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Sexual Dysfunction and Associated Factors among Post-Stroke Patients in a Rehabilitation Setting in Kinshasa: A Cross-Sectional Study

*Eric Kam Kampy[1], Daniel Okitundu[2], Teddy Bofosa[3], Guy Bumoko[4], Sauvage Chloé[5], Mathieu Loposso[6], Betty Miangindula[7]

[1-3,4,6,7] University of Kinshasa, Democratic Republic of the Congo

[5] Erasme Hospital H.U.B, Belgium

*Correspondence Author

Eric Kam Kampy
Email: kam.kampy@unikin.ac.cd
ORCID: 0000-0002-8408-7160

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A B S T R A C T

Background: Although common, post-stroke sexual dysfunctions are rarely screened for systematically in routine practice in rehabilitation units in Kinshasa.

Objective: To determine its prevalence and associated factors among post-stroke patients in rehabilitation settings in Kinshasa.

Methodology: Cross-sectional analytical study conducted on 169 patients. Male and female sexual function, depression and cognition, motor skills, and disability were assessed using validated tools. Statistical analyses (Pearson's χ^2 and logistic regression) were performed using Jamovi 2.6.44, with a significance threshold set at $p < 0.05$.

Results: Half of patients were aged 62 years old, with 58% being men. The prevalence of sexual dysfunction (SD) was 56.2 %. In multivariate analysis, female sex was associated with lower odds of sexual dysfunction (OR = 0.34; 95% CI: 0.14–0.81), whereas obesity (OR = 2.45; 95% CI: 1.05–5.74), cognitive impairment (OR = 3.21; 95% CI: 1.31–7.86), and post-stroke depression (OR = 6.29; 95% CI: 2.40–16.50) were independently associated with higher odds of sexual dysfunction. Smoking was associated with lower odds of sexual dysfunction (OR = 0.28; 95% CI: 0.10–0.79). Age showed a non-significant trend.

Conclusion: Sexual dysfunction is highly prevalent among stroke survivors in rehabilitation in Kinshasa and is strongly associated with depression, cognitive impairment, and obesity. These findings support systematic screening and multidisciplinary management of sexual health in post-stroke care.

Keywords: Associated factors, Rehabilitation, Stroke, Sexual dysfunction

Introduction

Strokes are a major public health concern, being one of the leading causes of disability and the second leading cause of death in Western countries, with increasing prevalence among young adults and women.[1,2] Their consequences are heterogeneous, depending on the location and type of the initial lesion, resulting in diverse clinical profiles and recovery trajectories.[3] Beyond physical impairments, stroke can significantly affect emotional, social, and sexual well-being.[4] While physical deficits, such as mobility difficulties, are easily observable, less apparent issues, such as fatigue, cognitive impairments, and limitations in activities of daily living (ADL) can have a major impact on post-stroke life, including sexual activity.[1,5] Despite the importance of sexual health for overall quality of life, conventional rehabilitation programs primarily focus on functional recovery, often neglecting sexual concerns.[5] According to the literature, 20–75% of stroke survivors experience sexual changes or difficulties,[6] highlighting the clinical significance of this issue.

Nevertheless, screening for sexual dysfunction is not routinely performed in rehabilitation units in Kinshasa, and both patients and healthcare professionals often hesitate to

address sexual health concerns after stroke. Furthermore, very few studies have investigated sexual dysfunction among post-stroke patients undergoing rehabilitation in the Democratic Republic of Congo, with female sexual function remaining particularly understudied.[5,6] Cultural and sociocultural barriers may partly explain this gap, despite the substantial impact of sexual dysfunction on psychological well-being, interpersonal relationships, and overall quality of life.[4,5] Despite the growing recognition of sexual dysfunction as an important consequence of stroke, evidence from sub-Saharan Africa remains scarce, particularly regarding female sexual function and associated factors among patients in rehabilitation settings.[5,6] To our knowledge, no study has comprehensively evaluated post-stroke sexual dysfunction using validated sex-specific instruments in rehabilitation centers in the Democratic Republic of Congo.

The objective of this study is therefore to determine the frequency of sexual disorders, identify the affected domains, and examine the factors associated with sexual dysfunction among patients undergoing rehabilitation in Kinshasa at least three months after a stroke.

Methodology

We conducted a cross-sectional analytical study from March 1, 2022, to March 31, 2023, among patients undergoing post-stroke rehabilitation for at least three months in the adult neurorehabilitation units of the University Clinics of Kinshasa and the Kinshasa Center for Physical Rehabilitation in the Democratic Republic of Congo (DRC). We used a convenience sample with consecutive recruitment. Of a total of 185 patients identified, 169 met the inclusion criteria, including stroke confirmed by CT scan or brain MRI, patients ≥ 3 months post-stroke, aged between 18 and 85 years, and consent to participate. Sixteen patients were excluded, including two with severe cognitive or communication impairments (e.g., severe aphasia) precluding reliable participation in interviews, one who was less than three months post-stroke, one with a history of pre-existing severe psychiatric disorders, two aged over 85 years, and ten who refused to participate.

Sociodemographic, clinical, and paraclinical data were collected from medical records and patient interviews, including age, sex, marital status, education, pre-stroke occupation, comorbidities, and stroke type. Age was categorized using a clinically relevant cut-off (≥60 years) for bivariate analysis. Validated clinical tools assessed disability (Modified Rankin Scale), motor function (Demeurisse Motor Index), female sexual function (BISF-W), male sexual function (MSHQ), cognition (MoCA), and depression (MADRS). Cognitive impairment was defined as a MoCA score < 26, according to established recommendations, and post-stroke depression as a MADRS score ≥7, consistent with previously published criteria.

Sexual dysfunction was initially screened using a structured patient-centered interview (Screening for Sexual Difficulties, SSD). Participants who agreed to discuss sexual health received standardized information regarding the potential impact of stroke on sexuality. Those expressing unmet sexual health needs or a desire for sexual health support within the rehabilitation process were considered to have a positive screening result. All participants subsequently completed the sex-specific questionnaires (BISF-W for women and MSHQ for men), whereas SSD was used only as an initial screening tool. BISF-W scores range from -16 to 75, with -16–19 indicating severe dysfunction, 20–40 mild-to-moderate dysfunction, and 41–75 normal function. MSHQ interpretation is based on intra- and inter-individual comparisons, with lower scores indicating dysfunction. Although different instruments were used for men and women, both questionnaires are validated sex-specific measures assessing comparable domains of sexual functioning, including sexual desire, arousal, orgasmic function, and sexual satisfaction.

The analyses were performed using Jamovi 2.6.44 software. Continuous variables were presented as mean ± standard deviation or median (interquartile range) depending on their distribution, and categorical variables were presented as numbers and percentages. Pearson's χ^2 test was used to examine associations between categorical variables. Continuous variables were analysed using Student's t-test or Mann-Whitney U test. Logistic regression was used to identify factors independently associated with sexual dysfunction. Normality was assessed using the Shapiro-Wilk test and effect size using Cramer's V. Statistical significance was set at $p<0.05$.

Prior to data collection, the study protocol was approved by the National Ethics Committee of the Ministry of Scientific Research (452/CNES/BN/PMMF/2022) and conducted in accordance with the Declaration of Helsinki.

Results

A total of 169 post-stroke patients were included. Participants were predominantly male, living with a partner, and had mainly experienced ischemic stroke. Cognitive impairment and post-stroke depression were observed in 29.6 % and 46.7 % of patients, respectively (Table 1).

Self-reported sexual dysfunction was present in 63% of cases, reported more frequently in men (39.6%) than in women (23.1%). After clinical assessment using the BISF-W and MSHQ, sexual dysfunction was present in 56.2% of patients, proportionally more frequent in women (72.6%) than in men (43.8%) (Table 2). Among the 73 women, the median overall BISF-W score was 10/75 (IQR = 27), reflecting significant impairment, mainly affecting desire, arousal, frequency, and initiative in sexual intercourse (Table 3). For men (n = 96), the median composite MSHQ score was 74.9 ± 28.5/125 (IQR = 49), with the main disorders being ejaculation/orgasm, erectile function, and sexual desire.

Bivariate analysis showed that sexual dysfunction was significantly associated with age ≥ 60 years, female sex, higher education level (high school or above), smoking, and post-stroke depression ($p < 0.05$). Marital status, diabetes, hypertension, alcohol consumption, and cognitive impairment were not significantly associated (Table 4).

In Multivariate analysis, female sex was associated with lower odds of sexual dysfunction compared with male sex (OR = 0.34; 95% CI: 0.14–0.81; p = 0.015). Obesity was independently associated with sexual dysfunction. Obese participants had 2.45 times higher odds of sexual dysfunction than non-obese participants (OR = 2.45; 95% CI: 1.05–5.74; p = 0.039). Participants with cognitive impairment had approximately 3.2 times higher odds of sexual dysfunction compared with those without cognitive impairment (OR = 3.21; 95% CI: 1.31–7.86; p = 0.011). Participants with post-stroke depression had approximately 6.3 times higher odds of sexual dysfunction than those without depression (OR = 6.29; 95% CI: 2.40–16.50; p < 0.001). Other sociodemographic and clinical factors showed no significant associations (Table 5).

Table 1. Baseline Sociodemographic and Clinical Characteristics of Participants (n = 169)

Variable		n (%) or Median (IQR)
Age (years)	-	62 (20)
Sex:	Male	96 (56.8%)
	Female	73 (43.2%)
Marital status	Single	43 (25.4%)
	Living with partner	126 (74.6%)
Education level	High school or less	56 (33.1%)
	High school and above	113 (66.9%)
Employment status before stroke	Inactive	71 (42.0%)
	Active	98 (58.0%)
Post-stroke duration (months)	-	9 (5)
Stroke type	Ischemic	125 (74.0%)
	Haemorrhagic	44 (26.0%)
Neurocognitive impairment (MoCA)	-	50 (29.6%)
Post-stroke depression (MADRS)	-	79 (46.7%)
Stroke recurrence	-	50 (29.6%)

Table 2. Frequency of Self-Reported and Clinically Assessed Sexual Dysfunction by Sex

Sex	SSD Negative n (%)	SSD Positive n (%)	Clinical assessment Absent n (%)	Clinical assessment Present n (%)
Male	31 (32.3%)	67 (69.8%)	54 (56.3%)	42 (43,8%)
Female	32 (43.8%)	39 (53.4%)	20 (27.4%)	53 (72.6%)
Total	63 (37.3%)	106 (62.7%)	74 (43.8%)	95 (56.2%)

Note: SSD=Screening for sexual difficulties

Table 3. Composite Scores and Domains of the BISF-W and MHSQ

Domain	N	Mean	Median	SD	IQR	Min	Max
BISF-W global (0–75)	73	10.14	8	18.1	27.25	-16	52
Desire (0–12)	73	4.5	4	4.25	8	0	12
Arousal (0–12)	73	3.18	2	3.35	6	0	11

Frequency (0–12)	73	2.17	1	2.33	4	0	7
Initiative (0–15)	73	3.49	3	2.1	2	0	8
Pleasure (0–12)	73	3.85	3	2.93	4.25	0	11
Satisfaction (0–12)	73	3.99	4	3.54	7	0	11
Domain D7 (0–16)	73	12.29	13	3.32	4	3	16
MSHQ global (0–125)	96	74.86	82	28.5	49	24	120
Erection (0–15)	96	8.76	9	4.31	8	0	15
Discomfort related to erection (0–5)	96	3.52	4	1.44	3	1	5
Ejaculation and orgasm (0–35)	96	20.71	24	11.4	21	1	35
Discomfort related to ejaculation (0–5)	96	3.27	4	1.54	3	1	5
Satisfaction (0–30)	96	18.78	21	8.21	16	6	30
Desire (0–35)	96	19.81	21	7	10	7	33

Note: Abbreviations: Mean = arithmetic mean; SD = standard deviation; IQR = interquartile range; Min = minimum; Max = maximum. BISF-W = Brief Index of Sexual Functioning for Women; MSHQ = Male Sexual Health Questionnaire.

Analysis of Factors Associated with Sexual Dysfunction

Table 4. Factors Associated with Sexual Dysfunction (Bivariate Analysis)

Factors	Category	Sexual Dysfunction Present N (%)	Sexual Dysfunction Absent N (%)	Cramer's V	p-value
Sex	Male	41 (44.1)	53 (73.6)	0.296	<0.001
	Female	52 (55.9)	19 (26.4)		
Age (years)	<60	40 (40.0)	13 (18.1)	0.265	<0.001
	≥60	53 (57.0)	59 (81.9)		
Marital Status	Single	26 (28.0)	16 (22.2)	0.065	0.402
	In relationship	67 (72.0)	56 (77.8)		
Education Level	High school or less	37 (39.8)	17 (23.6)	0.171	0.028
	Higher education	56 (60.2)	55 (76.4)		
Hypertension	No	36 (38.7)	26 (36.1)	0.027	0.733
	Yes	57 (61.3)	46 (63.9)		
Diabetes	Yes	26 (28.0)	17 (23.6)	0.049	0.528
	No	67 (72.0)	55 (66.4)		
Alcohol Consumption	Yes	50 (53.8)	44 (61.1)	0.074	0.344
	No	43 (46.2)	28 (38.9)		
Smoking	Yes	11 (11.8)	19 (26.4)	0.187	0.016
	No	82 (88.2)	53 (73.6)		
Neurocognitive Disorders	Present	30 (32.3)	20 (27.8)	0.048	0.535
	Absent	63 (67.7)	52 (72.2)		
Post-stroke Depression	Present	56 (60.2)	21 (29.2)	0.309	<0.001
	Absent	37 (39.8)	51 (70.8)		

Note: TNC = neurocognitive disorders; DPAVC = post-stroke depression. Associations tested using Chi-square test; effect size estimated using Cramer's V.

Table 5. Multivariable Logistic Regression of Factors Associated with Sexual Dysfunction After Assessment Using the BISF-W and MSHQ

Associated factor	β	SE	Z	p-value	OR	95% CI (Lower–Upper)
Age (years)	0.037	0.020	1.826	0.068	1.04	0.997–1.08
Sex (Female vs Male)	-1.079	0.442	-2.443	0.015	0.34	0.143–0.808
Marital status (Single vs in relationship)	-0.814	0.499	-1.633	0.103	0.44	0.167–1.177

Diabetes (Yes vs No)	0.484	0.457	1.060	0.289	1.62	0.663–3.974
Obesity (Yes vs No)	0.897	0.434	2.069	0.039	2.45	1.048–5.735
Smoking (No vs Yes)	-1.257	0.520	-2.420	0.016	0.28	0.103–0.788
Disability (mRS score)	0.283	0.300	0.944	0.345	1.33	0.737–2.387
Cognitive impairment (Yes vs No)	1.165	0.458	2.545	0.011	3.21	1.307–7.863
Depression (Yes vs No)	1.839	0.492	3.740	<0.001	6.29	2.400–16.496

Note. The estimate represents the log odds of "DSGLOB = Present" versus "DSGLOB = Absent."; β = regression coefficient; SE = standard error; Z = Wald test statistic; OR = odds ratio; CI = confidence interval.

Discussion

In the present study conducted among 169 stroke survivors, more than half of the patients exhibited sexual dysfunction as assessed using standardized clinical tools (56.3%), and a substantial proportion reported a positive screening for sexual difficulties (SSD) during the interview (62.7%). These figures fall within the range reported in the literature, where the prevalence of sexual dysfunction after stroke commonly varies between 20% and 75%, depending on the studied populations, the assessment methods used, and the definitions applied. [14,15]

The high frequency of sexual dysfunction observed in our cohort aligns with data from various international studies, supporting the fact that more than half of stroke survivors may experience sexual dysfunction.[16,17] In men, the most commonly reported difficulties include decreased sexual desire, erectile dysfunction, reduced frequency of sexual activity, and ejaculatory disorders, whereas in women, disorders of sexual arousal (lubrication) and orgasm are most frequently reported.[18,19] Baldwin reported that despite the variability of sexual dysfunction types, loss of sexual desire was more frequently observed in depressed patients than were arousal or orgasmic difficulties.[20] However, in our cohort, besides decreased sexual desire, erectile and orgasmic disorders were also common, which may be explained by the effects of certain antihypertensive and antidepressant medications, such as selective serotonin reuptake inhibitors (SSRIs), [21,22] given the current trend of prescribing these drugs for certain post-stroke pain syndromes and the presence of over one-third of hypertensive patients in our sample. These manifestations, observed in domains of sexuality for both sexes, are consistent with current clinical conceptions that define sexual dysfunction as a combination of decreased desire, physiological difficulties, and impaired sexual satisfaction.[20]

Through both bivariate and multivariate analyses, we identified several factors significantly associated with sexual dysfunctions in our cohort. In our study, post-stroke depression emerged as the strongest factor associated with sexual dysfunction. This finding is consistent with the results reported by Montalvan et al., who observed a twofold increase in the likelihood of sexual dysfunction among stroke survivors with depression.[16] The association between depressive symptoms and post-stroke sexual dysfunction is well-established and widely documented, as depression is one of the most common psycho-affective factors correlated with decreased sexual desire (libido) and reduced sexual satisfaction.[16] The reduced libido observed in depressed patients can be explained by neurobiological and psychological mechanisms involving serotonergic and dopaminergic imbalances, decreased sex hormones associated with the hypothalamic-pituitary-adrenal (HPA) axis, as well as fatigue, low self-esteem, and sexual anhedonia.[23,24]

Cognitive impairment was independently associated with SD, with affected patients exhibiting more than threefold higher odds of sexual dysfunction than cognitively preserved individuals. This finding supports the hypothesis that deficits in executive functioning, attention, memory, and social cognition may interfere with the initiation, planning, and maintenance of sexual activity. Recent studies increasingly emphasize the contribution of neurocognitive dysfunction to post-stroke sexual health beyond the effects of physical disability alone.[25]

Obesity was also independently associated with sexual dysfunction. Similar observations have been reported in the literature, where obesity has been linked to impaired sexual function through multiple mechanisms, including endothelial and vascular dysfunction, obesity-related hormonal disturbances, chronic low-grade inflammation, reduced physical performance, and negative body image perception. These factors may act synergistically to impair sexual desire, arousal, and overall sexual satisfaction.[26,27]

Smoking was independently associated with sexual dysfunction. This finding is biologically plausible, as tobacco exposure contributes to endothelial dysfunction, impaired vascular perfusion, oxidative stress, and atherosclerotic changes, all of which may adversely affect sexual function. Previous studies have similarly identified smoking as a risk factor for both male and female sexual dysfunction through

its detrimental effects on vascular and neurovascular mechanisms involved in sexual response.[28,29,30]

Female sex was associated with lower odds of sexual dysfunction compared to male sex in multivariate analysis. This may reflect differences in reporting, sexual expectations, or differential impact of stroke-related impairments on sexual function domains.

Unlike some previous reports, neither age nor disability severity remained independently associated with sexual dysfunction after adjustment. This observation may indicate that psychological, cognitive, and relational factors outweigh the influence of physical disability on sexual functioning among stroke survivors. Contemporary studies increasingly support a biopsychosocial model of post-stroke sexuality, emphasizing the role of depression, self-esteem, interpersonal relationships, and cognitive functioning in shaping sexual outcomes after stroke.[31]

Clinically, issues related to sexuality after a stroke are generally not well integrated into routine clinical practice, despite their significant impact on patients' self-image, marital relationships, and overall quality of life. Several studies have reported a lack of intervention by clinicians on issues related to the sexual health of stroke survivors, usually due to barriers such as lack of time, insufficient specialized knowledge, or the perception that these issues are outside their professional expertise.[16] To address this gap, it is imperative to systematically integrate the assessment of sexual difficulties into stroke care and follow-up programs, given that sexuality is a fundamental human need.[32]

Consensus-based, standardized guidelines for the management of post-stroke sexual dysfunction are currently lacking. However, a recent Cochrane review highlighted the limited nature of the available data for establishing recommendations for specific interventions, due to the methodological limitations of the published trials, which were often small in scale.[17] Nevertheless, expert recommendations suggest multidisciplinary approaches, including sexual counselling, psychological support, physical rehabilitation, and medication adjustment[18] in order to respond holistically to patients' needs. In addition to the above, educational strategies such as the PLISSIT or BETTER models have been proposed [18] and can be contextualized and integrated into our healthcare system to facilitate access to discussions about sexual health and formalize this topic in the continuum of care.

Strengths, limitations and Recommendations: This study addressed an important but understudied aspect of stroke rehabilitation in sub-Saharan Africa, particularly female sexual dysfunction. It contributes novel data from the Democratic Republic of Congo and identified several factors associated with post-stroke sexual dysfunction, some of which may be potentially modifiable. Furthermore, the use of validated sex-specific instruments enhanced the reliability of sexual function assessment.

Nevertheless, several limitations should be acknowledged. First, sexual function was assessed using self-reported measures, which may be subject to reporting and social desirability biases despite the assurance of participant anonymity. Second, the heterogeneity of instruments used to assess sexual dysfunction across studies may limit direct comparisons with findings from other populations. Third, information regarding medication use (particularly antidepressants and antihypertensive agents), hormonal status in women, and stroke lesion location was not systematically available and therefore could not be included in the analyses, potentially resulting in residual confounding. Finally, information regarding patients who declined participation was limited, preventing formal comparisons with included participants. Given the cultural sensitivity surrounding discussions of sexuality, selection bias related to non-participation cannot be excluded.

Conclusion

This study found a high frequency of sexual dysfunctions, affecting more than half of the patient's undergoing rehabilitation in Kinshasa, with a predominance of male. Sexual dysfunction was independently associated with male sex, obesity, cognitive impairment, and post-stroke depression. These findings highlight the need for systematic screening, as well as comprehensive management that integrates sexual health into the rehabilitation process, in order to enhance patients' quality of life and psychosocial well-being after stroke.

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Data Availability Statement: *The datasets generated and/or analysed during the current study are not publicly available due to ethical, legal, and participant confidentiality considerations but may be available from the corresponding author upon reasonable request, subject to institutional approval where applicable.*

Disclaimer: *This Article was part of thesis. We as authors also want to declare that we used AI-assistant tools in this article for improving language. We authors are fully responsible for the accuracy, originality, integrity, and scientific validity of this article.*

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