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Catastrophic health expenditure at a fee-free regional referral hospital in Uganda: a cross-sectional study of patient and household correlates

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Research Article

Keywords: Catastrophic health expenditure, Out-of-pocket payments, Universal health coverage, Health financing, Regional referral hospital, User fee abolition, Uganda

Posted Date: November 17th, 2026

DOI: https://doi.org/10.21203/rs.3.rs-11274209/v1

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Additional Declarations: No competing interests reported.

Abstract

Background

Catastrophic health expenditure (CHE) is one of the major hindrances to achieving universal health coverage. This study investigated the prevalence and correlates of catastrophic health expenditure among patients at Jinja Regional Referral Hospital (RRH), Uganda.

Methods

The study sample consisted of 224 adults (≥ 18 years) systematically sampled from outpatient (n = 123) and inpatient (n = 101) departments between August and November 2022. Structured interviews were used to determine out-of-pocket expenditure and household non-food expenditure. CHE was defined as out-of-pocket expenditure exceeding 10% of monthly household non-food expenditure. Analysis was performed using SPSS v25. Descriptive statistics were calculated, and log-binomial regression was used to produce crude and adjusted prevalence ratios (cPR and aPR) with 95% confidence intervals (CIs). Study reporting adhered to STROBE guidelines for cross-sectional studies.

Results

CHE prevalence was 34.8% (78/224), and 71.4% (160/224) of patients incurred out-of-pocket payments, driven primarily by medicines (45.0%) and transport (30.0%). Patient-level correlates of lower CHE risk included female sex (aPR = 0.62, 95% CI: 0.40–0.96, p = .034) and secondary O-level education versus post-secondary education (aPR = 0.54, 95% CI: 0.30–0.96, p = .036). Household-level correlates showed that female-headed households (aPR = 0.69, 95% CI: 0.48–0.99, p = .044) and households with four members (aPR = 0.11, 95% CI: 0.02–0.76, p = .025) had lower risk. Having one child under five years (aPR = 0.56, 95% CI: 0.34–0.94, p = .027) or two children under five years (aPR = 0.45, 95% CI: 0.23–0.88, p = .019) reduced risk compared to more than three children, while households with members aged 65 years or older had significantly higher risk (aPR = 1.55, 95% CI: 1.11–2.15, p = .010).

Conclusions

CHE was high at 35% despite public user fee abolition, and household factors showed stronger correlations with CHE than individual factors. Interventions must target pharmaceutical supply chains and vulnerable groups—including households with elderly members and large male-headed households—to advance universal health coverage.

Key message

- **Rationale — Healthcare financing gaps persist despite policy reforms:** Despite Uganda's 2001 user fee abolition at public health facilities, out-of-pocket payments remain critically high. No previous studies have specifically examined catastrophic health expenditure (CHE) among patients at public regional referral hospitals or explored intra-household characteristics as determinants of financial burden.
- **Key Finding — High CHE prevalence driven by medicine stockouts:** Over one-third (34.8%) of patients at Jinja Regional Referral Hospital experience catastrophic health expenditure, more than double Uganda's national average of 14.7%. Medicines account for 45.0% of out-of-pocket costs, indicating systematic stockouts that force patients to purchase essential medications from private pharmacies despite free public care mandates.
- **Key Finding — Household vulnerability matters more than individual factors:** Household characteristics showed stronger associations with catastrophic expenditure than patient-level factors. Households with elderly members (≥65 years) and large male-headed households are particularly vulnerable.
- **Policy Implications — Fee abolition alone is insufficient:** User fee abolition without addressing pharmaceutical supply chains and household-level vulnerabilities fails to provide financial risk protection. Strengthened medicine procurement systems, targeted social protection for vulnerable households, and health promotion strategies emphasizing early care-seeking among men are needed.

Introduction

Catastrophic health expenditure (CHE) is defined as out-of-pocket (OOP) health payments above a threshold for a household, usually between 10 and 40% of their non-food expenditure (Yazdi-Feyzabadi, Mehrolhassani, and Darvishi 2019; Wagstaff and Doorslaer 2003). More than a billion people globally and 16.5% of people in Sub-Saharan Africa experience CHE (WHO 2025; World Bank 2022; Eze et al. 2022). The financial impact of CHE on households is very detrimental for universal health coverage, since it can lead to them not receiving needed care, ultimately resulting in worse health outcomes (Hailemichael et al. 2019; Alamneh et al. 2022). In spite of health financing reforms in low- and middle-income countries (user fee abolition, expansion of health insurance schemes, increased public health spending), out-of-pocket payments remain high at 35–40% of total health expenditure (World Bank 2022; Ahmadi et al. 2021).

Uganda abolished user fees at public health facilities in 2001 in order to improve healthcare access and reduce household financial burdens (Nabyonga Orem et al. 2011; McIntyre and Thiede 2007). Initially, the policy increased how much people (particularly those from low-income populations) used healthcare (Nabyonga Orem et al. 2011), but the overall results have been lackluster, with an average OOP expenditure of 38.26% and a national CHE prevalence of 14.7% (World Bank 2022; Kwesiga et al. 2020). Although there has been some research interest in health financing in Uganda, significant research gaps persist. First, most existing CHE studies focused on urban populations, employed higher thresholds (30–

40%) that may underestimate the problem in public settings, and analyzed primarily national household survey data (Kwesiga, Zikusooka, and Ataguba 2015; Ssewanyana and Kasirye 2020). Critically, no studies have specifically examined CHE among patients receiving care at public regional referral hospitals, which are the backbone of Uganda's decentralized health system. Furthermore, prior research has inadequately explored intra-household characteristics as CHE correlates, focusing only on patient-level factors. Jinja Regional Referral Hospital, serving over 600,000 people across several districts in eastern Uganda and receiving referrals from 22 lower-level facilities, represents a critical case for investigation due to persistent anecdotal evidence of high OOP payments in spite of the free-care policy mandate (Babirye et al. 2022).

This study adopted Wagstaff and van Doorslaer's (2003) methodological approach to measuring CHE, defining it as out-of-pocket health expenditure exceeding 10% of household non-food consumption. The 10% threshold was selected as appropriate for public hospital settings where individual payments may be lower in absolute terms than in private facilities, but where even modest expenditures can be catastrophic for poor households. The study's conceptual framework posited that CHE is influenced by two interrelated categories of factors: patient-related and household-related variables. Patient-related characteristics included sex, age, education level, marital status, type and nature of illness (chronic versus acute), health insurance coverage, duration of care-seeking at the facility, and concurrent use of private healthcare alongside public services. Household characteristics encompassed sex of household head, household size, number of children under five years, number of elderly members aged 65 years or above, demographic and educational composition of the household, household head's education level, and presence of other chronically ill household members. These variables were selected based on evidence from previous CHE studies in similar contexts (Shumet et al. 2021; Haakenstad et al. 2022; Sayuti and Sukeri 2022; Shikuro et al. 2020; Bogale and Kassa 2022).

In order to understand CHE prevalence and its correlates at Jinja Regional Referral Hospital, the study had three specific objectives:

1. Determine the prevalence of catastrophic health expenditure among patients receiving healthcare services at Jinja Regional Referral Hospital.
2. Identify patient-related correlates of CHE, examining which individual demographic, socioeconomic, and clinical characteristics significantly predict CHE occurrence.
3. Establish intra-household correlates of CHE, analyzing how household composition, dependency burdens, and resource structures influence CHE risk beyond patient-level factors.

Methods

Study Design and Setting

This cross-sectional study, reported according to STROBE guidelines (von Elm et al. 2007), was conducted at Jinja Regional Referral Hospital located in Jinja city, eastern Uganda. The hospital serves

as a referral facility for four districts with a catchment population exceeding 600,000 people. As a government-funded facility, it should provide free general care. Data were collected between August and November 2022.

Participants

The study enrolled adults aged 18 years and older seeking any healthcare service (outpatient or inpatient) from Jinja Regional Referral Hospital. Jinja RRH was purposively selected due to documented high out-of-pocket expenditure. Sample size calculation employed the Krejcie and Morgan (1970) formula with an estimated monthly population of 434 non-incident patients, assumed population proportion of 0.5, confidence level of 95% (chi-square value 3.841), and precision of 0.05, yielding a required sample of 204 patients, adjusted to 224 after accounting for 10% non-response. Systematic random sampling with an interval of K = 2 was used to select participants from both outpatient (n = 123) and inpatient (n = 101) departments, ensuring equal selection probability for all eligible patients. Inclusion criteria required patients who had sought hospital care more than once in the preceding three months, allowing sufficient time for healthcare expenditure to accumulate. Patients found to be lethargic or in severely poor health were excluded due to inability to complete the 40-minute structured interview.

Variables

The outcome variable was CHE, defined as OOP expenditure exceeding 10% of monthly household non-food expenditure (Wagstaff and Doorslaer 2003). OOP expenditure was itemized to include medicines, laboratory tests, medical supplies, transport, and other healthcare-related costs. Exposure variables included patient characteristics (sex, age, marital status, education level, religion, duration of care-seeking at the facility) and household characteristics (sex of household head, household size, number of children below five years, presence of members above 65 years).

Data Sources and Measurement

Data were collected through structured face-to-face interviews using pre-tested questionnaires. Four trained data collection assistants conducted the interviews, with two assigned to the inpatient department and two plus the principal investigator to the outpatient department (Rajadhyaksha 2010). The questionnaire was pre-tested at Mpumudde Health Centre IV to identify errors and ensure readability (Hurst et al. 2015).

Non-food household expenditure was assessed across 21 categories including cash contributions, rent, utilities (electricity, telephone, water), transportation, clothing, education expenses, and entertainment. Healthcare expenditure captured all costs incurred during the most recent visit to the hospital, including specific amounts spent on medicines, medical supplies, tests, and transport.

Bias

The study's main limitation was the reliance on self-reports when assessing both CHE and its potential correlates, which likely resulted in an underestimation of CHE, since patients might minimize OOP expenditure due to social desirability. However, respondents were assured of confidentiality and anonymity to minimize concealment or exaggeration. Single-site recruitment limits generalizability beyond similar public regional referral hospitals in Uganda.

Statistical Methods

We analyzed data using SPSS version 25 for Windows, generating descriptive frequency distributions for all variables. Bivariate analysis examined relationships between independent and dependent variables through cross-tabulations. Log-binomial regression models were used to calculate crude prevalence ratios (cPR) and adjusted prevalence ratios (aPR) with 95% confidence intervals (Barros and Hirakata 2003). Variables with $p < .20$ in bivariate analyses were included in multivariate models, with only those maintaining $p < .05$ after confounder adjustment retained as significant correlates of catastrophic health expenditure. No missing data handling was required for this analysis.

Ethics

Ethical approval

was obtained from the Research Ethics Committee of the Department of Health Policy at the London School of Economics and Political Science (LSE), the Mildmay Uganda Research Ethics Committee (MUREC; Ref: #REC REF 0508–2022), and the Jinja Hospital Research and Ethics Committee at Jinja Regional Referral Hospital (Ref: JREC 272/2022). Written informed consent was obtained from all respondents, who were informed that participation was entirely voluntary and that they could withdraw at any time without consequence. Respondent anonymity was maintained as no names were captured on study tools. COVID-19 prevention standard operating procedures were followed during all interactions.

Results

Participant Characteristics

The study included 224 respondents (detailed demographics in Table 1), predominantly female, with the largest proportion in the 20–29 age group. Most participants were married or cohabiting and had received formal education, with education levels ranging from lower primary to post-secondary. Religious affiliations were relatively evenly distributed across Anglican, Catholic, Muslim, and Born Again denominations, and nearly half had been seeking services from the hospital for more than three years.

Table 1
Sociodemographic characteristics of respondents

Variable	Category	Frequency	%
Sex	Male	79	35.3
	Female	145	64.7
Age (years)	< 20	10	4.5
	20–29	70	31.3
	30–39	50	22.3
	40–49	44	19.6
	50–59	25	11.2
	≥ 60	25	11.2
Marital status	Married/cohabiting	151	67.4
	Single	52	23.2
	Widow	12	5.4
	Separated/divorced	9	4
Formal education	Yes	196	87.5
	No	28	12.5
Education level	Primary (Lower)	20	10.2
	Primary (Upper)	61	31.1
	Secondary (O-level)	74	37.8
	Secondary (A-level)	22	11.2
	Post-secondary	19	9.7
Religion	Catholic	57	25.4
	Anglican	63	28.1
	Muslim	54	24.1
	Born Again	50	22.3
Duration at hospital	< 1 year	55	24.6
	1 year	24	10.7
	2 years	27	12.1
	3 years	13	5.8

Variable	Category	Frequency	%
	> 3 years	105	46.9

CHE Prevalence

Among the sampled patients, 160 (71.4%) incurred out-of-pocket costs during their most recent visit. The prevalence of catastrophic health expenditure was 34.8% (78/224), meaning over one-third of patients spent above the 10% threshold of their household non-food expenditure on healthcare. Medicines emerged as the primary driver of out-of-pocket expenses at 45.0%, followed by transport at 30%. More than half (53.8%) of those who incurred costs spent between 10,000 and 90,000 Ugandan shillings (approximately US$3–25).

Correlates of CHE

In multivariate analysis, two patient-related characteristics showed statistically significant associations with catastrophic health expenditure. Female patients had lower CHE prevalence compared to male patients (aPR = 0.62, 95% CI: 0.40–0.96, p = .034), while those with secondary O-level education also demonstrated lower prevalence compared to those with post-secondary education (aPR = 0.54, 95% CI: 0.30–0.96, p = .036). Four household-related characteristics were significantly associated with CHE: Female-headed households showed protective effects (aPR = 0.69, 95% CI: 0.48–0.99, p = .044), as did households with four members (aPR = 0.11, 95% CI: 0.02–0.76, p = .025) and having one (aPR = 0.56, 95% CI: 0.34–0.94, p = .027) or two (aPR = 0.45, 95% CI: 0.23–0.88, p = .019) children under five years. Conversely, having a household member aged 65 years or older substantially increased CHE prevalence (aPR = 1.55, 95% CI: 1.11–2.15, p = .01).

Table 2
Patient-level and intra-household correlates of catastrophic health expenditure (N = 224)

Variable	Category	CHE n (%)	Non-CHE n (%)	cPR (95% CI)	p	aPR (95% CI)	p
Patient Characteristics							
Sex	Male	19 (24.1)	60 (75.9)	0.59 (0.38–0.92)	.019	0.62 (0.40–0.96)	.034
	Female	59 (40.7)	86 (59.3)	1		1	
Education	Primary (Lower)	7 (35.0)	13 (65.0)	0.74 (0.35–1.58)	.437	0.73 (0.35–1.53)	.409
	Primary (Upper)	26 (42.6)	35 (57.4)	0.90 (0.52–1.57)	.71	0.83 (0.48–1.41)	.485
	Secondary (O-level)	20 (27.0)	54 (73.0)	0.57 (0.31–1.04)	.069	0.54 (0.30–0.96)	.036
	Secondary (A-level)	7 (31.8)	15 (68.2)	0.67 (0.31–1.46)	.314	0.67 (0.31–1.42)	.291
	Post-secondary	9 (47.4)	10 (52.6)	1		1	
Household Characteristics							
Household head sex	Female	51 (31.1)	113 (68.9)	0.69 (0.48–0.99)	.045	0.69 (0.48–0.99)	.044
	Male	27 (45.0)	33 (55.0)	1		1	
Household size	One	5 (31.3)	11 (68.8)	0.81 (0.38–1.75)	.597	0.92 (0.43–1.95)	.82
	Two	9 (52.9)	8 (47.1)	1.38 (0.83–2.29)	.213	1.22 (0.73–2.03)	.454

Note. CHE = catastrophic health expenditure; cPR = crude prevalence ratio; aPR = adjusted prevalence ratio; CI = confidence interval; 1 = reference category.

Variable	Category	CHE n (%)	Non-CHE n (%)	cPR (95% CI)	p	aPR (95% CI)	p
Patient Characteristics							
	Three	14 (50.0)	14 (50.0)	1.30 (0.84–2.02)	.238	1.38 (0.91–2.11)	.132
	Four	1 (4.0)	24 (96.0)	0.10 (0.02–0.72)	.022	0.11 (0.02–0.76)	.025
	Five	6 (23.1)	20 (76.9)	0.60 (0.29–1.26)	.178	0.61 (0.30–1.28)	.193
	>Five	43 (38.4)	69 (61.6)	1		1	
Children < 5 years	One	19 (26.8)	52 (73.2)	0.57 (0.34–0.97)	.039	0.56 (0.34–0.94)	.027
	Two	9 (22.0)	32 (78.0)	0.47 (0.24–0.93)	.03	0.45 (0.23–0.88)	.019
	Three	11 (61.1)	7 (38.9)	1.30 (0.77–2.20)	.319	1.19 (0.74–1.93)	.47
	>Three	15 (46.9)	17 (53.1)	1		1	
Member ≥ 65 years	Yes	28 (50.9)	27 (49.1)	1.72 (1.21–2.44)	.002	1.55 (1.11–2.15)	.01
	No	50 (29.6)	119 (70.4)	1		1	

Note. CHE = catastrophic health expenditure; cPR = crude prevalence ratio; aPR = adjusted prevalence ratio; CI = confidence interval; 1 = reference category.

Discussion

This study found that 35% of patients receiving healthcare services at Jinja Regional Referral Hospital experience catastrophic health expenditure despite the facility being government-funded with abolished user fees. Household characteristics showed stronger associations with CHE than patient characteristics, with female household heads, smaller household sizes, fewer young children, and absence of elderly members having protective effects against CHE. These findings indicate that user fee

abolition alone is insufficient for financial protection without addressing medicine availability and household-level vulnerabilities.

The 35% CHE prevalence at Jinja Regional Referral Hospital substantially exceeds the Sub-Saharan African average of 16.5% and Uganda's national average of 14.7% (Eze et al. 2022; Kwesiga et al. 2020), meaning that over a third of patients pay out-of-pocket to an extent exceeding 10% of their household non-food expenditure. The primary driver was medicines procurement from private pharmacies, accounting for 45% of healthcare costs, indicating that medicine stockouts force patients to purchase essential medications externally. The 10% threshold used in this study was appropriate for a public facility where expenditure should theoretically approach zero. Countries with lower CHE prevalence typically have more robust health financing strategies, including wider health insurance coverage and better-funded public health systems (Joarder, Chaudhury, and Mannan 2019; Kwarteng et al. 2020; Yi 2021). Patients caught in this CHE trap face reduced medication adherence, worse health outcomes, and a vicious cycle of inability to afford continued care.

Female patients showed 38% lower CHE prevalence than males, consistent with sex-based differences in health outcomes and healthcare utilization patterns (Peckham et al. 2020; Ahrenfeldt et al. 2021). Women demonstrate stronger adaptive and innate immune responses to antigens and microbes compared to men (Klein and Flanagan 2016; Kadel and Kovats 2018), meaning that they less frequently require advanced antibiotic classes or intensive interventions necessitating private pharmacy procurement at high cost. Additionally, female individuals exhibit better health-seeking behaviors than male ones, engaging in more preventive practices and seeking care earlier when symptoms first appear (Abdullah et al. 2022; Beia, Kielmann, and Diaconu 2021), thus reducing their risk of severe morbidity which requires sophisticated and costly treatment. The finding that secondary O-level education was protective compared to post-secondary education appears counterintuitive but indicates that well-educated patients may request more potent medication classes or formulations than the regional referral hospital stocks, necessitating private pharmacy purchase. More educated patients are, therefore, more likely to use private and public healthcare services concurrently (Ahmed et al. 2022; Sriram and Albadrani 2022; Haakenstad et al. 2022), choosing superior options they know are available rather than accepting what the hospital provides free. This knowledge-driven demand for services beyond government provision paradoxically increases their CHE risk in spite of better overall health awareness.

Patients from female-headed households showed 31% lower CHE prevalence compared to male-headed households, a protective effect that mirrors females' positive influence on household health behaviors generally, aligning with studies from India (Pandey et al. 2018) and Egypt (Abdel-Rahman et al. 2021) but contradicting findings from Malaysia (Sayuti and Sukeri 2022) and Ethiopia (Shikuro et al. 2020). This might be a consequence of the fact that female individuals more readily adopt preventive measures and seek healthcare promptly, likely instilling similar behaviors in household members they lead, meaning that members of female-headed households may present with less severe disease requiring fewer advanced medications or interventions beyond government provision. Household size effects were substantial, with four-member households showing 89% lower CHE prevalence than larger households,

as resource pooling becomes more difficult as household size increases and multiple members may require care simultaneously or sequentially. Larger households are also more likely to contain both young children and elderly members, both of which require specialized care often unavailable at public facilities. The finding that one or two children under five was protective compared to more than three children reflects the cumulative burden, as children are more susceptible to severe illness requiring multiple laboratory investigations and medicine procurement from private facilities (Choi, Choi, and Yun 2022; Harwood et al. 2022). Elderly household members constitute significant CHE risk factors, with households containing members aged 65 years or older showing 55% higher CHE prevalence. This is a consequence of elderly patients requiring more sophisticated geriatric care that few regional referral hospitals in Uganda can fully provide, consistent with findings from China (Duan et al. 2019; Zhou et al. 2016) and Ethiopia (Shumet et al. 2021). This forces private care-seeking or private supply procurement, creating substantial financial burden for affected households.

This study's strengths include rigorous systematic sampling eliminating selection bias, comprehensive assessment of both patient and household factors with specific attention to intra-household characteristics often neglected in previous research, and focus on rural patients at a public facility using the sensitive 10% threshold appropriate for settings where care should be free. The study was conducted at a facility serving primarily rural populations, contrasting with previous urban-focused research and providing insights into healthcare financing challenges in underserved areas. Limitations include reliance on self-reported expenditure data without documentary verification, though assured confidentiality and anonymity aimed to minimize reporting bias. The cross-sectional design disallows causal inference about relationships between household characteristics and CHE development over time. Single-site recruitment at Jinja Regional Referral Hospital limits generalizability, though the facility's characteristics likely mirror other Ugandan regional referral hospitals. Self-reported expenditure may underestimate true CHE prevalence as patients might minimize out-of-pocket expenses due to social desirability bias or recall difficulties.

Findings indicate critical need for pharmaceutical supply chain reform, with government and implementing partners including USAID, CDC, and National Medical Stores needing to increase essential medicines supply chain efficiency to regional referral hospitals through complete fulfillment of hospital medicine orders, increased budgetary allocations for pharmaceutical supplies, and improved procurement planning to avoid stockouts forcing private purchases (Lugada et al. 2022). Beyond supply chain strengthening, targeted interventions for vulnerable groups are essential, as households with elderly members and large male-headed households face highest CHE risk and warrant specific support through subsidized medication programs for elderly patients, health insurance schemes targeting large households, or voucher systems ensuring access to necessary supplies unavailable at public facilities. Health promotion strategies require strengthening, particularly behavior change communication and health education targeting male patients, with district health educators and village health teams emphasizing disease prevention measures and encouraging regular facility visits for health status monitoring before conditions worsen to reduce likelihood of advanced disease requiring expensive treatments. Early care-seeking interventions could substantially reduce the financial burden on male

patients who currently present later with more severe conditions. Fundamentally, the persistence of 35% CHE prevalence at a fee-free public facility indicates that user fee abolition alone is insufficient for financial protection, requiring comprehensive approaches addressing medicine availability, service quality, and household vulnerability for advancing universal health coverage.

Conclusions

Catastrophic health expenditure affects 35% of patients at Jinja Regional Referral Hospital despite user fee abolition, indicating systematic failure of financial protection mechanisms. This burden is driven predominantly by household vulnerability factors including male household heads, large household size, elderly members, and multiple young children. Beyond fee abolition, Uganda requires comprehensive interventions targeting pharmaceutical supply chains to eliminate medicine stockouts and equity-focused programs protecting vulnerable households. This study builds on the Best Student Dissertation 2023 findings, providing evidence for policy reforms advancing universal health coverage.

Abbreviations

aPR
Adjusted prevalence ratio
CBHI
Community-based health insurance
CDC
Centers for Disease Control and Prevention
CHE
Catastrophic health expenditure
CI
Confidence interval
cPR
Crude prevalence ratio
JREC
Jinja Hospital Research and Ethics Committee
LMIC
Low- and middle-income country
LSE
London School of Economics and Political Science
MUREC
Mildmay Uganda Research Ethics Committee
OOP
Out-of-pocket
RRH
Regional Referral Hospital

SPSS
Statistical Package for the Social Sciences
STROBE
Strengthening the Reporting of Observational Studies in Epidemiology
UGX
Ugandan Shillings
UHC
Universal Health Coverage
USAID
United States Agency for International Development
WHO
World Health Organization.

Declarations

Ethics approval and consent to participate

Ethical approval for this study was obtained from three ethics committees and their respective parent institutions: (1) the Research Ethics Committee of the Department of Health Policy, The London School of Economics and Political Science (LSE), London, United Kingdom (approved 26 August 2022); (2) the Mildmay Uganda Research Ethics Committee (MUREC), Mildmay Uganda, Kampala, Uganda (Protocol Reference: #REC REF 0508–2022, approved 08 September 2022); and (3) the Jinja Hospital Research and Ethics Committee (JREC), Jinja Regional Referral Hospital, Ministry of Health, Jinja, Uganda (Registration Number: JREC 272/2022, approved 25 November 2022). Administrative permission to conduct the study was also granted by the Hospital Director of Jinja Regional Referral Hospital. All study procedures were performed in accordance with the ethical standards of the institutional and national research committees and with the 1964 Helsinki Declaration and its later amendments. Written informed consent was obtained from all individual participants included in the study prior to interview administration.

Consent for publication

Not applicable.

Competing Interests

The authors declare that they have no competing interests.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors. All field data collection and operational costs were self-funded by the corresponding author.

Author Contribution

Christopher Bwanika: Conceptualization, Methodology, Data curation, Software, Formal analysis, Investigation, Validation Writing original draft.Ambrose Nsabirwa: Reviewing and Editing.

Acknowledgement

This paper is based on an MSc Health Policy dissertation (London School of Economics, 2023) awarded Best Student Dissertation 2023. We are deeply grateful to George Wharton and Alistair McGuire, PhD for their expert supervision, methodology guidance and review of the manuscript during its development. We acknowledge the support of Jinja Regional Referral Hospital administration and staff, and the research assistants that supported the study.

Data Availability

All data supporting the findings of this study are available within the paper and its Supplementary Information.

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