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Prevalence and Predictors of Concern about Anal Cancer among Sexual and Gender Minorities Living with HIV in Abuja, Nigeria

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Abstract

Background: Anal cancer rates are rising among sexual and gender minorities (SGM) who live with HIV and engage in anal sex. Given that secondary cancer prevention programs for non-anal cancers are underutilized in sub-Saharan Africa, our objective was to assess concerns for anal cancer and hesitancy with cancer prevention among at-risk Nigerian SGM.

Methods: Within 4 weeks, SGM living with HIV were surveyed on levels of worry and hesitancy in engaging with a future anal cancer screening and treatment study. Worry was measured on a 5-point likert scale (0%, 25%, 50%, 75%, 100%) and categorized as low 25%, moderate 50%, and high 75%. Ordinal logistic regression identified factors associated with worry by estimating unadjusted and adjusted odds ratios (aOR) and 95% confidence intervals.

Results: Of 800 enrolled SGM, median age was 32 (interquartile range: 25 – 38) years, 99.2% were on antiretroviral therapy, of which 78.5% reported 95% pill adherence. The prevalence of moderate and high worry was 46.9% and 39.5%, respectively. Increasing worry was associated with reporting as a bottom for sexual position (aOR:3.12; 95%CI: 2.04–4.80), either top or bottom for sexual position (aOR:2.94; 95%CI: 1.92–4.52) or knowing anyone with anal cancer (aOR:2.99; 95%CI: 1.36–6.57). Participants aged 35 years were less worried (aOR:0.72; 95%CI: 0.59–0.95). Ninety-nine percent of participants provided contact information for a future cancer prevention study.

Discussion: SGM who heard about and engaged in at-risk practices for anal cancer were willing to access secondary prevention. Addressing biopsychosocial factors like age could foster future engagement.

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Keywords

MSM; HIV; anal receptive sex; HSIL; high-resolution anoscopy

INTRODUCTION

Anal cancer rates continue to increase by 2% annually.¹ This risk is 100-fold higher among sexual and gender minorities (SGM) who have anal sex with men and are living with HIV as compared to the general population.²⁻⁶ There is a growing body of evidence in sub-Saharan Africa (SSA) that oncogenic human papillomavirus (HPV), the virus that causes anal cancer, is abundant and multiple types are detected among SGM living with HIV.⁷⁻¹³ However, it remains unclear whether SGM living with HIV know of the relationship between HPV, the risk of anal cancer, and secondary prevention strategies to help mitigate anal cancer progression.

An assessment of this relationship is particularly needed in SSA where the burden of anal cancer is underreported.¹⁴⁻¹⁷ Of note, findings from a recent cross-sectional study in Liberia found SGM who engaged in anal sex scored the lowest on knowledge questions about HPV.⁹ Additionally, after introducing anal cancer screening and treatment for SGM in Nigeria, our participants reported a poor understanding of the symptoms of anal cancer that would prompt seeking a healthcare provider, suggesting a need for better knowledge dissemination.¹⁸ Although other studies of MSM living with HIV in Australia and the United States (U.S.) found higher levels of worry for HPV-associated illness,^{19,20} there is a dearth of research on these topics in SSA. A better understanding of the levels of concern among SGM for anal cancer in SSA is important to assess future uptake of screening and treatment if it were to become available.²¹

Recently, a randomized controlled trial in the U.S. found screening and treating anal precancerous lesions was efficacious at preventing anal cancer.²² Screening guidelines are under development and will eventually be forthcoming worldwide. Existing literature from SSA highlights disparities in accessing secondary prevention, such as colorectal^{23,24} and cervical^{25,26} cancer screening, and similar patterns may emerge for anal cancer. Thus, additional consideration of this area is timely to best ensure its future implementation and proper adherence. Moreover, it is prudent to take into account potential barriers to continued screening as psychological factors after experiencing screening may deter future engagement.²⁷ Screening hesitancy has been associated with intolerance to procedural pains¹⁸ and psychological distress.²⁸ It is possible SGM in SSA who engaged in our anal cancer screening pilot study²⁹ would report a higher level of hesitancy with future screening after undergoing the procedure.

The objective of this study, therefore, was to assess whether anal cancer was a concern and whether there was any screening hesitancy among SGM living with HIV in Abuja, Nigeria. We explored independent factors of concern for anal cancer including demographics, sexual practices, and HIV clinical factors.

METHODS

Study population

The International Centre for Advocacy on Rights to Health (ICARH) is a community-based organization that collaborates with the Institute of Human Virology Nigeria (IHVN) to support an SGM-focused health and research center (TRUST) in Abuja, Nigeria. Of note, the TRUST study was a prospective cohort study that evaluated and supported HIV prevention, treatment and care services for SGM enrolled between 2013 and 2020.³⁰

Recruitment of participants was conducted through community outreach and broadcast on protected SGM social media platforms between November 20 through December 14, 2021. Eligibility criteria included participants aged ≥ 18 years, assigned male sex at birth, living with HIV, history of anal sex with another male partner, and willingness to provide informed consent.

An electronic-based survey questionnaire was administered to enrollees at TRUST and was stopped after reaching a sample size of 800. Our primary outcome was level of worry for anal cancer measured on a 5-point Likert scale (0%, 25%, 50%, 75%, 100%) and combined to create 3 ordinal categories (low 0–25%, moderate 50%, and high 75–100%). Independent variables included: age at survey; preferred anal sexual position; history of receptive anal sex; number of receptive anal sex partners; knowing a person who had anal cancer; self-reported antiretroviral treatment (ART) adherence (<95%, ≥ 95% pill adherence); self-reported viral suppression (<20 copies/ml); received clinical care at TRUST; participated in our anal cancer screening pilot study in 2016²⁹ (TRUST-Anal Cancer study); first diagnosed with HIV at TRUST, and willing to participate in a future anal cancer screening and treatment study (yes, no, don't know).

Ethical considerations

Institutional Review Boards at the University of Maryland Baltimore and the Federal Capital Territory Health Research Ethics Committees in Nigeria approved this study. All participants provided written informed consent and data were deidentified.

Statistical analyses

Descriptive analyses described the distribution of covariates across levels of worry in bivariate contingency tables, using the Pearson's chi-squared test for categorical variables, Fisher's exact test for variables with small subgroups ≤ 5, and Kruskal-Wallis test for medians of continuous variables. Variables with potential collinearity were tested using an intraclass correlation (ICC) interrater reliability index.³¹ For any two variables with confirmed collinearity at ICC estimates >0.75 and p-value <0.01, the most important variable for the study objective was included in the multivariable model.

Ordinal logistic regression with proportional odds assumption estimated crude and adjusted odds ratios and 95% confidence intervals for factors independently associated with level of worry. Non-collinear variables statistically significant in bivariate analysis (p<0.05) that changed the model coefficients by more than 10% were retained in the final model. A

p-value <0.05 was considered statistically significant. Data collection and management employed the Research Electronic Data Capture (REDCap) application,³² and all statistical analyses were performed using Stata Statistical Software Release 16 (STATA Corp. 2019, College Station, TX, USA).

RESULTS

Of the 814 SGM living with HIV screened for the survey, 800 were eligible for enrollment. Fourteen were excluded because they did not report a history of anal sex with another male partner. Descriptive analyses found that 307 (38.4%) were aged ≥ 35 years, with a median (interquartile range [IQR]) age of 32 (25 – 38) years, and 297 (27.1%) received HIV clinical care at TRUST. Of the 297, 200 (67.3%) were first diagnosed with HIV at TRUST. Seven hundred and ninety-four (99.2%) SGM were on ART, of which 623 (78.5%) reported $\geq 95\%$ pill adherence. More than half (46.7%) self-reported viral suppression and 40.4% did not know their HIV viral loads. Most participants (91.9%) had receptive anal sex in their lifetime with 43.5% preferring the receptive (bottom) anal sexual position. The median number of receptive anal sex partners over their lifetime was 20 (IQR:7 – 45).

Moderate (46.9%) and high (39.5%) levels of worry for anal cancer were reported as shown in Table 1. Knowledge of anyone with anal cancer was 4.4% (n=35), and 10.7% of participants participated in the TRUST-Anal Cancer study. Almost all SGM (99.5%) expressed interest in participating in a future anal cancer screening and treatment study.

Bivariate analysis showed that increasing levels of worry was significantly more prevalent among SGM who were <35 years ($p=0.05$), received HIV care and treatment at TRUST ($p = 0.01$), preferred bottom receptive sex ($p = 0.01$), ever had receptive anal sex ($p = 0.01$), heard of anal precancer ($p = 0.01$), knew someone with anal cancer ($p = 0.01$), and participated in the TRUST-Anal Cancer study ($p = 0.01$) (Table 1).

Covariates that remained independently associated with worry for anal cancer were identified during the multivariable analyses (Table 2). These factors included ≥ 35 years of age (aOR 0.72; 95%CI: 0.59–0.95), prior engagement with care at TRUST (aOR 1.88; 95%CI: 1.41–2.51), preference for bottom (aOR 3.12; 95%CI: 2.04–4.80), or either sexual position (aOR 2.94; 95%CI: 1.92–4.52), and knowing (aOR 2.99; 95%CI: 1.36–6.57) or unsure (aOR 2.76; 95%CI: 1.63–4.68) of knowing someone with anal cancer.

DISCUSSION

While there are several studies that focus on biological factors (e.g., anatomical site/HPV genotype) related to anal cancer among SGM who engage in anal sex^{7,10} and people living with HIV,^{2,3} limited information on psychosocial factors exists for this population.³³ Additional consideration is warranted given the role psychosocial factors have on engagement with screening such as anal cancer awareness, worriedness, and personal willingness to seek out screening.²⁷ Understanding psychosocial barriers will help improve future cancer screening programs for aging at-risk SGM, particularly in SSA.

Recent work outside of SSA has reported high level of worry among men living with HIV who were either recommended for or had an anal biopsy.³³ In our study, we explored concern surrounding anal cancer among SGM living with HIV in a major country in SSA. We found that 40% of participants expressed a level of worry that was 75%. The high levels of worry may be from limited HPV knowledge and potentially sparse SGM-safe prevention and treatment centers in an environment unwelcoming of same-sex practices.^{34,35} This is concerning given the connection between criminalization of same-sex behavior and reduced use of healthcare prevention measures.^{34,36,37} Similar disparities may exist when seeking anal cancer specific healthcare services.

Young SGM below 35 years of age were more likely to be worried about anal cancer compared to participants who were older. There is increasing international evidence that younger people are more likely to use social media for health-related information,³⁸ which can impact health in positive and negative ways.^{39,40} Although the general knowledge and awareness of anal cancer may be low in SSA,^{9,18,41} increasing age may also be associated with an underestimation of risk of anal cancer.⁴² This could be partially explained by age-related differences in worry related processes which are theorized to be reduced in later adulthood.⁴³ Future interventions and screening guidelines may need to consider this underestimation as this demographic is more at risk for anal cancer.

The relationship between receptive anal sex and worry is consistent with the literature. It has become common knowledge that receptive anal sex is associated with many sexually transmitted infections (STIs), including HPV.^{44,45} Many of the participants may have experienced rectal gonorrhea, chlamydia, and HPV-associated anal warts;^{46,47} all associated with increased anal symptoms that require medical attention. It may be that knowing an additional medical condition, such as anal cancer, heightens levels of worry. This level of worry could be from the medical condition itself as well as anticipated worry from having to seek care from a cancer-specific healthcare provider outside SGM-friendly services. Level of worry could be further compounded if there is prior knowledge about the procedures involved in identifying anal cancer.²⁷ Future qualitative research can assess how receptive anal sex and STIs relate to these worry processes.

SGM who engaged in care at TRUST had an increased level of worry compared to those who received care elsewhere. Knowledge of risky sexual practices and potential consequences has improved over time for long term clients of TRUST.⁴⁸ More knowledge and awareness of anal cancer from engaging with TRUST could manifest with more worry, because SGM living with HIV who know little about anal cancer tend to underestimate its consequences.⁴² We also found more worry for those who knew individuals with anal cancer. This finding is consistent with the observation of a heightened knowledge of a certain cancer when reported among a person's social network, which personalizes the cancer for them.^{49,50} Lastly, persons may have heard about treatment options for anal cancer, which may have negative associations, further heightening level of worry.²⁸

The level of worry is a perceived expression that varies with individual personality types and may be subject to behavioral factors that our study was not powered to measure. Although the survey included language that distinguished anal cancer from warts, participants may

have attributed wart-related worry to cancer-related worry. Additionally, we did not ask participants about their level of knowledge on anal cancer, but we are pursuing this gap in future work. Finally, due to the same-sex prohibition act,³⁴ the actual population size of SGM in Nigeria is unknown and our sample may not be generalizable to the SGM community in Nigeria.

In conclusion, the level of worry surrounding anal cancer was high among the SGM community in Abuja, Nigeria. Consideration of biopsychosocial factors, such as age, together with levels of knowledge may be critical for rolling out sustainable anal cancer screening and treatment programs in SSA.

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Table 1.

Distribution of Enrollment Characteristics by Level of Worry for Anal Cancer

Characteristics	Ordinal Categories of Worry				P ⁴
	Total	Low 25%	Moderate 50%	High 75%	
	N=800 n (col %)	N=109 n (row %)	N=375 n (row %)	N=316 n (row %)	
Age (years)					0.05
<35	493 (61.6)	65 (13.2)	217 (44.0)	211 (42.8)	
35	307 (38.4)	44 (14.3)	158 (51.5)	105 (34.2)	
Age in years¹	32 (25 – 38)	33 (27 – 39)	33 (24 – 38)	31 (26 – 36)	0.14
Receives HIV care at TRUST					<0.01
No	503 (62.9)	66 (13.1)	274 (54.5)	163 (32.4)	
Yes	297 (27.1)	43 (14.5)	101 (34.0)	153 (51.5)	
Diagnosed with HIV at TRUST²					<0.01
No	88 (29.7)	8 (9.1)	49 (55.7)	31 (35.2)	
Yes	200 (67.3)	34 (17.0)	46 (23.0)	120 (60.0)	
Don't know	9 (3.0)	1 (11.1)	6 (66.7)	2 (22.2)	
Currently on ART					0.04
No	6 (0.8)	0 (0.0)	6 (100.0)	0 (0.0)	
Yes	794 (99.2)	109 (13.7)	369 (46.5)	316 (39.8)	
Adherence to ART³					0.08
<95% of pills	171 (21.4)	18 (10.5)	86 (50.3)	67 (39.2)	
95% of pills	623 (77.9)	91 (14.6)	283 (45.4)	249 (40.0)	
Not commenced ART	6 (0.7)	0 (0.0)	6 (100.0)	0 (0.0)	
Virally suppressed (<20copies/mL)					0.02
No	103 (12.9)	12 (11.7)	37 (35.9)	54 (52.4)	
Yes	374 (46.7)	50 (13.4)	193 (51.6)	131 (35.0)	
Don't know	323 (40.4)	47 (14.6)	145 (44.9)	131 (40.5)	
Preferred anal sexual position					<0.01
Top	118 (14.7)	45 (38.1)	36 (30.5)	37 (31.4)	
Bottom	348 (43.5)	29 (8.3)	178 (51.2)	141 (40.5)	
Either Top or Bottom	334 (41.8)	35 (10.5)	161 (48.2)	138 (41.3)	
Ever receptive anal sex					<0.01
No	55 (6.9)	31 (56.4)	18 (32.7)	6 (10.9)	
Yes	735 (91.9)	75 (10.2)	355 (48.3)	305 (41.5)	
Don't know	10 (1.2)	3 (30.0)	2 (20.0)	5 (50.0)	
Lifetime receptive partners¹	20 (7 – 45)	15 (6 – 45)	20 (9 – 45)	19 (7 – 45)	0.25
Know of anal precancer					<0.01
No	561 (70.1)	68 (12.1)	318 (56.7)	175 (31.2)	
Yes	163 (20.4)	32 (19.6)	48 (29.5)	83 (50.9)	
Don't know	76 (9.5)	9 (11.8)	9 (11.8)	58 (76.4)	

Characteristics	Ordinal Categories of Worry				<i>P</i> ⁴
	Total	Low 25%	Moderate 50%	High 75%	
	N=800 n (col %)	N=109 n (row %)	N=375 n (row %)	N=316 n (row %)	
Know someone with anal cancer					<0.01
No	693 (86.6)	90 (13.0)	358 (51.7)	245 (35.3)	
Yes	35 (4.4)	7 (20.0)	3 (8.6)	25 (71.4)	
Don't know	72 (9.0)	12 (16.7)	14 (19.4)	46 (63.9)	
Participated in TRUST-Anal Cancer Study					<0.01
No	683 (85.4)	95 (13.9)	343 (50.2)	245 (35.9)	
Yes	86 (10.7)	9 (10.5)	22 (25.6)	55 (63.9)	
Don't know	31 (3.9)	5 (16.1)	10 (32.3)	16 (51.6)	
Contact me for future anal cancer screening					0.11
No	1 (0.1)	1 (100.0)	0 (0.0)	0 (0.0)	
Yes	796 (99.5)	107 (13.4)	374 (47.0)	315 (39.6)	
Don't know	3 (0.4)	1 (33.3)	1 (33.3)	1 (33.3)	

Abbreviations: P, p-value; ART, antiretroviral therapy;

¹ median (interquartile range)

² Only those who answered Yes to receiving HIV care at TRUST (n=297) were subsequently asked if they were diagnosed HIV positive at TRUST.

³ Pearson's chi-squared test, Fisher's exact test, Kruskal-Wallis test. **Bold** indicates $P < 0.05$ and considered statistically significant.

Table 2:
Independent Factors Associated with Reporting Higher Levels of Worry Relative to Low Worry for Anal Cancer

Characteristics	Unadjusted OR	95% CI	P ¹	Adjusted OR	95% CI	P ^{1,2}
Age (years)						
<35	1.00					1.00
35	0.75	0.57 – 0.98	0.04	0.72	0.59 – 0.95	0.02
Receives HIV care at TRUST						
No	1.00			1.00		
Yes	1.80	1.36 – 2.38	<0.01	1.88	1.41 – 2.51	<0.01
Preferred anal sexual position						
Top	1.00			1.00		
Bottom	2.98	1.94 – 4.56	<0.01	3.12	2.04 – 4.80	<0.01
Either Top or Bottom	2.92	1.90 – 4.49	<0.01	2.94	1.91 – 4.52	<0.01
Know someone with anal cancer						
No	1.00			1.00		
Yes	3.37	1.56 – 7.26	<0.01	2.99	1.36 – 6.57	0.01
Don't know	2.54	1.52 – 4.23	<0.01	2.76	1.63 – 4.68	<0.01

Abbreviations: OR, odds ratios; CI, confidence intervals; P, p-value

¹ Ordinal Logistic Regression

² Multivariable model adjusted for age, received HIV care at TRUST, preferred anal sexual position, know someone with anal cancer. *P*<0.05 considered statistically significant.