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Effectiveness of A Group Cognitive Behavioural Therapy Intervention for Sexualized *Muguka* Use Among Adolescents and Youth in Kenya

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Abstract

The use of behavioural interventions against problem khat use remains understudied. This study tested the effectiveness of a group cognitive behavioural intervention among regular *muguka* (a variant of khat) users' frequency of use, sex-related beliefs and risk perception among others. A mixed-method design incorporating a pretest-posttest quasi-experimental approach and individual interviews was used on a sample of 249 regular *muguka* users. After a pretest, a 12-week cognitive behaviour intervention was administered once a week. A posttest was administered immediately after the intervention. In addition, 27 conveniently sampled participants were targeted for individual interviews. Results indicate significant changes in protected sexual intercourse, risk perception and cognitions at Time 2. Significant reduction in frequency of *muguka* use was also reported at Time 2. The study provides a proof of concept of the effectiveness, feasibility and acceptability of a cost-effective community-level behavioural intervention for *muguka* use.

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Introduction

Every day globally, 20 million people chew Catha edulis (khat), a primary substance of abuse that contains cathinone, cathine and norephedrine (Ngari et al., 2018; UNODC, 2019; Yitayih, 2022). It is known as miraa or *muguka* in Kenya (Ngari et al., 2018) and is categorized as a psychostimulant (Izzat et al., 2021) and "natural amphetamine" (UNODC, 2019). Studies from Kenya show high khat consumption (Aden et al., 2006; Njuguna et al., 2013; Okoyo et al., 2022; Ongeri et al., 2019) with khat-addicted individuals constituting the second largest group of addiction (UNODC, 2012). Evidence shows higher likelihood of khat addiction among those who start chewing at 14 years or earlier compared to those who start at later ages (Sadock & Sadock, 2011).

Continued khat use is promoted by family and peers (Alemu et al., 2020; Alsanusy & El-Setouhy, 2014; Astatkie et al., 2015; Gebrie et al., 2018; Njuguna et al., 2013); as a sign of maturity and social acceptability (Alsanusy & El-Setouhy, 2013); favourable khat-chewing attitudes (Gosadi et al., 2024) and beliefs about the effects of

khat on libido (Beckerleg, 2010), instant erections, desire, sexual endurance and performance, and as a female aphrodisiac (Carrier, 2007).

Problematic khat use is associated with mental health problems such as psychological distress, depressive and psychotic symptoms (Alsanusy & El-Setouhy, 2013; Kroll et al., 2011; Mihretu et al., 2020; Ongeri et al., 2019); and withdrawal symptoms including craving and loss of control of use (Abdeta et al., 2017; Kroll et al., 2011; Odenwald, 2014). These findings are supported by a recent systematic review (Olani et al., 2023).

Additionally, khat use is associated with physiological problems including weak erections (Alsanusy & El-Setouhy, 2014), erectile dysfunction and ejaculating without erections (Alsanusy & El-Setouhy, 2013) and impotence (Njuguna et al., 2013; gastrointestinal and oral hygiene problems (Kroll et al., 2011); and behavioural problems including multiple sexual partners and casual sex (Olani et al., 2023), promiscuity (Njuguna et al., 2013), early initiation of sexual activities and unprotected sex (Berhanu et al., 2017) that increase the risk of HIV infection; and polydrug use especially alcohol (Alemu et al., 2020; Berhanu et al., 2017; Kroll et al., 2011; Njuguna et al., 2013; Ongeri et al., 2019), cigarettes (Alemu et al., 2020; Berhanu et al., 2017; Njuguna et al., 2013; Ongeri et al., 2019), shisha and marijuana (Berhanu et al., 2017), amphetamines and heroin (Mihretu et al., 2017). According to the WHO, khat use could lead to dependency (Nyavanga, 2018).

Whereas most individuals who experience stimulant use problems do not seek medical treatment or professional help (UNODC, 2019), the few who seek help receive behavioural interventions including peer-led counselling (Giannini et al., 1992), support programs (UNODC, 2019), cognitive behaviour therapy, the Community Reinforcement Approach and contingency management, or their combinations (Jaguga et al., 2023). In some instances, drug therapies are employed (Nyavanga, 2018) or a combination of behavioural approaches and drug therapies (Izzat et al., 2021).

Behavioural preventive approaches employed for khat use include community sensitization, counselling services, rehabilitation and peer-based education programs (Carrier, 2007; Giannini et al., 1992). For instance, interventions like cognitive behaviour therapy are aimed at reduction of khat consumption, khat harm reduction and associated mental health effects (Ciccarone, 2011; Daud et al., 2019; Odenwald et al., 2015; Odenwald et al., 2012; UNODC, 2019; Widmann et al., 2017; Widmann et al., 2022). Some of the behavioural interventions have been found to reduce amount (Ciccarone, 2011; Odenwald et al., 2012) and frequency of khat use (Widmann et al., 2017); and rated as feasible and acceptable (Giannini et al., 1992; Widmann et al., 2017; Widmann et al., 2022). However, existing evidence on effectiveness of such interventions in the region is limited, focuses more on khat than the more potent *muguka* and may not be generalized to the population of *muguka* users in Kenya.

The success of interventions depends to a large part in addressing *muguka* use risk factors including thinking patterns that predict increased use. These include sex-related beliefs and low risk assessment of the health effects of *muguka*. This is a major gap that this study aimed to address. By so doing, we aimed at establishing proof of concept of a cost-effective CBT intervention. Applying cost-effective behavioural approaches is justified by the lack of specialized programs or treatment facilities (Daud et al., 2019) and the need to add a layer of support to *muguka* users.

Considering the gap in behavioural interventions for khat use in Kenya, the main objective of this study was to test the effectiveness, feasibility and acceptability of a 12-week cognitive behaviour therapy intervention for *muguka* use. Implementation outcomes targeted in this study are important in harm reduction efforts in this emerging area of substance use.

Methods

Study Design

A mixed-method design incorporating a pretest-posttest quasi-experimental approach and individual interviews was used to explore the effectiveness of a group CBT therapy for regular *muguka* users. Data was measured at two time points.

Sampling

Study participants were drawn from a community needs assessment carried out among khat-using adolescents and youth (N = 657) aged 15-35 years in Mombasa and Lamu Counties in the Coast region of Kenya. Using the Yamane formula (Yamane, 1967), the sample of 249 participants was divided equally between Mombasa (n = 125) and Lamu (n = 124). Non-random assignment was employed to create groups of 4-7 *muguka* users in each sub-county. A total of 28 groups were created from 6 sub-counties. We targeted a representative community sample of *muguka* users and not individuals who had ever sought help for *muguka* use. Therefore, individuals with diverse *muguka* use patterns from excessive (several times a day) to moderate (weekly use) were included in the sample. Group membership was kept confidential to avoid contamination effects.

Ethical Approval

Ethical approval was provided by the Technical University of Mombasa Ethics Review Committee No. TUM SERC EXT/005/2024. Participants provided written informed consent, and they were assured of confidentiality and anonymity. No identifying information was used during reporting.

Procedures

First, in respective groups, a pre-test was administered capturing participants' frequency and amount of *muguka* use, *muguka*-related sex beliefs, risk perception and help seeking behaviour. Thereafter, participants were exposed to a 2-hour weekly group cognitive behavioural therapy intervention for 12 weeks. The CBT intervention covered topics on sex-related beliefs, risk perception of the effects of *muguka* and health effects of use. The CBT intervention was developed after an initial needs assessment (N = 651) and a consultative validation exercise. The intervention was delivered by the Muslim Education and Welfare Association (MEWA) field staff in the Kiswahili language. Staff had previously undergone a 3-day training in administration of the intervention.

At the end of the 12-week intervention, a post-test was administered. To capture data on acceptability, 27 participants from the main sample were purposively selected for individual interviews after a 3-month follow up. Interviews were conducted in the Kiswahili language and recorded for transcription. Data were collected in spaces where participants usually met to chew *muguka*.

Data Analysis

Quantitative data from pre- and post-test was analysed using IBM SPSS Statistics (v.25). To establish significant changes in implementation outcomes between Time 1 and Time 2, repeated measures ANOVA was used. Effectiveness was measured in terms of change in *muguka*-related sex beliefs, increased risk perception of the negative effects of *muguka*, increased need for help seeking, reduction in *muguka* and other substance use and awareness of the role of cognitions in behaviour change at Time 2 compared to Time 1. Feasibility and acceptability were measured by retention/loss to follow up after 12 weeks; and by participants own experiences of the intervention. Thematic analysis of qualitative data was undertaken based on indicators of acceptability: behavioural benefits, filling information gaps and general improvement in daily functioning.

Findings

Descriptives

The final sample comprised of 220 participants (34.8% female) aged 17-35 (Mean = 26.83, SD = 4.60) from Mombasa (44.8%) and Lamu (54.9%) counties. Data from four participants were removed from final analysis for incompleteness while 25 were lost to attrition. Seventy-one percent reported being in a current romantic relationship while 43.4% reported using other substances in addition to *muguka*. A total of 107 participants reported using other substances together with or after *muguka* use. These include cannabis (81.3%), raw tobacco and cigarettes (10.3%), alcohol (3.7%) and quazepam (4.7%).

The frequency of sexual intercourse, *muguka* use and other substance use reduced at Time 2 while frequency of protected sex increased at Time 2. The most strongly held sex beliefs were using *muguka* for confidence and to reduce anxiety. There was an increase in knowledge of change in thinking for behaviour change at Time 2. Table 1 presents means of measured indicators at Time 1 and Time 2.

Bivariate correlations show strong positive correlations between frequency of *muguka* use and frequency of use of other substances at Time 1 but a negative correlation at Time 2. Higher levels of *muguka*-based sex beliefs were associated with decrease in frequency of protected sexual intercourse at Time 1 only. Stronger beliefs that *muguka* was not risky to health significantly and positively correlated with higher frequency of sexual intercourse and sex-related beliefs at Time 1 but not Time 2; and negatively correlated with help seeking at Time 1. Table 2 presents the results of bivariate correlations.

Table 1
Means of Measured Indicators

Variable/Indicator	TIME 1		TIME 2	
	M	SD	M	SD
Demographics				
Frequency of sexual intercourse	2.96	.98	2.76	.94
Frequency of protected sex	2.82	1.58	3.33	1.47
Frequency of *muguka* use	2.34	1.04	2.05	.97
Frequency of other substance use	1.07	1.40	1.03	1.32
***Muguka*-related Beliefs**				
Increasing stamina	3.66	.81	2.62	1.19
Increasing arousal	3.75	.73	2.90	1.22
Increasing focus	3.75	.69	2.76	1.16
Increasing confidence	3.87	.59	3.44	1.14
Reducing anxiety	3.88	.61	3.41	1.12
Increasing endurance	3.58	.76	2.54	1.14
Increasing sensitivity	3.62	.73	2.68	1.13
Increased pleasure	3.76	.67	3.16	1.16
Increasing feelings and connection to partner	3.60	.78	2.66	1.16
Increasing intensity of orgasm	3.50	.81	2.55	1.10
Improving communication with partner	3.52	.80	2.92	1.16
Improving overall relationship with partner	3.21	.97	2.63	1.12
Risk perception				
Stimulant use has no risk for me	3.20	1.00	2.35	1.21
Help seeking				
I need help for stimulant use	2.81	.82	2.77	.97
CBT effect on thinking and behaviour				
Change in thinking leads to behaviour change	2.27	.77	4.21	.70

Table 2

Bivariate Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Frequency of sexual intercourse T1 (1)	1																	
Frequency of protected sex T1 (2)	.28**	1																
Frequency of *muguka*/Miraa use T1 (3)	-.04	-.04	1															
Frequency of other substance use T1 (4)	-.09	-.13	.34**	1														
Sex-related beliefs T1 (5)	.38**	.26**	-.10	-.13	1													
Interpersonal relationships beliefs T1 (6)	.27**	.26**	-.01	.04	.54**	1												
Risk perception T1 (7)	.26**	.31**	-.11	.06	.29**	.54**	1											
Help seeking T1 (8)	.03	.15*	.13	.05	-.08	-.12	-.21*	1										
Thinking and Behaviour T1 (9)	-.07	-.13	.09	-.11	.13	.09	.07	.41**	1									
Frequency of sexual intercourse T2 (10)	.45**	-.02	-.08	-.10	.25**	.20**	.13	-.07	.07	1								
Frequency of protected sex T2 (11)	-.03	-.05	.12	-.06	.08	.05	.03	-.03	.15*	-.10	1							
Frequency of *muguka*/Miraa use T2 (12)	-.03	-.00	.04	-.21**	.18**	.14*	.08	-.05	.23**	.16*	.08	1						
Frequency of other substance use T2 (13)	-.10	-.01	-.13	.00	-.09	-.08	.02	.05	-.14*	-.03	-.23**	-.18**	1					
Sex-related beliefs T2 (14)	-.09	.05	.06	.11	.05	-.03	.10	-.08	-.03	.23**	-.09	.19**	.18**	1				
Interpersonal relationships beliefs T2 (15)	.07	-.08	.04	-.04	.13	.10	.00	-.10	.12	.30**	.10	.25**	.03	.50**	1			
Risk perception T2 (16)	.02	-.04	-.19**	.00	.07	.12	.09	.02	-.07	.10	-.01	-.09	.08	.21**	.26**	1		
Help seeking T2 (17)	-.01	.14*	.00	-.01	-.04	.16*	-.04	.02	.10	.05	.13	.01	-.08	-.06	-.17*	-.05	1	
Thinking and Behaviour T2 (18)	-.08	-.08	-.05	-.08	.01	.05	.03	.02	-.01	-.16*	.13	-.05	.12	-.07	.00	-.09	.07	1

N=220

** Correlation significant at p-value=0.01 (2-tailed)

* Correlation significant at p-value=0.05 (1-tailed)

Pairwise comparison of means in Table 3 show that compared to males, female participants used *muguka* more at Time 1 and Time 2. While *muguka* use decreased among males at Time 2, the use of other substances increased slightly. Compared to female participants, males engaged in more protected sex at Time 1 but not Time 2. *Muguka*-related sex beliefs for confidence and reducing anxiety ranked highest among both males and females. Compared to females, male participants perceived *muguka* use as less risky. Compared to Time 1, both male and female participants reported slight decrease in need for help for stimulant use at Time 2.

Table 3

Pairwise Comparisons by Gender

Variable/Indicator	TIME 1				TIME 2			
	Male		Female		Male		Female	
	M	SD	M	SD	M	SD	M	SD
Demographics								
Frequency of sexual intercourse	3.08	.92	2.70	1.06	2.78	.98	2.71	.86
Frequency of protected sex	2.95	1.55	2.58	1.61	3.29	1.51	3.43	1.40
Frequency of *muguka* use	2.27	1.01	2.48	1.10	1.96	.96	2.23	.97
Frequency of other substance use	1.04	1.31	1.10	1.54	1.16	1.32	.78	1.29
***Muguka*-related Beliefs**								
Increasing stamina	3.57	.86	3.82	.70	2.63	1.24	2.60	1.10
Increasing arousal	3.75	.73	3.75	.73	2.96	1.27	2.81	1.13
Increasing focus	3.76	.67	3.75	.73	2.80	1.19	2.69	1.12
Increasing confidence	3.85	.61	3.91	.54	3.45	1.17	3.42	1.10
Reducing anxiety	3.91	.63	3.81	.57	3.45	1.12	3.34	1.12
Increasing endurance	3.59	.76	3.56	.75	2.58	1.21	2.47	1.01
Increasing sensitivity	3.66	.73	3.53	.74	2.72	1.15	2.62	1.08
Increased pleasure	3.77	.65	3.75	.73	3.22	1.20	3.06	1.08
Increasing feelings and connection to partner	3.61	.74	3.60	.86	2.75	1.20	2.51	1.07
Increasing intensity of orgasm	3.52	.79	3.44	.83	2.63	1.16	2.39	.98
Improving communication with partner	3.52	.79	3.52	.84	2.90	1.19	2.96	1.11
Improving overall relationship with partner	3.17	.99	3.29	.92	2.53	1.14	2.81	1.06
Risk perception								
Stimulant use has no risk for me	3.27	.99	3.08	1.01	2.31	1.23	2.43	1.17
Help seeking								
I need help for stimulant use	2.77	.82	2.90	.82	4.21	.78	4.21	.55
CBT effect on thinking and behaviour								
Change in thinking leads to behaviour change	2.14	.66	2.51	.91	4.21	.78	4.21	.55

Subsequent independent samples t-tests revealed that female participants significantly used *muguka* more than males at Time 2, $t(218) = 2.03$, $p = .044$. Female participants also significantly outmatched males in knowledge about changing thinking patterns for behaviour change at Time 1, $t(119.33) = 3.43$, $p = .002$. Male participants significantly differed from females in frequency of sexual intercourse at Time 1, $t(207) = 2.62$, $p = .009$, and frequency of use of other substances at Time 2, $t(218) = 2.05$, $p = .041$. Other measures returned non-significant gender differences.

Effectiveness of CBT intervention

Repeated measures ANOVA revealed significant increase in frequency of protected sexual intercourse and risk perception about the effects of *muguka*; and reduction in *muguka* use at Time 2. Further, significant changes in *muguka*-related sex- and relationship beliefs were found at Time 2. Finally, a significant increase was found in the knowledge that changes in thinking patterns influenced behaviour change. However, non-significant findings were reported in frequency of use of other substances and help-seeking at Time 2. Table 4 presents a summary of the ANOVA findings.

Table 4

Repeated Measures ANOVA

Indicator	F	df	p	*ηp2*
Frequency of sexual intercourse	8.23	206	.005	.04
Frequency of protected sexual intercourse	11.87	219	.001	.05
Frequency of *muguka* use	9.25	219	.003	.05
Frequency of other substance use	1.00	219	.753	.00
Sex-related beliefs	155.40	219	.000	.42
Interpersonal relationship beliefs	55.13	219	.000	.20
Risk perception	8.41	219	.000	.24
Help seeking	1.00	219	.322	.02
Change in thinking leads to behaviour change	676.65	219	.000	.76

Feasibility/Acceptability of CBT Intervention

Loss to follow up was calculated as the difference between numbers of participants at Time 1 and Time 2. A total of 25 participants were lost to attrition representing 10% of the initial sample. Therefore, a retention rate of 90% renders this intervention feasible.

Qualitative analysis showed that for majority of participants, the intervention markedly reduced *muguka* and other substance use (cannabis) over the past three months. Some participants reported reductions from several times a day to three times a week, or from several times a week to twice a week or month. Participants reported that information provided in the intervention about the pharmacological effects of *muguka* had helped them reduce usage. One participant reported that "*I am now able to reduce from seven times per day to two times from Saturday to Sunday*" (Female, 25, Mombasa). A male participant from Mombasa (21 years old) reported that "*I have reduced the usage of bhang from six times per day to once a day*".

Participants also reported that the intervention empowered them to control the use of *muguka*. For many, regular use was a product of loss of self-control over *muguka* use and financial management. The intervention had provided an awareness in participants' ability to manage finances and quit use. Reduction in *muguka* use had brought financial savings and gradual financial security by increasing the ability to plan. A male participant from Mombasa (35 years old) reported that "*I have reduced muguka from seven days to three days, which has resulted in saving of KES 400…from KES 1000 previously to KES 600 now*". Another participant from Mombasa said that "*I now have self-control and function without the influence of stimulants*" (Male, 18, Mombasa).

Some participants also reported reduction in unprotected sexual intercourse over the past month. For instance, according to one participant, "*Having sexual encounters is not very common when a condom is not there*" [Male, 22, Mombasa].

Among some participants, achievement of control over *muguka* use brought along societal respect, which was desirable. For some, control over *muguka* use had also resulted in reduction in petty thievery while for others, reduction in use had reignited marital relationships. For instance, a male participant from Mombasa (17 years old) reported that "*I have gained respect and self-control over muguka use*", while another participant from Mombasa said that "*I have since changed my friends and now I have good relations with my husband*" (Female, 23).

Discussion

This study aimed at establishing the effectiveness of a 12-week cognitive behavioural therapy intervention on sexualized *muguka* use. Findings demonstrated the effectiveness, feasibility and acceptability of a behavioural intervention in a community sample of *muguka* users in Mombasa and Lamu.

These broad positive outcomes support previous literature (Widmann et al., 2022) that shows the effectiveness of minimally resourced community level interventions in reducing khat-related challenges. Considering the social acceptability of khat (*muguka*), community level interventions can potentially reach populations outside the scope of hospital care since diagnosis for khat (*muguka*) problem use and associated physical and mental health concerns is usually undesirable or unavailable for users.

A significant general reduction in frequency of *muguka* use was reported after the intervention. This finding corroborates earlier findings on similar khat behavioural interventions (Daud et al., 2019; Widmann et al., 2017; Widmann et al., 2022). Additionally, whereas higher *muguka* use predicted higher use of other substances use at Time 1, the relationship was reversed at Time 2. This suggests that whereas the intervention successfully reduced *muguka* use at Time 2, its effect on the use of other substances was insignificant. Qualitative findings corroborate this finding by showing reduction in frequency of *muguka* use from several times a day to a few times a week or month. Interestingly, whereas no significant gender differences were reported in *muguka* use at Time 1, significant differences were reported at Time 2. Unexpectedly, the frequency of *muguka* use among females was significantly higher than among males at Time 2. This may be attributed to a general reduction in *muguka*-related sex beliefs and an increase in other unknown reasons for *muguka* use among female participants.

We found that many participants used *muguka* to increase confidence and reduce anxiety in sexual situations, supporting sex-linked substance use literature

(Beckerleg, 2010; Carrier, 2007). Significant decreases in *muguka*-related sex beliefs were reported at Time 2 which may explain the significant decrease in frequency of *muguka* use. Interestingly, though not significant, participants' need for help reduced at Time 2. This may be related to increase in efficacy as qualitative data revealed, which increased participants' ability to deal with *muguka* use without external help. This supports a previous study (Widmann et al., 2017) that reported an increase in everyday functioning following a 2-month intervention for khat use.

The high retention rate of 90% showed that the intervention was acceptable. The acceptability of the intervention lies in the ability to recruit and retain participants for the 12-week intervention. In addition to quantifiable changes in frequency and amount of *muguka* use, sex beliefs and risk perception, for many users, the intervention brought actual savings of more than 50% of the previous expenses on *muguka*. This suggests that this community-level intervention provided a feasible approach to reach populations that are not accessed by existing interventions as reported in previous literature (Jaguga et al., 2023; Widmann et al., 2022). Finally, similar to earlier findings (Alsanusy & El-Setouhy, 2013), participants in this study reported improvements in familial, economic and mental health circumstances, an indicator of the holistic nature, feasibility and acceptability of the CBT intervention.

The major strength of this study lies in the ability of non-medical field officers with short training to provide flexible and localised behavioural interventions in community settings. Such interventions are available to participants at their convenient time and location. However, providing the intervention at participants' convenience may also have produced spurious findings since the effort to administer the intervention was borne by field officers. This is evidenced in low dropout rates. This finding also needs to be understood in the context of *muguka*'s legal status in Kenya. This is because *muguka* remains both legal and socially acceptable in Kenya and especially in the Coast region, and hence participants found it easy to continue *muguka* use and still attend the CBT sessions Its legality may be responsible for low dropout rates since the study did not target a help-seeking sample. Additionally, it is possible that participant contamination occurred since no random assignment was done. Finally, individual differences in field officers' understanding of the intervention and presentation approaches may have influenced treatment fidelity, and ultimately, outcomes at Time 2. That notwithstanding, these results provide proof of concept of the effectiveness of the CBT intervention. Treatment effects as seen in effect sizes of the outcomes show the potential of the behavioural intervention in community settings.

Conclusions

By finding significant changes in frequency of *muguka* use, sex beliefs, risk perception and the role of cognitions in behaviour change, the study presents a proof of concept of the efficacy of a 12-week cognitive behaviour therapy for sexualized *muguka* use among adolescents and youth. Findings therefore provide a strong basis for promoting adolescent and youth sexual health by addressing linkages between chemically induced sexual urge and sexual activity; and ultimately the control of mental health outcomes by challenging sex-related irrational beliefs that fuel *muguka* use. Additionally, these findings provide evidence-based data on the efficacy of a behavioural intervention that can be upscaled into other harm reduction programs. Based on the

study findings, we recommend robust awareness creation and advocacy in the area of chemically induced sex among adolescents and youth targeting irrational *muguka*-related sex beliefs. Secondly, community level interventions need upscaling since they show promise in behaviour change. Finally, there's need for randomized controlled trials (RCT) for exact estimation of outcomes including frequency and amount of *muguka* use, risk perception, and sex beliefs post-intervention.

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Authors' Roles in the Project: As the first author, Habil Otanga was involved in conceptualization, formal analysis and writing the first draft, review and editing, including corrections suggested by reviewers. Fatma Jeneby, Duncan Kishoyian and Dennis Munene were involved in data analysis, review and editing of the first draft. The other authors were involved in data collection and cleaning (initial steps in analysis) and in revisions to the first draft.

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