

HIV Prevalence and Sexual Behaviour Risk Among Male Regular Partners of Female Sex Workers. A Mixed-Methods Study at a Peri-urban Clinic in Kampala, Uganda

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Abstract

Background: In Uganda, female sex workers (FSWs) and their male partners are estimated to contribute 16% to new HIV infections. We assessed HIV prevalence and associated sexual behaviour risk among male regular partners of FSWs attending a peri-urban clinic in Kampala, Uganda.

Methods: Between June 2012 - June 2017, we conducted a mixed methods cross-sectional study among male regular partners (aged ≥ 18 years old) of FSWs. The men were enrolled through FSWs attending a routine three monthly visit at a research clinic. Eligible and interested men were consented and counselled for parallel rapid HIV testing (Determine, Statpak, Unigold) on a serum sample. HIV-positive men were assessed and enrolled into HIV care and 3 monthly follow up. Data on socio-demographic, sexual behaviour (sexual relationships, condom and alcohol use), and clinical characteristics were collected. Multivariable logistic regression was used to identify factors associated with HIV sero-positivity. In-depth interviews were conducted to elicit information on participants' knowledge of HIV and its prevention as well as sexual risk practices. Qualitative data was analysed using NVIVO 12.0 following thematic approach.

Results: One hundred and sixty-two men were included in the analysis; mean age was 35 years old ($SD \pm 8.43$). The overall HIV sero-positivity was 65/162 (40%), of these 57/65 (88%) men were initiated on ART from the clinic. Ninety percent had no signs of sexually transmitted infections (STI), 119/162 (73%) reported not using a condom during last sexual intercourse. At adjusted analysis, HIV sero-positivity was less likely among men with no STI ($aOR = 0.21$; 95% CI: 0.06-0.70) and using a condom during last sexual intercourse ($aOR = 0.39$ (95% CI: 0.18-0.85)). HIV sero-positivity was more likely among uncircumcised men ($aOR=3.10$; 95%CI: 1.49-6.45), those with multiple sexual relationships [two or more sexual partners] ($aOR=3.45$; 95% CI: 1.59-7.51). Qualitative findings highlight that most participants were not consistently using condoms with FSWs; the main reason given was that they "trusted" their steady FSWs.

Conclusions: HIV prevalence among male regular partners was associated with high risk sexual behaviour. Interventions targeting FSWs should be extended to their male regular partners, to enable their access to HIV care and support.

Background

The HIV epidemic is one of the world's most serious public health and social problems [1]. The importance of male regular partners (MRPs) of female sex workers (FSWs) in human immunodeficiency virus (HIV) and sexually transmitted infections (STIs) epidemiology has increasingly been recognized globally [2]. Male regular partners of FSWs can act as a "bridge" connecting high risk sexual networks to lower-risk sexual networks in the general population [3-5]. In Uganda, previous reports show that 6% of men aged 15-49 have paid for sexual intercourse at some point in their lives [6]. An estimated 16% of new infections may be attributed to FSWs and their male partners in Uganda [7]. The HIV prevalence among FSWs in Uganda is also high, ranging between 33% and 37% compared to 9.5% among the general female population [8-10]. The high prevalence of HIV/STIs in FSWs suggests a critical need for interventions directed towards both FSWs and their male partners.

Previous reports have shown that MRPs who have sex with FSWs have higher prevalence of HIV/STIs and are usually a population which is harder to reach than other men in the general population [11]. However, because these men are not a readily identifiable group, targeting this population for prevention programs is challenging [12]. The perceived lack of confidentiality and community stigma towards HIV may play a role in MRP's unwillingness to access HIV care, potentially affecting transmission dynamics [11]. Hence, MRPs are an important target group for HIV/STIs prevention, and programs addressing their needs in different settings continue to be important [13].

Sexual behaviour risks among MRPs have been identified in different studies in sub-Saharan Africa (SSA) [14]. Unprotected sex between FSWs and their MRPs is associated with the highest risk of HIV infection [15, 16]. In Uganda, despite many promotion campaigns on condom use, the utilization rate is still low among these high risk populations [16]. Multiple sexual relationships are common among many MRPs, resulting in large and interconnected sexual networks that contribute to the rapid expansion of the HIV epidemic [11]. Furthermore, MRPs of FSWs who drink excessive alcohol and use illicit drugs engage in riskier sexual behaviour (e.g. unprotected sex) and are more likely to have HIV and other STIs [17]. The loss of control following alcohol consumption is sometimes described as leading to sexual violence [18]. These gender inequalities and unequal power dynamics between FSWs and their MRPs influence the high HIV/STIs prevalence rates in the social context in which FSWs operate [19].

Whereas in SSA, the MRPs of FSWs constitute a core group for HIV transmission, few interventions have been developed to target this population. They are less often the targets of HIV/AIDS-related research and preventive interventions than FSWs [20]. In this paper, we assess the HIV prevalence and associated sexual behaviour risk among MRPs of FSWs in a peri-urban clinic setting in Kampala, Uganda.

Methods

Study design, population and setting

This was a mixed methods cross sectional study which employed both quantitative and qualitative data collection methods. Between June 2012- June 2017, we enrolled MRPs aged ≥ 18 years old into the study. The MRPs were enrolled through FSWs attending routine three monthly visits at the Good Health for Women Project (GHWP) clinic. The GHWP clinic is in a peri-urban suburb in the south of Kampala, the capital city of Uganda. The clinic was established in 2008 to study the epidemiology of HIV and STIs and to implement HIV/STI prevention among FSWs. HIV prevalence among FSWs in the cohort is 37% (7).

Eligibility criteria

The eligibility criteria for participation in the study included: 1) being an MRP of a FSWs aged ≥ 18 years old; 2) agrees to test for HIV; 3) MRPs who indicated that their relationship with the referring FSW had lasted for at least six months and if he had had sexual intercourse with a FSW within a month. We excluded non-consenting and mentally impaired participants.

Quantitative component

Recruitment and study procedures

Participants were recruited through an on-going open cohort of FSWs established since 2008. Female sex workers are recruited by field workers and peer educators who approach them at their “hot spots”. Female sex workers attend three monthly clinic visits for routine HIV counselling and testing, free condoms and other services at each visit. During their follow-up visits, enrolled FSWs are screened for having an eligible MRP on an individual basis. The FSWs who may report having many partners, are asked to identify only one of their sexual partners with whom they have had sexual contact within the last one month, and their relationship has lasted for at least six months. The FSWs having eligible MRPs and willing to bring their MRPs inform them about the study using the “Information sheet” for referral. Potential MRPs are screened to determine their eligibility and to verify that they are the MRPs of FSWs. The MRPs who meet the eligibility criteria are asked if they would be interested to take part in a research study, including drawing blood for HIV testing and a 30-minute face-to-face interview about their sexual behaviours and other related information. The MRPs who were interested and eligible were enrolled into the study. Both HIV-negative and -positive MRPs were recruited into the study. Eligible and interested men were consented and counselled for serial rapid HIV testing (Determine, Statpak, Unigold) on a serum sample. HIV-positive men were assessed and enrolled into HIV care and 3 monthly follow up. Participants were also screened for STIs and those with STIs were offered free treatment according to Ministry of Health (MoH) clinical guidelines [21]. Counselling on STI / HIV prevention was done at each visit and condoms provided.

Laboratory procedures

As part of routine clinical care, blood samples were collected by an experienced and trained health worker for assessing HIV sero-positivity. Participants underwent confidential pre-test counselling and a free anonymous rapid HIV test. HIV diagnosis was made from 2 rapid tests in parallel (Determine, Statpak, Unigold [was used as a tiebreaker in case of discrepant results]) as per national guidelines [22]. Participants received HIV post-test counselling and HIV test results on the initial visit. The HIV test results were linked to participants by their unique study identification number.

Data collection and study measures

After obtaining a written informed consent, eligible MRPs were consecutively enrolled and face-to-face semi-structured interviews conducted. Counsellors collected data on socio-demographic characteristics, sexual behaviour and clinical characteristics. The primary outcome of this study was HIV sero-positivity assessed as either positive or negative at enrolment. Socio-demographic measures included age, marital status, education level, alcohol use, and illicit drug use. Alcohol use was assessed by using a standardized WHO [Alcohol Use Disorders Identification Test](#) (AUDIT) [23]. Alcohol use was classified into three categories i.e. harmless or low risk drinkers: score 1-7, harmful or high-risk drinkers: score 8-19 and alcohol dependent: score 20+. The sexual behaviour characteristics included number of sexual partners, paying food or money for sex and condom use at last sexual intercourse with FSW. The clinical characteristics included presence of STI symptoms in the last 12 months. Presence of STI symptoms was determined if

an MRP self-reported having had any symptoms suggesting STIs in the last 12 months including urethral discharge, genital ulcer, and pain during urination.

Quantitative data analysis

Data were double entered in OpenClinica (OC), cleaned, and exported to Stata15.0 (StataCorp, College Station, TX, USA) for analysis. We resolved discrepancies by checking the source documents for clarification. Categorical demographic and clinical characteristics were summarized by counts and percentages. Continuous variables were summarized by means and standard deviations or medians and interquartile ranges. The proportion with HIV sero-positivity was analysed by the different demographic, sexual behaviour and clinical characteristics. Factors for which the association attained statistical significance on log likelihood ratio test (LRT) of $p<0.20$ were selected for the multivariable logistic regression model. Logistic regression models were fitted to identify factors associated with HIV sero-positivity at unadjusted analysis. Factors were retained in the final multivariable logistics regression model if their inclusion did not make the fit of the model significantly worse at the 5% level on a likelihood ratio test (LRT).

Qualitative component

Sample selection and recruitment

Informed by a study conducted in Kenya [24] and based on our experience of conducting qualitative studies, a sample of 34 MRPs was selected, a number which was anticipated to allow us achieve saturation. The participants were part of the quantitative component and were consecutively recruited into this study. Potential participants were identified using the clinic register compiled during the period June 2012- June 2017, as part of the main GHWP MRP cohort. The interviewer then compiled a list and the selection of each participant was based on choosing a range of people representing participants of the different age, educational level, duration in the cohort, and geographical location. Purposive sampling was used to recruit as varied a sample as possible in order to gather a wide range of responses. Purposive sampling was used to ensure maximum variation of the sample and experiences. MRPs were approached by the social scientist, given information and invited to participate during their clinic visit. MRPs in the community were contacted by telephone to ascertain their willingness to be interviewed. Those who responded positively, were invited to participate in the interviews either at the participants' homes, or in a private place at GHWP clinic, depending on the preference of the MRP.

Data collection procedure

Face-to-face in-depth interviews were conducted by an experienced social scientist in the participants' preferred language (English or Luganda). The interviews lasted between 45 – 60 minutes and were not audiotaped as was the preference with most of the participants. Instead, detailed notes were written out immediately after each interview and these formed the basis of the analysis. Such a practice has been found to be effective data [25]. An in-depth interview guide was used to elicit background information on participants' knowledge of HIV and its prevention as well as sexual risk practices. The following topic areas

were explored flexibly throughout each interview; knowledge on HIV and the prevention strategies; money, love, sex and HIV risk; multiple sexual relationships; HIV and condom use; alcohol and illicit drug use. The interviews were conducted at times and in quiet places that were convenient to the participants either at the clinic or away from the clinic with written informed consent from the participant.

Qualitative data analysis

The data was analysed thematically using a Framework Analysis approach [26]. Two social scientists went through the scripts to identify common themes which were linked to the research questions. They then coded the data around these themes and transferred these by copying from text and pasting in an excel table in order to identify patterns, associations, and even concepts in relation to the main topics discussed with the MRPs.

Results

Quantitative results

Participants' baseline characteristics

We included 162 men in the analysis; mean age was 35 years ($SD= 8.43$). More than a third attained primary education and most (62%) were married with one wife. Nearly half were dependent alcohol drinkers, majority (90%) had no signs of STIs, and most (73%) reported using a condom during the last sexual intercourse. More than 50% were not circumcised and nearly half reported having two or more sexual partners. Only a few (14%) reported paying food or money for sex. The overall proportion of participants who were HIV sero-positive was 65/162(40%), of these 57/65 (88%) men were initiated on ART from the clinic. With regard to age, HIV sero-positivity increased with increasing age, 52% (>35 years) vs 48% (≤ 35 years). The proportion of participants with an HIV sero-positive result was highest among participants who hadn't attended school (42%) compared to those who had attended secondary school and above (23%). Similarly, the proportion with an HIV sero-positive result was highest among the non-circumcised men (66%) compared to the circumcised (34%). Additionally, the proportion with HIV sero-positive result was highest among participants with multiple sexual relationships (two or more sexual partners) (68%) compared to those with less than two sexual relationships (32%). (Table 1).

HIV sero-positivity and associated factors

At unadjusted analysis, HIV sero-positivity was less likely when having no STI symptom ($uOR= 0.24$, 95% CI: 0.08-0.72) and use of a condom in the last sexual intercourse ($uOR=0.36$, 95% CI: 0.18-0.75). HIV sero-positivity was more likely among uncircumcised men ($uOR=2.56$; 95%CI: 1.33-4.91), those with multiple sexual relationships [two or more sexual partners] ($uOR= 2.86$, 95% CI: 1.48-5.52).

At adjusted analysis, HIV sero-positivity was less likely among men with no STI symptoms ($aOR= 0.21$; 95% CI: 0.06-0.70) and using condoms during the last sexual intercourse ($aOR = 0.39$, 95% CI: 0.18-0.85). HIV

sero-positivity was more likely among the uncircumcised men ($aOR=3.10$, 95%CI: 1.49-6.45), those with multiple sexual relationships (two or more sexual partners) ($aOR= 3.45$, 95% CI: 1.59-7.51). (Table 1).

Tables 1: Baseline characteristics, HIV Prevalence and associated factors among MRPs of FSWs at GHWP clinic in Kampala, Uganda (2012-2017)

Baseline Characteristics	Category	Overall N=162 n(col%)	Prevalent N=65 n(col%)	uOR 95%CI	LRT P-value	aOR 95%CI	LRT P-value
Socio-demographic characteristics							
Age(years), mean (\pm SD)		35 (SD \pm 8.43)					
Age category, years					0.823		
	\leq 35	79(49)	31(48)	Reference			
	>35	83(51)	34(52)	1.07(0.57-2.01)		1.35(0.62-2.92)	0.451
Level of education					0.177		
	Secondary +	48(30)	15(23)	Reference			
	Primary	59(36)	23(35)	1.41(0.63-3.14)		2.12(0.84-5.37)	0.112
	Never	55(34)	27(42)	2.12(0.95-4.76)		2.28(0.88-5.92)	0.09
Marital Status					0.288		
	Married with many wives	34 (21)	10(15)	Reference			
	Married 1 wife	101(62)	42(54)	1.71(0.74-3.95)			
	Not married	27(17)	13(20)	2.23(0.78-6.40)			
Ever used drug					0.366		
	Yes	44(27)	15(23)	Reference			
	No	118(73)	50(77)	1.42(0.69-2.93)			
Alcohol use					0.245		
	Low risk	52(32)	31(48)	Reference			
	Harmful/high risk	37(23)	19(29)	0.50(0.21-1.17)			
	Alcohol dependent	73(45)	15(23)	0.71(0.28-1.82)			
Clinical characteristics							

Baseline Characteristics	Category	Overall N=162 n(col%)	Prevalent N=65 n(col%)	uOR 95%CI	LRT P-value	aOR 95%CI	LRT P-value
Presence of STI symptoms in the last 12 months					0.007		
	Yes	17(10)	12(18)	Reference			
	No	145(90)	53(82)	0.24(0.08-0.72)		0.21(0.06-0.70)	0.012
Sexual behavioural characteristics							
Condom use during the last sexual intercourse					0.005		
	No	43(27)	25(38)	Reference			
	Yes	119(73)	40(62)	0.36(0.18-0.75)		0.39(0.18-0.85)	0.018
Circumcision status					0.004		
	Yes	77(48)	22(34)	Reference			
	No	85(52)	43(66)	2.56(1.33-4.91)		3.10(1.49-6.45)	0.003
Number of women with sexual relationship					0.001		
	0-1	85(52)	21(32)	Reference			
	2+	77(48)	44(68)	2.86(1.48-5.52)		3.45(1.59-7.51)	0.002
Paying food or money for sex					0.585		
	Yes	22(14)	10(15)	Reference			
	No	140(86)	55(85)	0.78(0.31-1.92)			

uOR=unadjusted odds ratio; aOR=adjusted odds ratio; CI= Confidence interval; LRT=Likelihood ratio test

Qualitative results

Participant characteristics

The youngest MRP in the qualitative sample was nineteen years old while the oldest was fifty-seven years old. The majority were in the age range of 25 to 45 years old. Their main occupations were in the informal sector involving farming, working in the building sector and riding commercial motorcycles. They described the sort of work they do as being mobile most of the time. Most (18/34) attained only primary education and were not married to the FSWs who introduced them to the GHWP clinic. During the interviews, more than half (18/34) of the men disclosed they were HIV positive.

HIV and condom use

The participants showed good knowledge of HIV/STI transmission routes. They frequently mentioned the importance of condom use to prevent infection, although this knowledge did not translate into safer-sex practices. Most men, regardless of social status, said condoms were important to protect themselves and their families, as a 34-year-old man describes: "Unsafe sexual behaviour is not good, I want to remain healthy and look after my children".

While condoms have been widely distributed in bars and lodges by outreach clinic staff, several admitted to inconsistent condom use, particularly when alcohol was involved. They were unable or unwilling to use condoms with their partners/spouses, as this would lead to evidence or suspicion to outside sexual relationships. A 50-year-old man explains; "I don't use a condom with my partner because we trust each other. One can never use a condom with his own wife".

Not using condoms with their partners/FSWs, was linked to the desire to have children, intimacy and trust as a 34- year- old man mentions; "Too much love does not accommodate condoms....." Another one also said; "The desire for children exposes his partners to HIV risk but it's a risk they are both willing to take" [38-year-old MRP]

The MRPs who sometimes used a condom did so at the first encounter with a new FSW. Some MRPs had difficulty understanding that someone could be infected with HIV and not have any physical symptoms.

Multiple sexual relationships

All the MRPs reported having other sexual partners in addition to their FSWs partners. The men emphasised that they were in intimate relationships with their FSW partners. A 34-year-old man said:

"I admit to having multiple partners even then, I struggled to come to terms with the FSW label of my partner but I feel there is an emotional connection"

And for all of them, once they had joined the clinic, they were encouraged to bring their other partners to the clinic for HIV testing. One 31 –year- old man said that although he was introduced to the programme by one of the partners, he was encouraged to bring in others: he was introduced to GHWP by a partner who

was living with HIV but he also brought another partner who tested negative. Some men stated that they engaged in multiple sexual relationships because they wanted women who would contribute to the relationship financially. Such relationships ended up with sexual risk behaviour with no condoms involved. Below is an excerpt from an interview with a 31 year old man who narrated that:

"He started a relationship with an older woman whom he met as he worked at the construction site, used condoms once and it broke in the process and so they abandoned them after all there was nothing to protect, she had his child, they separated citing her promiscuity but got back together after they both tested negative. However, they finally separated when she was delivering another of his children and he started another relationship at a different construction site. He liked the 2nd partner because she would contribute to household income".

Another risk behaviour that the MRPs were involved in was excessive alcohol drinking and use of illicit drugs which affected their judgement about unprotected sex with multiple sexual partners thus exposing them to acquiring HIV and other sexually transmitted infections. A 19 year old man said he drinks to cope with stress; a 44 year old man told us that marijuana gave him courage to have sex with older women.

Discussion

We found a relatively high HIV prevalence among a group of men who reported having a stable relationship with FSWs in Kampala, Uganda. The HIV prevalence among these MRPs is six times higher than the national average of 6.3%, and 10 times higher than the national average for men in the general population of 4 % [27]. This finding is comparable with the HIV prevalence among FSWs at the GHWP clinic, in Uganda [28]. However it was lower than what was reported among male partners of FSWs in Côte d'Ivoire [17]. As a group at high risk of contracting HIV/STIs, MRPs are thought to be an important core transmitter group or the so-called 'bridge population', forming critical transmission networks between high-risk groups such as FSWs and the general population [4]. The high alcohol use in our participants is also a likely contributor to the HIV prevalence in this population. The male partners of FSWs in Zimbabwe and Benin who had high numbers of sexual partners were more likely to have HIV/STIs [14, 15].

In this study, condom use provided a protective effect for HIV sero-positivity. Previous reports have shown that boyfriends or male regular partners may not use condoms with their steady FSWs [24]. Results from a qualitative study [29] found that condom use between these partnerships was very inconsistent. In the same study, they also reported that these intimate partners had aspirations of having children and also due to emotional connections it was difficult for them to always use condoms [29]. Furthermore, a study in Tanzania among truck-drivers also found that condom use with regular or steady FSWs was very low [30]. This is possibly because regular FSWs are treated as wives, with whom using a condom is unacceptable because it tends to signal lack of trust. Thus, there is a need to continue intensifying efforts and programs to increase condom use among MRPs who visit FSWs. Unfortunately, such programs are likely to face challenges. For example, in SSA, alcohol use is central to the culture of commercial sex and drunk male partners are frequently hostile to condom use [31].

This study also demonstrated that HIV sero-positivity was less likely among men who presented with no STI symptoms. This confirms reports from earlier studies in this cohort and elsewhere in SSA [28]. Interventions to address STI prevalence include behavioural-change-based education on HIV/AIDS and STI transmission, condom promotion, circumcision counselling, and promotion of STI diagnosis and treatment. In Côte d'Ivoire, such programs have indicated spectacular decrease in HIV prevalence among partners of FSWs [17].

In this study, HIV sero-positivity was more likely among the uncircumcised men. While medical male circumcision can reduce the risk of HIV infection by up to 60% [32, 33], in our study only a few HIV sero-positive men reported that they were circumcised. Although the overall percentage of circumcised MRPs in this study was slightly higher than the national average [27], it is still below the national target [34] and could be further scaled up through community awareness campaigns. Encouragement of HIV negative MRPs to circumcise for HIV prevention should be emphasized.

Implications for policy and practice

The information from this study provides areas to focus prevention efforts. This study shows that MRPs are practising high risk sexual behaviours similar to those of FSWs, and yet male partners have received little attention in HIV prevention programs [5]. This omission must be addressed, MRPs must receive as much intensive HIV prevention counselling as FSWs. Successful FSWs programs such as peer education programs, distribution of free condoms and information to become more aware of their own risk behaviours should be extended to MRPs. Information, education, and communication (IEC) campaigns should include advertising condom use as a sign of taking responsibility and protecting a partner (be it a wife, girlfriend, or FSW).

Limitations

Our study had some limitations. First, this population was drawn from one clinic in Kampala. Thus, the HIV prevalence in our study group is probably not representative of MRPs in other areas, so results may not be generalizable to other MRPs in Kampala. Second, a selection bias may have been introduced, because MRPs with higher incomes and education were probably more likely not to participate. Additionally, only a consecutive subsample of FSWs recruited a partner and the FSWs may not have randomly selected a partner to refer from among her network of partners. Third, the numbers of MRPs included in this study were relatively small, which led to lower statistical power and thus assessing characteristics that were independently associated with HIV was limited. Future larger studies will be required to enhance our understanding of the possible HIV/STI transmission dynamics in these MRPs. Last, participants went through a face-to-face interview, which may have introduced a response bias on sensitive questions such as condom use and multiple sexual relationships. However, to minimise this, the interviews were conducted in private clinic rooms by trained counsellors.

Conclusion

HIV prevalence among MRPs **is relatively high**. HIV sero-positivity was less likely among men with no STI symptoms and using a condom during the last sexual intercourse, but was more likely among the uncircumcised men and those with multiple sexual relationships [two or more sexual partners]. Interventions targeting FSWs should be extended to their regular partners, to enable their access to HIV care and support.

List Of Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
FSWs	Female sex workers
GHWP	Good Health for Women Project
HIV	Human Immunodeficiency Virus
IQR	Interquartile range
LMICs	Low and middle income countries
LSHTM	London School of Hygiene and Tropical Medicine
MRC	Medical Research Council
MRPs	male regular partners
OR	Odds ratio
SD	Standard deviation
STIs	Sexually transmitted infections
SSA	Sub-Saharan Africa
UNCST	Uganda National Council of Science Technology
UVRI	Uganda Virus Research Institute
WHO	World Health Organisation

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Uganda Virus Research Institute Research and Ethics Committee and the Uganda National Council for Science and Technology (reference number HS364). Written informed

consent was obtained from the participants for both qualitative and quantitative data separately. Confidentiality and anonymity were maintained throughout the study period.

Consent to publish

All authors have read and approved the submitted manuscript for publication.

Availability of data and materials

The data collected in this study is available for sharing and procedures for accessing it is contained in the data sharing policy accessible from the Medical Research Council (MRC) website (<https://www.mrcuganda.org/publications/data-sharing-policy>).

Competing Interests

The authors declare that they have no competing interests.

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Authors' contributions

GN conceived and designed the study, OK and GN performed the statistical analysis, GN wrote the manuscript; DB, YM, TK, RK, MM, AS and JS oversaw the overall execution of the manuscript writing; JS oversaw the critical revisions of the manuscript. All authors read and approved the final manuscript.

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