

Retention in HIV Pre-Exposure Prophylaxis Among Men Who Have Sex with Men in Tanga, Tanzania

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Purpose: Men who have sex with men are at high risk of Human immunodeficiency virus (HIV) infection and bear the highest burden of the disease in Tanzania. Although pre-exposure prophylaxis (PrEP) has demonstrated high efficacy in the prevention of HIV infection in clinical trials, challenges with retention threaten its effectiveness. Therefore, we assessed the extent and predictors of retention in PrEP care among men who have sex with men in Tanga, Tanzania.

Methods: This study included 369 men who have sex with men who were recruited using respondent-driven sampling. Baseline data were collected using structured questionnaires that captured socio-demographic and behavioral characteristics. The primary outcome was one-month retention in PrEP care. A statistical analysis using modified Poisson regression was conducted to identify independent factors associated with 1-month retention.

Results: A total of 369 men (mean age, 24.7 ($\pm$ 5.5 years)) participated in the study. After one month, 87 participants (23.6%) were retained in PrEP care. Independent factors associated with retention included assuming a receptive position in anal sex (aPR 1.6, 95% CI: 1.0–2.6, p = 0.030), having initiated sexual activity with anal, oral, or thigh sex (aPR 2.1, 95% CI: 1.2–3.8, p = 0.011), and having adequate social support (aPR: 1.6, 95% CI: 1.0–2.6, p = 0.030).

Conclusion: Tailored interventions that improve social support and address the varying needs of men who have sex with men with diverse sexual behavior patterns are essential for improving retention and maximizing the effectiveness of PrEP in HIV prevention. Practically, this highlights the need to strengthen supportive environments within communities and healthcare systems to enhance retention in PrEP, reduce HIV transmission, and advance progress toward ending HIV as a public health threat by 2030.

Keywords: retention, pre-exposure prophylaxis, men who have sex with men, HIV/AIDS

Introduction

Human immunodeficiency virus (HIV) infection remains a global public health challenge, with an estimated 39.9 million people living with the virus worldwide by 2023.¹ The Joint United Nations Programme on HIV/AIDS (UNAIDS) global research reports a 39% decrease in new HIV cases in the general population; however, some populations, such as men who have sex with men and members of other key populations, are far behind this victory.¹ Recent data by UNAIDS indicate that men who have sex with men account for approximately 20% of all HIV infections.¹ In the majority of sub-Saharan African countries, same-sex practice is criminalized and stigmatized.^{1,2} This has negative implications for accessing and using HIV prevention services in this population group. Due to this, the available limited data show that the magnitude of the problem is higher compared to other regions, and HIV prevalence among men who have sex with men is 4.9 times higher than that in the general population.^{2,3} In Tanzania, recent data show that HIV prevalence among men who have sex with men is more than twice that of the general population.^{4–6} Thus, to achieve the UN 2030 goals of

ending HIV/AIDS as a public health threat, there is a need for innovative interventions for HIV prevention among men who have sex with men and other individuals at a higher risk of contracting HIV.

In the battle against HIV, pre-exposure-prophylaxis (PrEP) was recommended by the World Health Organization (WHO) in 2015 as a biomedical prevention tool to be used in combination with other available methods among the populations at high risk.⁷ The WHO policy recommendations on HIV prevention using PrEP were adopted in Tanzania in 2017, and the roll-out started in 2021 following a demonstration trial.⁸ Evidence from clinical trials has shown that oral PrEP provides up to 99% protection against HIV when adhered to as prescribed.^{9–11}

Despite the proven efficacy of PrEP in preventing HIV transmission, most users are not retained in the service after initiation. Retention in PrEP care among men who have sex with men has been reported to be low globally.^{12–16} Factors that impact retention range from individual to social and structural levels. Individual factors such as poor knowledge about PrEP, fear of PrEP side effects, low self-efficacy, alcohol consumption, and drug use have explained the low retention rates.^{17,18} Social factors such as stigma, presence of supportive social connections, as well as healthcare-related factors like provider attitudes and infrastructure, access to peer support groups, psychological services, are also reported to affect retention.^{19–21} Generally, the presence of positive individual and social support factors is associated with improved retention in care. There is a growing body of literature on retention in PrEP care in sub-Saharan Africa; however, most studies have reported retention in an interventional setting.^{17,22,23} Therefore, this study aimed to investigate the extent and associated predictors of retention in PrEP care in real-world settings among men who have sex with men in Tanga, Tanzania.

Materials and Methods

Study Design and Setting

This study draws on data collected from the control arm of a pragmatic quasi-experimental study for PrEP Roll-Out in Tanzania (PREPTA). PREPTA was a collaborative project between Muhimbili University of Health and Allied Sciences (MUHAS) and the University of Oslo (UiO) to study PrEP use and PrEP use promotion via a mobile health (“mHealth”) intervention among two key populations in Tanzania (men who have sex with men and Female sex workers). The project was implemented in Dar es Salaam (the mHealth intervention area) and Tanga (the mHealth control area). The project details are described elsewhere.^{24,25} This paper focuses on the analysis of data for men who have sex with men in the Tanga region, that is, men who joined the project and started PrEP but were not enrolled in the mHealth intervention. We focused our analysis on the control region, which allowed us to understand the extent of retention and its determinants in a real-world setting.

Sample Size Estimation

Sample size estimation was based on a standard statistical formula for cohort studies.^{26,27} The sample size was calculated using a 95% confidence level and 80% statistical power. Baseline adherence to PrEP was estimated at 30% based on the SEARCH study in Uganda and Kenya,²² with a minimum adherence threshold of 45% to detect a 15% difference. This resulted in the recruitment of 369 men who have sex with men in Tanga.

Study Participants and Sampling Criteria

The study participants were men who have sex with men aged ≥ 18 years. The inclusion criteria were being a resident of Tanga, defined as having lived in the region for at least six months, being HIV negative, having had same-sex within the past three months, and being ready to start PrEP. Participants were recruited through respondent-driven sampling.

Data Collection Procedure

Data were collected through structured face-to-face interviews conducted by trained research assistants. The research assistants underwent a three-day training covering data safety, the research process, and ethical considerations to ensure high-quality data collection. Responses were recorded using handheld tablets linked to the Services for Sensitive Data (TSD) platform, a highly secure server designed to store and process sensitive information with stringent access and data transfer

controls.²⁸ The structured questionnaire was pre-tested with 10 participants to assess clarity, flow, and contextual relevance. It included questions on sexual behaviors, HIV knowledge, PrEP-related stigma, self-efficacy, and social support.

Study Variables

Outcome Variables

The outcome variable in this study was retention in PrEP care, measured one month after initiating PrEP. One-month retention is crucial for predicting long-term retention, as it marks the first reconnection between the client and healthcare providers.²⁹ This reconnection enables them to discuss their initial experiences and obtain social support to identify and address various complications that could affect long-term retention. In line with Tanzania's PrEP implementation framework, an HIV rapid test was conducted during the first visit to confirm eligibility for PrEP and provide a medication refill, both of which are essential for sustained retention. Studying retention at 1 month would enable the timely design of interventions to support long-term retention in care. Participants who attended their follow-up visit within 28 days of their scheduled appointment were considered retained, consistent with the definitions used by Mbotwa et al and Hovaguimian et al.^{25,29}

Independent Variables

The independent variables included the socio-demographics that were age, marital status, gender identification, education level, having financial dependents, having children, and total monthly income; Sexual behavior predictors that included age at sexual debut, steady sex partner situation, type of sex at debut, preferred sexual positioning, condom use at last sex, multiple sex partners, lubricant use, and paid sex. Other factors included comprehensive HIV knowledge, perceived HIV risk, PrEP knowledge, perceived PrEP stigma, PrEP self-efficacy, access to condoms when required, and social support.

Data Analysis

Descriptive statistics were used to summarize the baseline characteristics (including sociodemographic and psychosocial characteristics), and the outcome (1-month retention). Continuous variables were summarized as means and standard deviations. Categorical variables were summarized as frequencies and percentages. To identify predictors of retention in PrEP care, we performed a Modified Poisson regression analysis. Variables meeting a significance threshold of $p < 0.2$ in bivariate analysis were included in the multivariable logistic regression model. Data were analyzed using Stata version 18 (StataCorp, College Station, Texas, USA).

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki. It was approved by the National Health Research Ethics Committee of Tanzania (protocol code: NIMR/HQ/R.8a/vol. IX/3454) and the Regional Ethical Committee (REK) in Norway (protocol code: 33675). The participants provided written informed consent prior to data collection. To protect their privacy, all data were stored in TSD, a highly secure server explicitly designed for handling sensitive information.²⁸ De-identification was performed before the analysis, and personal identifiers were removed to safeguard the participants' anonymity. Access to the TSD server is limited to authorized personnel to ensure that participant information remains secure.

Results

Participants Socio-Demographic Characteristics

A total of 369 men who have sex with men, with a mean age of 24.7 ± 5.5 years, were included in the study. Over two-thirds (67.2%) had at least a secondary education level, more than one-third (34.5%) reported having children, and 87.5% had never been married (Table 1).

Participants Sexual Behaviors

The majority of men, 287 (77.8%), assumed an insertive position in anal sex, while 47 (12.7%) were receptive, and 35 (9.5%) were versatile. Most participants (284 [77%]) reported that condoms were accessible each time they needed them.

Table 1 Comparison of Socio-Demographics and Other Socio-Behavioral Factors by Retention in PrEP Care Among Study Participants

Variable		Frequency	Not Retained (%)	Retained (%)	p-value
Age	18-24	217	167 (77.0)	50 (23)	0.185
	25-34	129	101 (78.3)	28 (21.7)	
	35+	23	14 (60.1)	9 (39.1)	
Marital status	Never married	323	252 (78)	71 (22)	0.056
	Married or previously married	46	30 (65.2)	16 (34.8)	
Education level	No formal education	25	20 (80)	5 (20)	0.497
	Primary education	96	77 (80.2)	19 (19.8)	
	Secondary +	248	185 (74.6)	63 (23.4)	
Has own children	Yes	126	91 (72.2)	35 (27.8)	0.149
	No	242	191 (79)	51 (21)	
Type of sex at debut	Anal/oral/thighs	137	96 (70.1)	41 (29.9)	0.027
	Vaginal	232	186 (80.2)	46 (19.8)	
Age at first anal sex	Below 15	52	39 (75)	13 (25)	0.559
	15-17	97	78 (80.4)	19 (19.6)	
	18+	220	165 (75)	55 (25)	
Last anal sex position	Insertive	287	226 (78.8)	61 (21.2)	0.129
	Receptive	47	33 (70.2)	14 (29.8)	
	Versatile	35	23 (65.7)	12 (34.3)	
Used condom last time had anal sex with a man	Yes	113	88 (77.9)	25 (22.1)	0.648
	No	255	193 (76)	62 (24)	
Multiple sex partners	Yes	205	154 (75.1)	51 (24.9)	0.462
	No	162	127 (78.4)	35 (21.6)	
Steady male partners	Yes	189	136 (72)	53 (28)	0.038
	No	180	146 (81)	34 (19)	
Used lubricant last time had anal sex	Never used	85	72 (84.7)	13 (15.3)	0.022
	Yes	241	174 (72.2)	67 (27.8)	
	No	42	36 (85.7)	6 (14.3)	
Ever been paid for having oral or anal sex	Yes	276	216 (78.3)	60 (21.7)	0.152
	No	93	66 (71)	27 (29)	
Ever tested for HIV	Yes	240	177 (73.7)	63 (26.3)	0.099
	No	129	105 (81.4)	24 (18.6)	

(Continued)

Table 1 (Continued).

Variable		Frequency	Not Retained (%)	Retained (%)	p-value
Comprehensive HIV knowledge	Yes	259	201 (77.6)	58 (22.4)	0.411
	No	110	81 (73.6)	29 (26.4)	
Perceived HIV Risk	High risk	266	203 (76.3)	63 (23.7)	0.317
	Medium risk	33	28 (84.9)	5 (15.1)	
	Low/ no risk	62	44 (71)	18 (29)	
PrEP knowledge	High	124	97 (78.2)	27 (21.8)	0.562
	Low	245	185 (75.5)	60 (24.5)	
Perceived PrEP stigma	High	75	57 (76)	18 (24)	0.923
	Low	294	225 (76.5)	69 (23.5)	
PrEP Self-Efficacy	High	268	204 (76.1)	64 (23.9)	0.823
	Low	101	78 (77.2)	23 (22.8)	
Access to condom when in need	Yes	284	211 (74.3)	73 (25.7)	0.168
	No	82	68 (82.9)	14 (17.1)	
Social support	Adequate	87	59 (67.8)	28 (32.2)	0.031
	inadequate	282	223 (79)	59 (21)	

However, only 113 (30.6%) participants reported condom use during their last anal sex. Furthermore, 51.2% of the participants (189) reported having steady sexual partners; among these, 96 (51.2%) had more than one steady sexual partner, and 48.8% (93) had one steady sexual partner. Among the participants, 276 (74.8%) reported being paid for oral or anal sex. Of these, only 78 (28.3%) used a condom, whereas 194 (70.3%) did not use a condom during their last paid sex (Table 1).

Retention in PrEP Care at 1-month Follow-up

Of the 369 men in the study, 87 (23.6%) were retained in PrEP care 1-month after initiation. Higher retention was observed among men who reported anal, oral, or thigh sex as their first sexual experience (28.8%) than among those whose sexual debut type was vaginal (19.8%); $p=0.027$. Men with steady sex partners had higher retention rates (28%) than those without (18%), ($p=0.038$). Men who had used lubricants the last time they had anal sex with men were more often retained (27.8%) than those who had not (14.3%) ($p=0.22$). Furthermore, a larger proportion of men who reported adequate social support were retained at 1-month (32.2%) compared to those with inadequate social support (21%) ($p=0.031$).

Factors Associated with Retention in PrEP at month 1

Bivariate Analyses

Bivariate analyses showed that PrEP retention was significantly associated with having a steady male partner, ever being married, having debuted with anal/oral or thigh sex, and having adequate social support. Retention was 1.5 times higher among men with a steady male partner compared to those without (PR 1.7, 95% CI: 1.0–2.2, $p=0.041$). In addition, the prevalence of retention was higher among men who had ever been married than among those who had never been married (PR 1.6, 95% CI: 1.0–2.5, $p=0.044$). Men whose type of sex debut was anal/oral or thighs sex had a higher prevalence of retention than those who had vaginal sex at the debut (PR 1.5, 95% CI: 1.0–2.2, $p=0.027$). Furthermore,

the prevalence of retention was 1.5 times higher for men who assumed a receptive position than those who assumed an insertive position during anal sex (PR 1.5, 95% CI: 1.0–2.2, $p = 0.044$). Finally, men who reported adequate social support had a higher prevalence of being retained in PrEP care than those who reported inadequate support (PR 1.5, 95% CI: 1.1–2.3, $p = 0.027$).

Independent Predictors of Retention in PrEP Care

In the multivariable regression analysis, independent predictors of retention in PrEP care were preferring the receptive position in anal sex, having had anal, oral, or thigh sex at sexual debut, and having adequate social support. Taking a receptive position in anal sex was associated with retention in PrEP care at month-1 (aPR 1.6, 95% CI: 1.0–2.6, $p = 0.030$). Furthermore, anal, oral, or thigh sex at sexual debut was also a significant predictor of 1-month retention (aPR 2.1, 95% CI: 1.2–3.8, $p = 0.011$), and adequate social support was a significant predictor of 1-month retention (aPR: 1.6, 95% CI: 1.0–2.6, $p = 0.030$). Table 2 lists the bivariate and multivariate correlates of the 1-month retention.

Table 2 Factors Associated with 1-month Retention in PrEP

Variable		N	Retained n(%)	Bivariate Analysis PR (95% CI)	p-value	Multivariable Analysis: aPR (95% CI)	p-value
Age (Years)	18-24 (Ref.)	217	50 (23.0)	1.00			
	25-34	129	28 (21.7)	0.9 (0.6–1.4)	0.775	0.7(0.4–1.0)	0.064
	35+	23	9 (39.1)	1.7 (1.0–3.0)	0.066	1.0(0.5–1.9)	0.923
Marital status	Never married (Ref.)	323	71 (22.0)				
	Married or previous married	46	16 (34.8)	1.6(1.0–2.5)	0.044	1.2(0.6–2.1)	0.632
Education level	No formal education	25	5 (20)				
	Primary	96	19 (19.8)				
	Secondary+	248	63 (25.4)	1.3 (0.8–1.9)	0.245		
Financial dependents	Yes	242	63 (26.0)	1.4 (0.9–2.0)	0.134	1.5 (1.0–2.3)	0.082
	No (Ref.)	127	24 (18.9)				
Has own children	Yes	126	35 (27.8)	1.3 (0.9–1.9)	0.147	1.1(0.7–1.7)	0.576
	No (Ref.)	242	51 (21.1)				
Total income per month	≤100,000	116	22 (19.0)				
	100,001–299,999	137	34 (24.8)	1.3 (0.8–2.1)	0.269	1.1(0.7–1.7)	0.717
	≥300,000	113	31 (27.4)	1.4 (0.9–2.3)	0.133	1.1(0.7–1.9)	0.690
Steady male Partner	Yes	189	53 (28.0)	1.5 (1.0–2.2)	0.041	1.4 (0.9–2.0)	0.134
	No (ref)	180	34 (18.9)				
Age at sex debut	Below 15	88	18 (20.5)				
	15-17	173	37 (21.4)				
	18+	108	32 (29.6)	1.4 (1.0–2.0)	0.074		

(Continued)

Table 2 (Continued).

Variable		N	Retained n(%)	Bivariate Analysis PR (95% CI)	p-value	Multivariable Analysis: aPR (95% CI)	p-value
Type of sex at sex debut	Anal/Oral/Thighs	137	41 (30.0)	1.5 (1.0–2.2)	0.027	2.1 (1.2–3.8)	0.011
	Vaginal	232	46 (19.8)				
Age at first anal sex	Below 15	52	13 (25)				
	15–17	97	19 (19.6)				
	18+	220	55 (25)	1.2 (0.8–1.7)	0.437		
Last Anal sex position	Insertive	287	61 (21.3)				
	Receptive/Versatile	82	26 (31.7)	1.5 (1.0–2.2)	0.044	1.6 (1.0–2.6)	0.030
Used condom last time had anal sex with man	Yes	113	25 (22.1)	0.9 (0.6–1.4)	0.664		
	No	255	62 (24.3)				
Multiple sex partners	Yes	205	51 (24.9)	1.1 (0.8–1.6)	0.512		
	No	162	35 (21.6)				
Ever used any lubricant	Yes	283	73 (25.8)	1.6 (0.9–2.7)	0.082		
	No	85	13 (15.3)				
Ever tested for HIV	Yes	240	63 (26.2)	1.4 (0.9–2.1)	0.107	1.2 (0.8–1.9)	0.317
	No	129	24 (18.6)				
Comprehensive HIV knowledge	Yes	110	29 (26.4)	1.2 (0.8–1.7)	0.408		
	No	259	58 (22.4)				
Perceived HIV Risk	High risk	266	63 (23.7)	1.0 (0.7–1.5)	0.938		
	Medium risk	33	5 (15.2)				
	Low/ no risk	62	18 (29.0)				
PrEP knowledge	High	124	27 (21.8)	0.9 (0.6–1.3)	0.565		
	Low	245	60 (24.5)				
Perceived PrEP stigma	High	75	18 (24.0)	1.0 (0.6–1.6)	0.923		
	Low	294	69 (23.5)				
PrEP self-efficacy	High	268	64 (23.9)	1.0 (0.7–1.6)	0.824		
	Low	101	23 (22.8)				
Access to condom when in need	Yes	284	73 (25.7)	1.8 (0.9–3.3)	0.081	1.8 (0.9–3.5)	0.116
	No	82	14 (17.1)				
Social support	Adequate	87	28 (32.2)	1.5 (1.1–2.3)	0.027	1.6 (1.0–2.4)	0.017
	Inadequate	282	59 (21.0)				

Abbreviations: PR, Prevalence ratio; CI, Confidence interval; aPR, adjusted Prevalence ratio, Ref, reference category.

Discussion

Men who have sex with men bear a disproportionate burden of HIV, making it critical for them to utilize different preventive mechanisms, including PrEP. However, in our study, only 23.6% of men who have sex with men were retained in PrEP care 1-month after initiation. The challenge of low retention in PrEP care has also been observed in

other PrEP programs, such as among female sex workers in Dar es Salaam, Tanzania, whereby the retention was only 27.7% at month 1.²⁵ This could be due to the challenge of criminalization and stigmatization of the key population in the Tanzanian setting.^{24,25} Criminalization traces its roots from punitive laws that not only exist on paper but also manifest through stigmatization, harassment, and violence against men who have sex with men.³⁰ This situation creates an environment in which seeking HIV prevention services, including PrEP, becomes risky and unwelcoming and therefore reduces retention.

Unlike our study, studies in the US reported retention rates exceeding 70% at month one.^{12,31} This discrepancy could be attributed to contextual factors such as high levels of criminalization, stigmatization, and low social support for Men who have sex with men in the Tanzanian setting, which likely impact their willingness and ability to continue with PrEP. Surprisingly, in a recent study conducted in Kenya, with almost identical legal and health infrastructure settings to those in the current study, 96.8% of men were retained at three months.²³ This difference may be due to the Kenyan study being intervention-based, whereby there was dedicated financial and administrative support for clients in PrEP as well as community-based organizations for AIDS prevention among gay men, bisexual men, and other men who have sex with men. Our findings highlight retention challenges among men who have sex with men in the real world, emphasizing the need for targeted interventions to improve retention in this population.

Furthermore, this study revealed that preferring a receptive sex position during anal sex and having anal sex at sexual debut were associated with retention in PrEP care. This may be due to heightened perceived HIV susceptibility among men who engage in receptive anal sex compared to the ones engaging in insertive anal sex. There is a higher risk of HIV acquisition in receptive than in insertive condomless anal sex^{32,33} which could lead men engaging in receptive sex position to be more motivated to utilize PrEP than their counterparts. Additionally, in Tanzania, due to the stigma and legal repercussions around having same sex, the men preferring insertive anal sex with men are either still “in the closet” or generally assume a heterosexual role as “real men” while the ones preferring receptive anal sex with men are the only ones who are perceived as gay.³⁴ Due to that, receptive ones easily access HIV prevention support and utilize it more than insertive ones, who have less risk perception and are not considered as members of the key population needing continuous PrEP care. Generally, our findings indicate that sexual roles and preferences determine retention in PrEP care among men who have sex with men, highlighting the need for further exploration of factors contributing to this difference to enable tailoring interventions accordingly to enhance retention.

Adequate social support was a significant predictor of retention in PrEP care, consistent with findings from other studies.^{35,36} Since the clients who are expected to be retained in PrEP are “simply” at risk and not even living with the infection, attending follow-up visits regularly could be tiring and demotivating. Adequate support from family, partners, and healthcare workers could counteract these challenges, increase motivation, promote a sense of belonging, and improve retention in care.³⁶ Furthermore, social support could counteract the effects of stigma around the men who have sex with men’s sexuality and PrEP, which is reported to be a huge barrier to retention in PrEP.^{36–38} Adequate social support helps develop a sense of belonging and worth among men who have sex with men³⁷ which could strengthen their commitment to health protection and increase their chances of being retained in PrEP. Interestingly, no association was found between perceived PrEP stigma and retention in this study. This suggests that the more social support there is, the more resilient individuals become to the negative effects of stigma, and are better able to commit to ongoing PrEP care. Therefore, this study calls for the development of supportive social systems to promote retention in care and ultimately contribute to reduced HIV transmission among men who have sex with men and the general population.

Study Strengths and Limitations

This study was conducted in Tanzania, an African setting where PrEP use is a relatively new intervention, thereby contributing valuable evidence in a field with limited research. However, its quantitative nature does not offer an in-depth understanding of the factors that influence retention or the mechanisms through which they operate. Therefore, in-depth qualitative studies are recommended to explore factors that influence retention and their mechanisms of action.

Conclusion

Overall, our study reports low retention rates in PrEP care at one month among men who have sex with men in Tanzania. The fact that most men who have sex with men are not retained in PrEP care or use condoms increases the risk of HIV transmission within

them and the general population. These findings suggest an urgent need to strengthen HIV prevention strategies beyond enrolment in PrEP to focus on retention. These strategies could include developing peer support initiatives, enhancing provider training to ensure supportive and nonjudgmental care, and integrating psychosocial support into PrEP programs. Collectively, these approaches may foster more supportive environments within societies and healthcare systems, improving PrEP retention among men who have sex with men, reducing HIV transmission risk, and contributing to ending HIV infection as a public health threat by 2030.

Data Sharing Statement

The data used in this analysis are available to the PREPTA project's principal investigator (PI) upon reasonable request. Contact details: Prof. Elia J. Mmbaga Email: elia.mmbaga@medisin.uio.no.

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Disclosure

The authors report no conflicts of interest in this work.

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