Associations between punitive policies and legal barriers to consensual same-sex sexual acts and HIV among gay men and other men who have sex with men in sub-Saharan Africa: a multicountry, respondent-driven sampling survey

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Summary

Background Few assessments of associations between structural-level factors and HIV among gay men and other men who have sex with men (MSM) have been conducted, especially in sub-Saharan Africa. Our objective was to examine HIV testing history, HIV status, and stigmas among MSM living in ten countries with heterogeneous legal environments.

Methods This study used pooled data from ten country-specific, cross-sectional studies done in 25 sites in Burkina Faso, Cameroon, Côte d'Ivoire, The Gambia, Guinea-Bissau, Nigeria, Senegal, Eswatini, Rwanda, and Togo. MSM were recruited by respondent-driven sampling and were eligible if they met country-specific requirements for age, area of residence, and self reported being assigned male sex at birth and having anal sex with a man in the past 12 months. Policy related to same-sex sexual behaviour for each country was categorised as not criminalised or criminalised. Countries were also categorised on the basis of recent reports of prosecutions related to same-sex sexual acts. Legal barriers were defined as those that legally prevented registration or operation of sexual orientation related civil society organisations (CSOs). Individual data on HIV testing history, HIV status, and stigma were collected via interviewer-administered sociobehavioural questionnaires and HIV testing. Multilevel logistic regression with random intercepts was used to assess the association between policies, recent prosecutions, legal barriers to CSOs, and HIV-related factors with adjusted odds ratios (aORs) and 95% CIs.

Findings Between Aug 3, 2011, and May 27, 2020, we recruited 8047 MSM with a median age of 23 years (IQR 21–27). 4886 (60·7%) lived in countries that criminalise same-sex sexual acts. HIV prevalence among MSM was higher in criminalised settings than non-criminalised settings (aOR 5·15, 95% CI 1·12–23·57); higher in settings with recent prosecutions than in settings without prosecutions (12·06, 7·19–20·25); and higher in settings with barriers to CSOs than without barriers to CSOs (9·83, 2·00–48·30). HIV testing or status awareness was not associated with punitive policies or practices. Stigma was associated with HIV status but did not consistently vary across legal environments. Disparities in HIV prevalence between MSM and other adult men were highest in punitive settings.

Interpretation Structural risks including discriminatory country-level policies, prosecutions, and legal barriers might contribute to higher HIV prevalence among MSM. Taken together, these data highlight the importance of decriminalisation and decreasing enforcement, alongside stigma reduction, as central to effective control for HIV.

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Introduction

Globally, gay men and other men who have sex with men (MSM) are disproportionately affected by HIV, with recent estimates suggesting MSM are about 25 times more likely to be living with HIV than other adult men.[1] Even in countries across sub-Saharan Africa where HIV epidemics are more generalised, estimates are as high as nearly one in two MSM living with HIV.[2] For MSM, HIV risks are shaped by individual, network, social, and structural factors that include stigma and discrimination related to sexual behaviour, orientation, or preferences. Stigma is a social process by which an individual or group is labelled and devalued on the basis of a perceived characteristic, resulting in adverse experiences, few opportunities, and suboptimal wellbeing in the context of unequal power.[3] Stigmas can arise from poor understanding, tolerance, and acceptance of diverse identities, behaviours, or health conditions.[4] Stigmas can manifest at the individual, community, and structural or macro levels, and through prejudice, discounting, discrediting, and discrimination.[5]

The role of individual-level and community-level stigmas as barriers to HIV outcomes has been well

Research in context

Evidence before this study

Globally, gay men and other men who have sex with men (MSM) are disproportionately affected by HIV. The role of individual-level and community-level stigmas as barriers to HIV prevention and diagnosis has been well established and these stigmas have been identified as key barriers to HIV control. However, assessments of the effect of structural stigmas and discriminatory policies on individual-level health outcomes affecting MSM are scarce. We searched PubMed with the terms "HIV" AND ("Sexual and Gender Minorities" OR "Homosexuality, Male") AND ("Criminal Law" OR "Law Enforcement" OR "Policy" OR "Legislation as Topic" OR "Social Stigma") with no language restrictions, for publications up to Dec 31, 2021. Anti-LGBT legislation has been associated with non-disclosure of same-sex attractions, sexual behaviours, and sexual identities among MSM. A recent systematic review and meta-analysis of studies conducted in sub-Saharan Africa observed that levels of testing history and awareness of HIV status were lower in countries with the most severe legal penalties related to same-sex relations compared with countries with the least severe legal penalties. A cross-national global ecological analysis observed that countries with LGBT criminalising laws and policies had lower aggregate levels of knowledge of HIV status and lower HIV viral suppression among people living with HIV. Despite these existing findings, the current evidence assessing criminalisation of same-sex sexual behaviours affecting HIV outcomes among MSM is limited to aggregate-level analyses and is subject to ecological fallacies, as none of the existing studies have directly assessed the association between punitive policies and HIV outcomes using individual-level data.

Added value of this study

This study uses individual-level sociobehavioural and biological data from 8047 MSM from across ten countries in sub-Saharan Africa to understand the relationships of country-level policies, prosecutions, and legal barriers with HIV testing, prevalence, and status awareness among MSM. Our findings suggest that MSM living in countries that criminalise and enforce discriminatory policies around same-sex relationships have the highest burden of HIV. MSM living in countries that have recent prosecutions related to same-sex sexual acts still have an elevated HIV prevalence compared with countries without recent prosecutions. Furthermore, the presence of legal barriers to registration and operation of civil society organisations was associated with higher prevalence of HIV.

Implications of all the available evidence

This study contributes to the existing evidence on understanding the role of harmful policies, such as criminalisation, on HIV among MSM. Individual-level data from countries across sub-Saharan Africa have shown that structural risks, including discriminatory country-level policies, recent prosecutions, and legal barriers might contribute to higher HIV prevalence among MSM. These results provide evidence that decriminalisation of same-sex relationships, as well as decreasing enforcement of criminalising policies are central to effective HIV control.

established,[5,6] although assessments of structural stigmas and discrimination and their relationship to individual-level health outcomes are scarce. This is likely to be due to the complexity of how structural stigmas manifest and the scarce individual-level data from multicountry studies available to properly assess these factors alongside HIV outcomes.[7] Structural stigma is a macrosocial form of stigma acting at the level of policies, systems, and structures.[5] At the structural or macro levels, laws serve multiple roles. Laws might reflect the dominant norms of a given society and seek to shape a population's behaviour to meet those norms, but they also have an expressive function in which they shape social norms.[8] As such, laws and policies can be both a means through which social stigma is created or enforced and a means of remedying or preventing stigma and blunting its harms.[9]

Anti-LGBT legislation and enforcement functions at the structural level to discriminate against individuals on the basis of sexual orientation, behaviours, or preferences. An online survey conducted among MSM from 38 European countries found that in countries with more stigmatising laws and policies, MSM were less likely to report same-sex attractions, sexual behaviours, and sexual identities than in countries with less stigmatising laws and policies.[10] Non-disclosure of sexual behaviours has been shown to negatively affect HIV prevention, diagnosis, and treatment, as disclosure of sexual behaviours to health-care providers is essential to informing appropriate care.[11] A systematic review and meta-analysis of studies conducted in sub-Saharan Africa observed that levels of testing history and awareness of HIV status were lower in countries with the most severe legislation than in countries with the least severe legislation.[12] A cross-national global ecological analysis showed that countries with LGBT criminalising laws and policies had lower levels of knowledge of HIV status and lower HIV viral suppression among people living with HIV.[13] Despite these existing findings, the current evidence is limited to aggregate-level analysis because no studies have used individual-level data to directly assess the association between punitive legal environments and HIV outcomes, especially in sub-Saharan Africa.

In settings with punitive policies such as the criminalisation of same-sex sexual acts, civil society organisations (CSOs) could serve a protective function by enacting health services and advocacy to shape policies, funding, and programmes for devalued communities such as MSM.[14] For instance, the involvement of CSOs

For more on **HIV laws and policies** see https://www.hivpolicylab.org/

See **Online** for appendix 2

and communities of people living with HIV were central in scaling up the HIV response globally.[15] However, many countries have legal barriers to the operation and registration of CSOs to support sexual and gender diverse efforts, impeding access to care and services among individuals at risk for and living with HIV.

Recognising stigma as a barrier to HIV prevention, diagnosis, and treatment, UNAIDS has established the goal of achieving zero discrimination by 2025 to support eliminating HIV as a public health threat by 2030. UNAIDS has also established the 10-10-10 targets, which focus on removing social and legal impediments to support access to and use of HIV services.[16] However, there remains a crucial need to characterise the mechanisms by which structural stigma and discrimination harm the HIV response in order to inform intervention strategies. We

aimed to assess the associations between discriminatory laws, prosecutions, and legal barriers with HIV prevalence and testing history among MSM across ten countries in sub-Saharan Africa. We also aimed to assess the association between stigmas and HIV and explore if these relationships vary according to the legal environments. Last, we aimed to assess the association between punitive environments and HIV prevalence disparities between MSM and other adult men.

Methods

Study design and participants

This study used pooled data from ten country-specific, cross-sectional studies done in Burkina Faso, Cameroon, Côte d'Ivoire, Eswatini, The Gambia, Guinea-Bissau, Nigeria, Rwanda, Senegal, and Togo. Study teams led primary data collection in the ten countries (appendix 2 p 1). All data were cross-sectional and individuals were recruited and enrolled over the specified time periods for each study between 2011 and 2020. All recruitment was conducted via respondent-driven sampling (RDS) independently across 25 sites within the ten countries.[17] Recruitment chains were initiated by seeds in each site, who were individuals selected in collaboration with local community-based organisations to represent heterogeneity in demographic characteristics and geographical representation.

Participants were eligible if they met country-specific requirements for age (appendix 2 p 1), area of residence, and self-reported being assigned male sex at birth and having anal sex with a man in the past 12 months. All participants provided verbal or written informed consent depending on the approach determined for each country. Secondary data analysis was overseen by the Johns Hopkins School of Public Health Institutional Review Board (approval IRB00007006) and data collection was approved by country-specific ethics committees (appendix 2 p 1).

Procedures

We used individual-level data from sociobehavioural questionnaires and HIV testing for these analyses. The primary dependent variable was HIV status based on HIV test results at the time of RDS participation. Additional HIV measures included self-reported history of ever having received an HIV test and awareness of HIV positive status among those living with HIV. Study teams conducted interviewer-administered questionnaires in a private location with trained study staff. Testing for HIV, including pre-test and post-test counselling, was done following country-specific national guidelines. HIV testing was done before administering the sociobehavioural questionnaires. Study staff led post-test counselling and review of HIV test results with participants after completion of the sociobehavioural questionnaire.

Individual-level stigmas were explored as exposures of interest. 13 stigma items were administered consistently across countries. These items were combined into separate

	Total (n=8047)	Policy related to same-sex sexual relationships	
		Not criminalised (n=3161)	Criminalised (n=4886)
Age, years			
<24	4941/7935 (62·3%)	1993/3161 (63·0%)	2948/4774 (61·8%)
25–30	2163/7935 (27·3%)	820/3161 (25·9%)	1343/4774 (28·1%)
≥31	831/7935 (10·5%)	348/3161 (11·0%)	483/4774 (10·1%)
Education level			
None	342/7968 (4·3%)	137/3152 (4·3%)	205/4816 (4·3%)
Some primary	589/7968 (7·4%)	203/3152 (6·4%)	386/4816 (8·0%)
Primary completed or some secondary	3324/7968 (41·7%)	1772/3152 (56·2%)	1552/4816 (32·2%)
Completed secondary or post-secondary	3713/7968 (46·6%)	1040/3152 (33·0%)	2673/4816 (55·5%)
Sexual orientation			
Gay or homosexual	3871/8007 (48·3%)	1733/3147 (55·1%)	2138/4860 (44·0%)
Bisexual	3994/8007 (49·9%)	1313/3147 (41·7%)	2681/4860 (55·2%)
Heterosexual	133/8007 (1·7%)	98/3147 (3·1%)	35/4860 (0·7%)
Other	9/8007 (0·1%)	3/3147 (0·1%)	6/4860 (0·1%)
Disclosure of sexual minority status*			
Disclosure of sexual minority status to family	1784/8033 (22·2%)	758/3161 (24·0%)	1026/4872 (21·1%)
Disclosure of sexual minority status to health-care providers	2113/7333 (28·8%)	548/2487 (22·0%)	1565/4846 (32·3%)
Sexual minority stigmas*			
Stigma from family and friends	2422/8041 (30·1%)	1193/3161 (37·7%)	1229/4880 (25·2%)
Anticipated health-care stigma	2064/8038 (25·7%)	791/3161 (25·0%)	1273/4877 (26·1%)
General social stigma	4573/8046 (56·8%)	1454/3161 (46·0%)	3119/4885 (63·9%)
HIV*			
History of HIV testing among all participants	5895/8028 (73·4%)	2379/3156 (75·4%)	3516/4872 (72·2%)
Living with HIV	1581/7958 (19·9%)	264/3116 (8·5%)	1317/4842 (27·2%)
Ever told of HIV positive status among those living with HIV	629/1581 (39·8%)	102/264 (38·8%)	527/1317 (40·0%)
Currently on antiretroviral among those living with HIV	333/1581 (21·1%)	49/264 (18·6%)	284/1317 (21·6%)

*Items reporting when value is yes; those reporting no are not shown.

Table 1: Demographic characteristics among men who have sex with men across ten countries in sub-Saharan Africa, stratified by policy related to same-sex sexual acts

stigma scales for this analysis on the basis of the results of an exploratory factor analysis published previously (appendix 2 p 2).[18] Stigma categories included: stigma related to family and friends; anticipated or perceived health-care stigma; and general social stigma (self-reported experiences of stigma attributable to having sex with men).

The other individual-level measures explored as potential confounders were age, education, sexual orientation, marital status, disclosure of same-sex sexual relationships to family or friends, and disclosure of same-sex sexual relationships to a health-care provider.

Legal environment measures included country-level same-sex sexual practice-related policies, which were defined and categorised on the basis of work developed by the International Lesbian, Gay, Bisexual, Trans, and Intersex Association (ILGA)[19] and the HIV Policy Lab.[20] Criminalisation of same-sex sexual practices was categorised as not criminalised where national law avoids criminalising consensual same-sex sex acts, and was categorised as criminalised in countries where national law criminalises consensual same-sex sex acts. Prosecutions for consensual same-sex sexual acts was applied to countries where there were reports of prosecutions for consensual same-sex sexual acts within the past year. Categories were determined on the basis of the year of data collection for each country. Legal barriers to the registration or operation of CSOs was defined on the basis of ILGA confirmed reports. Full definitions and sources are outlined in appendix 2 (pp 2–3).

Country-level measures were HIV epidemic setting, HIV population prevalence, antiretroviral therapy (ART) coverage, and HIV disparity. HIV epidemic setting was defined for each country as either generalised or concentrated, on the basis of UNAIDS and WHO definitions. HIV epidemic setting, HIV population prevalence, and ART coverage for each country were based on UNAIDS estimates. HIV disparity score was calculated as the difference between the HIV prevalence among MSM in each country-specific study sample and HIV prevalence among adult men in each country (appendix 2 p 3).

Statistical analysis

The sample size was determined separately for each country-specific data collection. The sample size for each country was calculated based on the ability to estimate the HIV population prevalence in each setting. We pooled data across countries and sites. We did not apply RDS-adjusted weighting because MSM did not represent a single network, violating a key assumption of RDS.[21,22] Although results represent valid sample estimates, they might differ from population-level estimates given the absence of full RDS adjustment.[17] Proportions of demographic characteristics, HIV status, HIV testing history, knowledge of HIV positive status, HIV status disclosure, and stigma were described using crude estimates.

The dependent variables of interest were HIV status, HIV testing history, and awareness of HIV positive status. The primary exposures of interest were policy, prosecutions, and legal barriers to CSOs. Potential confounders were age, education, marital status, sexual orientation, epidemic setting, HIV population prevalence, site, year of data collection, and recruitment seed.

We used multilevel logistic regression with random intercepts to estimate odds ratios (ORs) and 95% CIs. Final models were adjusted for age, education, marital status, sexual orientation, HIV epidemic setting, ART coverage, HIV prevalence, year of data collection, recruitment seed, and site, and clustered by country. We ran separate multivariable models for each policy, prosecution, or legal barrier exposure and outcome of interest to avoid potential collinearity (appendix 2 p 4).

Secondary exposures of interest were stigma related to family and friends, anticipated or perceived health-care stigma, and general social stigma. Multilevel logistic regression with random intercepts was used to estimate the ORs and 95% CIs between stigma exposures and HIV status. Stigma exposure models were run separately due to potential collinearity between stigma scales. Final models were adjusted for age, education, marital status, sexual orientation, epidemic, HIV prevalence, year of data collection, seed, site, and respective disclosure variables when conceptually relevant. All models were clustered by country. Stigma models were not adjusted for the legal environment, as these measures were conceptualised as modifiers and not confounders (appendix 2 p 4).

To explore potential effect measure modification in which the relationship between stigma scales and HIV status might vary depending on the existence of particular policies, the relationship between stigma scale and HIV status was stratified by policies, prosecutions, and legal barriers to CSOs on same-sex sexual relationships. The

	Total (8047)	Living with HIV (n=1581)*		
		n/N (%)	OR (95% CI)	aOR† (95% CI)
Policy related to consensual same-sex sexual acts				
Not criminalised	3161 (39·3%)	264/3116 (8·5%)	1 (ref)	1 (ref)
Criminalised	4886 (60·7%)	1317/4842 (27·2%)	4·49 (2·05–9·82)	5·15 (1·12–23·57)
Prosecutions for consensual same-sex sexual acts				
No	4170 (51·8%)	385/4120 (9·3%)	1 (ref)	1 (ref)
Yes	3877 (48·2%)	1195/3837 (31·1%)	4·92 (2·53–9·52)	12·06 (7·19–20·25)
Legal barriers to civil society organisations				
No	3286 (40·8%)	338/3243 (10·4%)	1 (ref)	1 (ref)
Yes	4761 (59·2%)	1242/4715 (26·3%)	2·01 (0·66–6·10)	9·83 (2·00–48·30)

aOR=adjusted odds ratio. OR=odds ratio. *1581 of 7958 with available data. †Adjusted for age, education, sexual orientation, marital status, year of data collection, country-level population HIV prevalence among adults aged 15–49 years, epidemic setting, country-level antiretroviral therapy coverage, recruitment seed, site, and clustered by country.

Table 2: Policy, prosecutions, and legal barriers to civil society organisations related to same-sex sexual acts and HIV status among men who have sex with men

	Total (8047)	Has ever tested for HIV among all study participants (n=5895)*			Has awareness of HIV positive status among those living with HIV (n=629)†		
		n/N (%)	OR (95% CI)	aOR‡ (95% CI)	n/N (%)	OR (95% CI)	aOR‡ (95% CI)
Policy related to consensual same-sex sexual acts							
Not criminalised	3161 (39·3%)	2379/3156 (75·4%)	1 (ref)	1 (ref)	102/263 (38·8%)	1 (ref)	1 (ref)
Criminalised	4886 (60·7%)	3516/4872 (72·2%)	0·70 (0·27–1·78)	0·76 (0·25–2·26)	527/1317 (40·0%)	0·65 (0·19–2·21)	0·78 (0·19–3·22)
Prosecutions for consensual same-sex sexual acts							
No	4170 (51·8%)	3034/4160 (72·9%)	1 (ref)	1 (ref)	127/285 (33·0%)	1 (ref)	1 (ref)
Yes	3877 (48·2%)	2861/3868 (74·0%)	0·91 (0·35–2·38)	1·03 (0·34–3·18)	502/1195 (42·0%)	0·88 (0·25–3·03)	1·72 (0·43–6·79)
Legal barriers to civil society organisations							
No	3286 (40·8%)	2408/3278 (73·5%)	1 (ref)	1 (ref)	106/338 (31·4%)	1 (ref)	1 (ref)
Yes	4761 (59·2%)	3487/4750 (73·4%)	1·08 (0·42–2·77)	1·66 (0·52–5·40)	523/1242 (42·1%)	1·61 (0·48–5·50)	4·02 (1·27–12·76)

aOR=adjusted odds ratio. OR=odds ratio. *5895 of 8028 with available data. †629 of 1581 living with HIV. ‡Adjusted for age, education, sexual orientation, marital status, year of data collection, country-level population prevalence among adults aged 15–49 years, recruitment seed, site, and clustered by country.

Table 3: Policy, prosecutions, and legal barriers to civil society organisations related to same-sex sexual acts and HIV testing history among men who have sex with men

Mantel-Haenszel test of homogeneity was used to assess differences between stigma and HIV across different legal barriers, using a significance level of a p value less than 0·05.

HIV prevalence disparity was assessed as a dependent variable with policy, prosecutions, and legal barriers to CSOs, and exposures of interest. Multilevel mixed-effects generalised linear models were used to assess the exposures and HIV prevalence disparity outcome separately, and models adjusted for country, site, ART coverage, and HIV prevalence.

Statistical analyses were done using STATA version 15.1. This study was not registered.

Role of the funding source

The funders of the study had no role in study design, data collection, data analysis, data interpretation, or writing of the report.

Results

Data were collected between Aug 3, 2011, and May 27, 2020. 8047 MSM are represented in these analyses: 672 (8·4%) in Burkina Faso; 1323 (16·4%) in Cameroon; 1301 (16·2%) in Côte d'Ivoire; 326 (4·1%) in Eswatini; 114 (1·4%) in The Gambia; 451 (5·6%) in Guinea-Bissau; 1716 (21·3%) in Nigeria; 737 (9·2%) in Rwanda; 724 (9·0%) in Senegal; and 683 (8·5%) in Togo (appendix 2 p 1). Among participants, 3161 (39·3%) lived in countries where same-sex sexual acts were not criminalised; 4886 (60·7%) lived in countries where same-sex sexual acts were criminalised; 3877 (48·2%) lived in countries with recent prosecutions related to same-sex sexual acts; and 4761 (59·2%) lived in countries with legal barriers to CSOs. The median age of participants was 23 years (IQR 21–27; table 1).

1581 (19·9%) of 7958 participants with available data were living with HIV (table 1). In countries without criminalisation, 264 (8·5%) of 3116 participants had HIV, and in countries with criminalisation, 1317 (27·2%) of 4842 participants had HIV (table 1). HIV prevalence among study participants in criminalised settings was higher than among participants in non-criminalised settings (table 2). HIV prevalence among study participants in countries with recent prosecutions was higher than in settings without recent prosecutions (table 2). HIV prevalence among study participants living in countries with barriers to CSOs was higher than in settings without barriers (table 2).

5895 (73·4%) of 8028 participants with available data reported ever having an HIV test (table 1). Among 1581 participants living with HIV, 629 (39·8%) reported being aware of their HIV positive status (table 1). Ever testing for HIV was not associated with policy, prosecutions, or barriers to CSOs (table 3). Awareness of HIV positive status was associated with CSO barriers (table 3).

2422 (30·1%) of 8041 participants reported stigma from family or friends, 2064 (25·7%) reported anticipated or perceived health-care stigma, and 4573 (56·8%) reported general social stigma. HIV was associated with stigma from family or friends, anticipated or perceived health-care stigma, and general social stigma (table 4). The association between social and family stigma and HIV varied by existence of legal barriers to CSOs, and the association between anticipated or perceived health-care stigma and HIV varied by criminalisation status and recent prosecutions (table 4).

HIV prevalence difference between study participants and adult men in each country was higher in criminalised settings than non-criminalised settings (table 5). HIV prevalence difference was higher in settings with recent prosecutions than settings without recent prosecutions and higher in settings with legal barriers to CSOs than settings without legal barriers (table 5).

	Total living with HIV			Policy related to same-sex sexual acts			Prosecutions for same-sex sexual acts			Legal barriers to civil society organisations		
				Not criminalised		Criminalised	No		Yes	No		Yes
	n/N (%)	OR (95% CI)	aOR* (95% CI)	Mantel-Haenszel p value*	aOR† (95% CI)	aOR† (95% CI)	Mantel-Haenszel p value*	aOR† (95% CI)	aOR† (95% CI)	Mantel-Haenszel p value*	aOR† (95% CI)	aOR† (95% CI)
Stigma from family or friends	543/1581 (34·3%)	1·66 (1·45–1·89)	1·37 (1·17–1·60)	0·42	..	..	0·53	..	..	0·0058	1·54 (1·20–1·97)	1·29 (1·07–1·56)
Anticipated or perceived health-care stigma	539/1580 (34·1%)	1·52 (1·33–1·73)	1·49 (1·27–1·74)	0·0086	1·22 (0·91–1·64)	1·58 (1·33–1·88)	0·0015	1·19 (0·92–1·54)	1·69 (1·41–2·03)	0·46	..	..
General social stigma	1207/1581 (79·3%)	1·91 (1·66–2·20)	1·49 (1·26–1·78)	0·19	..	..	0·087	..	..	0·073	..	..

aOR=adjusted odds ratio. OR=odds ratio. *The Mantel-Haenszel test of homogeneity was used to assess differences between stigma and HIV across different policy, enforcement, and legal barriers contexts, using a significance level of p<0·05. If the Mantel-Haenszel p value was not <0·01 then it did not suggest that values differed by setting. †Adjusted for age, year, orientation, education, marital status, disclosure of sexual behaviour to relevant group (stigma from family or friends included disclosure to family or friends, anticipated or perceived health-care stigma included disclosure to health-care provider, and general social stigma included disclosure to health-care provider), year of data collection, country HIV prevalence, recruitment seed, site, and clustered by country.

Table 4: Associations between stigmas and positive HIV status among gay men and other men who have sex with men

Discussion

We explored the relationships between legal environments, types of stigma, HIV testing, HIV status, and awareness of HIV status among MSM living in ten countries across sub-Saharan Africa. Punitive policies against same-sex sexual acts as well as recent prosecutions related to same-sex sexual acts were associated with prevalent HIV among MSM. Extending beyond the criminalisation of same-sex sexual orientation, behaviours, and preferences, criminalisation of CSOs supporting MSM was also associated with higher HIV prevalence among MSM in this study. Stigma from family and friends, within health care, and in the community was associated with HIV status among MSM but did not consistently change based on the legal environment, highlighting the potentially complex drivers and facilitators influencing stigmas affecting MSM. Additionally, HIV prevalence difference between MSM in this study and other adult men in each country was associated with criminalisation, recent prosecutions, and legal barriers to CSOs.

Awareness of HIV positive status among MSM living with HIV in this study sample was low, and far from UNAIDS targets for HIV control. Although a high proportion of study participants reported having ever received an HIV test, awareness of HIV status suggests that study participants might not be accessing HIV tests regularly. For people without HIV, HIV testing services provide opportunities to access prevention services, allowing them to remain HIV free; and for people living with HIV, HIV testing facilitates access to ART, achievement of viral suppression, and reduction of onward transmission. Although HIV testing history was not associated with policy, prosecutions, or legal barriers to CSOs, this study suggests regular, routine testing and communication of positive results are needed across legal environments among MSM.

MSM living in settings where prosecutions had been recently documented had 12 times the odds of living with

	Mean HIV prevalence disparity score (SD)*	HIV prevalence ratio comparing HIV prevalence disparity score between policy and legal settings	
		Prevalence ratio† (95% CI)	Adjusted prevalence ratio‡ (95% CI)
Policy related to consensual same-sex sexual acts			
Not criminalised	7·22 (3·57)	1 (ref)	1 (ref)
Criminalised	24·82 (13·06)	17·59 (17·13–18·06)	13·08 (12·73–13·43)
Prosecutions for consensual same-sex sexual acts			
No	6·58 (4·07)	1 (ref)	1 (ref)
Yes	30·09 (8·63)	23·50 (23·21–23·79)	18·24 (18·08–18·40)
Legal barriers to civil society organisations			
No	8·89 (5·69)	1 (ref)	1 (ref)
Yes	24·13 (13·82)	15·25 (14·74–15·74)	16·58 (16·21–16·95)

*HIV prevalence disparity score is defined as the prevalence difference between men who have sex with men and other adult men in each country. †Multilevel mixed-effects generalised linear models were used to assess the legal environment exposures and outcome of interest (HIV prevalence disparity score). ‡Adjusted for country, site, country-level antiretroviral therapy coverage, and country-level population prevalence among adults aged 15–49 years.

Table 5: HIV prevalence disparity between gay men and other men who have sex with men and other adult men, and associations with legal environments

HIV than individuals in settings without recent prosecutions. Additionally, MSM living in criminalised settings had 5 times the odds of living with HIV compared with men living in settings without criminalisation. These results support ecological analyses highlighting differential HIV measures based on criminalisation status[13] and reinforce the harmful role of a punitive context on HIV.[12] These results suggest that the existence of laws, even if the laws are not being actively enforced, might contribute to HIV risk among MSM, and that the burden might be greatest in settings with recent prosecutions. Therefore, although decreasing enforcement might prove helpful, removing laws and decriminalisation might still be important in supporting HIV programming among MSM in sub-Saharan Africa.

This study highlights that CSOs are likely to play an important role in supporting health services and advocacy

efforts for MSM, across criminalised settings.[14] MSM in this study were more likely to be living with HIV in settings with legal barriers to CSO operation and registration. In settings with criminalisation, access to legal and health services through CSOs remains an avenue to mitigate barriers to health and human rights.[23] Senegal is an example where CSOs have made progress in achieving access to HIV services for MSM through advocacy efforts and direct care provision.[24] Although same-sex sexual acts and marriage in Senegal remain criminalised, the ministry of health has prioritised efforts towards HIV services for MSM. In South Africa, the early HIV response among MSM was driven by existing social support networks and health services for MSM.[25] Generally, CSOs are well positioned to achieve progress in rights-constrained environments.[24] However, legal barriers to CSOs in the context of punitive policies against same-sex sexual acts reduce opportunities for advancements in HIV and human rights. In 2014, Nigeria increased punitive policies to further criminalise same-sex sexual acts, including prohibiting participation in organisations, service provision, or meetings that support gay people, and punish attempts to enter civil unions or publicly show same-sex romantic relationships. This law resulted in an immediate effect on fear and avoidance of seeking health services.[26]

Stigma from family or friends, health-care stigma, and general social stigma were associated with increased HIV prevalence among MSM in this study. The relationship between health-care stigma and HIV status was greater in settings with recent prosecutions. However, the relationships between general social stigma and HIV did not differ by criminalisation status, recent prosecutions, or legal barriers to CSOs. This suggests that stigma experienced by individuals within these domains and its influence on HIV remains a major factor regardless of the legal environment. It also suggests the need to address stigma that occurs across levels, such as intrapersonal, social, community, organisational, and structural levels. These findings differ from studies assessing stigma and HIV across settings with criminalisation policies of sex work, which suggest that state actors might be playing a large role in these dynamics.[27] It might be that stigma affecting MSM is driven or facilitated by social context, cultural beliefs, and social norms more than legal frameworks. For example, despite the establishment of legal protections based on sexual orientation in South Africa in 1994, MSM in South Africa are not less likely to experience human rights abuses than MSM in criminalised settings.[28] This complex dynamic was observed in the USA as well, where, although legal protections for MSM exist, the prevalence of stigma is high and not different from MSM across sub-Saharan African countries.[29] Given this dynamic, interventions spanning across cultural, gender, religious, and legal spaces are likely to be needed to improve human rights among MSM. However, social acceptance should not be considered a prerequisite for decriminalisation; rather, decriminalisation can precede and coincide with community advocacy for improved social acceptance.

Last, the difference between HIV prevalence among MSM in this study and adult men in each country can serve as a measure of disparity between MSM and non-MSM populations. Punitive policy, recent prosecutions, and legal barriers to CSOs were all associated with higher HIV prevalence disparities in this study. Structural factors such as criminalisation, active prosecutions and enforcement, and barriers to CSO might contribute to disparity in prevention, risk, and ultimately progress of achieving HIV control.

Limitations to this study should be considered. Importantly, all data are cross-sectional and cannot assess causality. RDS is a non-probabilistic-based sampling approach and might introduce selection bias. We adjusted for recruited seed in our analyses but did not apply RDS-weighted adjustments given the limited consensus on this approach for complex, multilevel models. Self-reported measures might be subject to recall bias and social desirability bias, which might differ across settings. Measurement variance in the stigma measures across countries exists and might represent potential differential error in measurement by country.

Data were collected over 9 years, and although we have adjusted for time in which data were collected to account for secular trends, this adjustment might not capture all the different ways in which the experiences of MSM and control of HIV might have changed over this period. Enforcement practices beyond arrests, programme funding, and other external measures over time might have influenced stigma, HIV status, or HIV risk.

It is possible that countries that take a punitive approach towards MSM might also take this approach towards other populations and overall might use approaches for HIV control that are less informed by public health. This might result in latent unmeasured confounding that might influence the specific relationships observed in this study. Importantly, ART coverage reduces mortality among people living with HIV and can contribute to a higher HIV prevalence in a population. Therefore, higher HIV prevalence might not always represent poor HIV control. To account for this, we adjusted for ART coverage and HIV prevalence in our analyses.

It is possible that unmeasured confounders preceding both same-sex policies and country-level HIV epidemics exist and feed independently into both, thus resulting in residual confounding. We cannot rule out the possibility of uncontrolled confounding, particularly as there might be unmeasured confounders that are associated with punitive laws or stigma, as well as causally associated with HIV and not in the causal pathway between exposure and outcome. None of the countries in this study met the criteria for decriminalised status, or had

protective policies in place, and therefore these legal contexts could not be assessed. Data collection for Burkina Faso, Eswatini, and Togo took place in years that are not captured in the HIV Policy Lab Database. ILGA state-sponsored homophobia reports and online media were reviewed for recent prosecutions and did not report any prosecutions in these countries during the years covered by the study. However, the process for identifying arrests was different from those identified in the HIV Policy Lab database and might be subject to misclassification.

MSM living with HIV might experience intersectional stigma due to HIV status and sexual or gender diversity. However, this study did not assess the potential intersections of stigmas attributable to these characteristics. In the development of the disparity score, HIV estimates for adult men were compared with our study sample, which might not account for demographic characteristics of these populations. Importantly, most of the countries included in these analyses are in west and central Africa, with the exceptions of Eswatini and Rwanda. Therefore, these results might not be generalisable across all countries in sub-Saharan Africa.

Across sub-Saharan Africa, punitive policies, enforcement practices, and legal barriers to CSOs were associated with a higher HIV prevalence among MSM in this study. These results provide individual empirical data showing how structural risks and discriminatory policies might contribute to HIV prevalence among MSM across sub-Saharan Africa. The findings of this study highlight the potential effect of decreasing enforcement or decriminalisation to optimise HIV prevention and treatment efforts. However, this study also highlighted the complexity of stigma affecting MSM, suggesting that policy reform alone will not eliminate stigma but that interventions addressing social and cultural drivers might support comprehensive stigma reduction.

Contributors
This manuscript was conceptualised by CEL, SMu, SB, JOTR, and KM. CEL, SMu, JOTR, and KM contributed to the analytical approach. The analyses were led by CEL. CEL and JOTR accessed and verified the data. JOTR reviewed and duplicated all analyses. The manuscript was drafted and finalised by CEL in collaboration with JOTR, KM, SMu, and SB. JOTR, KM, DD, IMN, IB, AK, UT, BC, MAD, E-PO, EK, AS, RGN, TAC, SMa, SK, J-PE, MK, GAM, CB, SMu, and SB provided a substantive review of the manuscript, contributed to the content, and provided feedback. CEL, JOTR, DD, IMN, IB, AK, UT, BC, MAD, E-PO, EK, AS, RGN, TAC, SMa, SK, J-PE, SMu, and SB contributed to the country-specific study design, implementation, and data collection. All authors had full access to all the data in the study and had final responsibility for the decision to submit for publication.

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