered into Excel and analysed using R software (version 4.4.2). Categorical variables were summarised as frequencies and percentages, while Fisher's and Pearson's chi-square tests were used to evaluate associations between categorical variables and ED severity. Univariate and multivariate logistic regressions were conducted to calculate crude and adjusted odds ratios, confidence intervals, and p-values, identifying factors associated with ED. A 95% confidence interval and a 5% margin of error were applied, with the null hypothesis rejected if $p < 0.05$

3. Results

3.1. Prevalence of Erectile Dysfunction

Seventy-six per cent of the patients experienced erectile difficulties. Among these patients, 21 (37%) had moderate erectile dysfunction, 21 (37%) had

mild erectile dysfunction, and 12 (21%) had severe erectile dysfunction (**Table 1**).

Table 1. Prevalence of erectile dysfunction.

Parameters	n (%)
Erectile difficulties	
Yes	52 (76%)
No	16 (24%)
Grade of erectile dysfunction	
Moderate	21 (37%)
Mild	21 (37%)
Severe	12 (21%)
Normal	3 (5.0%)

3.2. Sociodemographic Factors

Table 2. Sociodemographic factors of the study population.

	Erectile Dysfunction					
Sociodemographic factors	Overall (N = 57)	Severe (N = 12)	Moderate (N = 21)	Mild (N = 21)	Normal (N = 3)	p-value
Group age (years)						0.5
>50 years	30 (53%)	8 (14%)	12 (21%)	9 (16%)	1 (1.8%)	
25 - 50 years	27 (47%)	4 (7.0%)	9 (16%)	12 (21%)	2 (3.5%)	
Education level						0.6
Primary	19 (33%)	6 (11%)	6 (11%)	7 (12%)	0 (0%)	
Secondary	19 (33%)	4 (7.0%)	7 (12%)	6 (11%)	2 (3.5%)	
Higher	19 (33%)	2 (3.5%)	8 (14%)	8 (14%)	1 (1.8%)	
Marital status						0.6
Married	46 (81%)	9 (16%)	17 (30%)	17 (30%)	3 (5.3%)	
Single	10 (18%)	2 (3.5%)	4 (7.0%)	4 (7.0%)	0 (0%)	
Divorced	1 (1.8%)	1 (1.8%)	0 (0%)	0 (0%)	0 (0%)	
Occupation						0.7
Liberal sector	25 (46%)	5 (9.3%)	8 (15%)	11 (20%)	1 (1.9%)	
Retired	13 (24%)	3 (5.6%)	7 (13%)	2 (3.7%)	1 (1.9%)	
Unemployed	9 (17%)	1 (1.9%)	3 (5.6%)	5 (9.3%)	0 (0%)	
Public sector	7 (13%)	1 (1.9%)	3 (5.6%)	2 (3.7%)	1 (1.9%)	

The data are presented as frequencies (N, n) and percentages (%). The p-value was calculated using Pearson's Chi-squared test to assess differences in proportions of sociodemographic factors across the various levels of erectile dysfunction. For this test, the confidence interval for the null hypothesis was set at 95%, with a margin of error of 5% (significance defined as $p < 0.05$).

Table 2 presents the sociodemographic factors of patients according to the

levels of erectile dysfunction (ED): severe, moderate, mild, and normal. Although no variable showed a statistically significant relationship with ED ($p > 0.05$), certain trends observed. Patients over the age of 50 are more represented in the severe (14%) and moderate (21%) levels, while those aged 25 - 50 show a balanced distribution with a predominance of mild ED (21%). Regarding education level, severe ED is more frequent among patients with a primary education level (11%), whereas those with higher education are more represented in the moderate (14%) and mild (14%) groups. Married patients constitute the majority (81%), with a predominance of moderate and mild ED (30% each). Finally, occupation also showed no significant association, although retirees presented a higher risk of moderate (13%) and severe (5.6%) ED (**Table 2**).

3.3. Association Between Sociodemographic Factors and Erectile Dysfunction

Table 3. Univariate and multivariate logistic regression assessing the association between sociodemographic factors and erectile dysfunction in patients with chronic kidney disease.

	Univariate analysis			Multivariate analysis		
Sociodemographics factors	cOR	95% CI	p-value	aOR	95% CI	p-value
Group age (years)			0.25			0.4
>50 years	1			1		
25 - 50 years	1.93	0.63, 6.4	0.26	1.87	0.44, 9.3	0.4
Education level			0.13			0.16
Primary	1			1		
Secondary	3.3	0.67, 25	0.17	3.06	0.54, 24.8	0.23
Higher	4.75	1.01, 34.6	0.07	4.83	0.94, 37.29	0.07
Marital status			0.75			0.9
Single	1			1		
Married	0.8	0.23, 3.31	0.75	1.03	0.22, 5.29	0.9
Occupation			0.66			0.8
Retired	1			1		
Unemployed	2.25	0.30, 20.1	0.42	1.58	0.14, 17.8	0.6
Liberal sector	2	0.41, 14.5	0.41	1.76	0.23, 16.1	0.5
Public sector	3.6	0.46, 34.6	0.23	2.70	0.28, 29.89	0.3

cOR: Crude odds ratio; aOR: ajust odds ratio.

Table 3 presents the results of univariate and multivariate logistic regression assessing the association between sociodemographic factors and erectile dysfunction (ED) in patients with chronic kidney disease. None of the associations were statistically significant ($p > 0.05$) in either the univariate or multivariate analyses. However, certain trends were observed: patients aged 25 - 50

years showed an increased risk of ED compared to those over 50 years (aOR = 1.87, 95% CI: 0.44 - 9.3; p = 0.4). Regarding education level, patients with higher education exhibited a stronger association with ED (aOR = 4.83, 95% CI: 0.94 - 37.29; p = 0.07) compared to those with primary education. Marital status and occupation did not show a significant relationship with ED, although patients working in the public sector (aOR = 2.70) or the liberal sector (aOR = 1.76) had slightly higher values compared to retirees (**Table 3**).

3.4. Association between Diabetes, Hypertension, Stress, Marital Problems, Alcohol Consumption, Smoking, Physical Activity, and Erectile Dysfunction in Patients with Chronic Kidney Disease

Table 4. Univariate and multivariate logistic regression assessing the association between diabetes, hypertension, stress, marital problems, alcohol consumption, smoking, physical activity, and erectile dysfunction in patients with chronic kidney disease.

	Univariate Analysis			Multivariate Analysis		
Factors	cOR	95% CI	p-value	aOR	95% CI	p-value
Diabetes			0.06			0.002
No						
Yes	4.12	0.68, 13.69	0.08	9.7	1.8, 74.59	0.04
Hypertension			0.4			0.9
No						
Yes	1.76	0.47, 8.44	0.4	0.9	0.13, 7.29	0.9
Stress			<0.001			<0.001
No						
Yes	0.07	0.0, 0.38	0.01	1.67	0.01, 2.18	0.02
Marital problems			<0.001			0.01
No						
Yes	1.5	0.01, 3.46	0.02	1.76	0.42, 6.77	0.04
Alcohol consumption			0.9			0.8
No						
Yes	1.1	0.14, 5.4	0.9	0.7	0.029, 12.59	0.8
Cigarette			0.4			0.7
No						
Yes	3.3	0.13, 87.79	0.4	1.8	0.05, 92.5	0.7
Practise sport			0.2			0.1
Yes						
No	0.52	0.16, 1.68	0.2	0.3	0.05, 1.72	0.1

cOR: Crude odds ratio; aOR: ajust odds ratio.

Table 4 presents the results of univariate and multivariate logistic regression assessing the association between various factors (diabetes, hypertension, stress, marital problems, alcohol consumption, smoking, and physical activity) and erectile dysfunction (ED) in patients with chronic kidney disease. Among the factors studied, diabetes was significantly associated with an increased risk of ED in the multivariate analysis (aOR = 9.7, 95% CI: 1.8 - 74.59; p = 0.04), although it was not significant in the univariate analysis. Stress also showed a significant association with ED, with an aOR = 1.67 (95% CI: 0.01 - 2.18; p = 0.02). Marital problems were similarly identified as a factor associated with ED (aOR = 1.76, 95% CI: 0.42 - 6.77; p = 0.04). In contrast, hypertension, alcohol consumption, smoking, and lack of physical activity did not show a statistically significant association with ED in either the univariate or multivariate analyses (p > 0.05) (**Table 4**).

4. Discussion

Erectile dysfunction (ED) is a common yet under-addressed complication in chronic kidney disease (CKD) patients, significantly affecting their physical, emotional, and relational well-being. In sub-Saharan Africa, including Cameroon, limited resources and research on the CKD-ED link hinder comprehensive care. Identifying factors such as diabetes, hypertension, and psychosocial stress could inform targeted interventions, including psychological support, to improve treatment and quality of life for these patients. A study at the General Hospital of Douala is essential to determine ED prevalence and associated factors, enhancing management strategies for CKD patients.

Our study revealed that 76% of chronic haemodialysis patients experienced erectile dysfunction (ED), with 37% presenting moderate ED, 37% mild ED, and 21% severe ED. These findings are consistent with those of Navaneethan *et al*. (2010) [16], who reported ED prevalence ranging from 70% to 80% among dialysis patients, and Zhang *et al*. (2014) [17], who documented high rates of moderate-to-severe ED in advanced chronic kidney disease (CKD). In Cameroon, studies conducted by Mbanya *et al*. (2018) [18] and Tchouanguep *et al*. (2020) [19] also highlighted a high prevalence of ED among CKD patients, although they did not categorize its severity, limiting direct comparisons. Unlike studies conducted in settings with structured CKD and ED management systems, our study uniquely details the severity of ED in a Cameroonian context, offering critical insights for localized management strategies aimed at improving the quality of life of hemodialysis patients.

Erectile dysfunction in hemodialysis patients is multifactorial, involving vascular, hormonal, neurological, and psychological mechanisms. CKD and hemodialysis contribute to endothelial dysfunction, leading to reduced production of nitric oxide (NO), a key element for penile vasodilation during erection [20]. The accumulation of uremic toxins further exacerbates endothelial dysfunction, reducing blood flow to erectile tissues [21]. Additionally, CKD is

associated with hypogonadism, caused by dysfunction of the hypothalamic-pituitary-gonadal axis, leading to decreased testosterone levels, which negatively affect libido and erectile function [22]. This hormonal imbalance, combined with vascular calcification induced by secondary hyperparathyroidism, further impairs penile blood flow. Uremic neuropathy also contributes to ED by damaging autonomic and somatic nerves, disrupting sensitivity and sexual response [23].

Our study identified significant associations between ED and diabetes (aOR = 9.7, p = 0.002), stress (aOR = 1.67, p < 0.001), and marital problems (aOR = 1.76, p = 0.01). Diabetes is a well-documented risk factor for ED due to its microvascular and neuropathic complications, which damage small blood vessels and peripheral nerves, thereby reducing penile blood flow and sensitivity [24]. This condition is exacerbated in hemodialysis patients, where diabetes accelerates vascular calcification and endothelial dysfunction. Stress affects ED through neuroendocrine mechanisms, activating the hypothalamic-pituitary-adrenal (HPA) axis and increasing cortisol levels, which inhibit testosterone production and disrupt the balance of the autonomic nervous system [25]. Marital problems exacerbate ED by introducing a significant psychosocial dimension, including relational conflicts, reduced intimacy, and the emotional burden of chronic illness [26].

Our findings align with those of Navaneethan *et al*. [16], who identified diabetes as a key determinant of ED in hemodialysis patients, and Zhang *et al*. [17], who emphasized the impact of stress on erectile function in this population. Similarly, Sullivan and Keane [27] described how relational conflicts worsen ED in patients with chronic illnesses. Unlike studies conducted in developed countries, where socioeconomic disparities and education levels significantly influence healthcare access, our results reveal relative homogeneity in these factors among the Cameroonian population. This reinforces the notion that ED severity is primarily driven by medical factors related to CKD rather than sociodemographic characteristics.

Identifying these risk factors highlights the need for a multidimensional approach to ED management in hemodialysis patients, including strict glycemic control, stress management, and psychosocial interventions targeting relational conflicts. Implementing these strategies could reduce the prevalence and severity of ED, thereby improving the quality of life of patients in similar settings.

5. Conclusion

This study reveals a high prevalence of erectile dysfunction (ED) among chronic hemodialysis patients followed up at the General Hospital of Douala, with 76% of participants experiencing erectile difficulties, including 37% with moderate ED, 37% with mild ED, and 21% with severe ED. The main factors associated with ED in this population include diabetes, stress, and marital

problems. These results highlight the importance of considering psychological and relational comorbidities in the management of ED among chronic hemodialysis patients.

6. Limitations

This study has some limitations. The small sample size and lack of a control group limit the generalizability of the results. Additionally, the cross-sectional design does not allow for causal relationships between CKD and the identified risk factors for ED. Lastly, the assessment of ED was based on self-reports, which could introduce social desirability bias.

7. Future Directions

We plan to conduct longitudinal studies with larger samples to assess trends in ED progression among CKD patients in Cameroon and to develop interventions tailored to their specific context.

Consent to Publish

We, the undersigned authors of the article titled "***Prevalence and Associated Factors of Erectile Dysfunction in Chronic Kidney Disease Patients in Douala, Cameroon***", confirm that we have significantly contributed to its conception, writing, critical revision, and final approval. We attest that this manuscript is original, has not been published elsewhere, and is not under consideration by another journal. By this statement, we grant our consent for its publication by "***Open Journal of Nephrology***", as well as its reproduction, distribution, and dissemination, in accordance with the journal's policies. We also declare that all potential conflicts of interest and funding sources related to this work have been disclosed, and we collectively take responsibility for the published content.

Ethical Approval and Consent to Participate

The study received administrative authorisation and ethical approval from the General Hospital of Douala. Written informed consent to participate in this study was provided by the legal guardians/next of kin of the participants.

Availability of Data and Equipment

The original data supporting the conclusions of this article will be made available by the authors without undue reservation.

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Authors' Contributions

ENLPJ and ENFG designed the experimental approach and the writing plan. ENLPJ and NNE recruited the participants and conducted the laboratory analyses. ENLPJ performed the statistical analysis and prepared all the figures. ENLPJ drafted the manuscript. ENLPJ, ENFG, NNA, and FMEHD reviewed the manuscript. All the authors made substantial, direct, and intellectual contributions to the work and approved it for publication.

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Conflicts of Interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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