




BMJ Open Is Internalised Homonegativity associated with HIV testing and HIV risk behaviours of men who have sex with men: a multilevel cross-sectional study of sub-Saharan African countries

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ABSTRACT

Objectives This study assessed the associations of Internalised Homonegativity (IH) with HIV testing and risk behaviours of adult men who have sex with men (MSM) in sub-Saharan Africa (SSA) and effect modification by the legal climate.

Design We used data from the cross-sectional 2019 Global Lesbian, Gay, Bisexual, Transgender and Intersex (LGBTI+) Internet survey study.

Setting and participants Overall, the 2019 Global LGBTI Internet Survey collected data from 46 SSA countries. In this secondary analysis, we included data from 3191 MSM in 44 SSA countries as there were no eligible MSM responses in the 2 countries excluded.

Outcome measures Our response variables were self-reported binary indicators of ever tested for HIV, recently tested in the past 6 months (from those who reported ever testing), transactional sex (paying for and being paid for sex in the past 12 months), and unprotected anal sex (that is without a condom or pre-exposure prophylaxis (PrEP)) with a non-steady partner (in the past 3 months).

Results Our findings showed high levels of IH (range 1–7) in MSM across SSA (mean (SD)=5.3 (1.36)). We found that MSM with higher IH levels were more likely to have ever (adjusted OR (aOR) 1.18, 95% CI 1.03 to 1.35) and recently tested (aOR 1.19, 95% CI 1.07 to 1.32) but no evidence of an association with paying for sex (aOR 1.00, 95% CI 0.89 to 1.12), selling sex (aOR 1.06, 95% CI 0.95 to 1.20) and unprotected sex (aOR 0.99, 95% CI 0.89 to 1.09). However, we observed that a favourable legal climate modifies the associations of IH and paying for sex (aOR 0.75, 95% CI 0.60 to 0.94). Increasing levels of IH had a negative association with paying for sex in countries where same-sex relationships are legal. We found no associations of IH with unprotected anal sex in the population surveyed.

Conclusions We confirm that IH is widespread across SSA but in countries that legalise same-sex relationships, MSM were less likely to engage in transactional sex compared with those in countries where homosexuality is criminalised.

STRENGTHS AND LIMITATIONS OF THIS STUDY

- ⇒ This study used identical methods across countries to collect data from all the sub-Saharan Africa countries.
- ⇒ Using multilevel analysis, this study accounted for the hierarchical structure of the data.
- ⇒ Using the ecosocial theory of disease distribution and the minority stress model to guide this study broadened the scope of measures included and improved the conceptual and methodological rigour of the study.
- ⇒ This study used cross-sectional data, which limits the ability to draw causal inferences or determine temporality.
- ⇒ The generalisability of the data could be limited as men who have sex with men at the margins could have been missed, such as those living in rural locations, who might have lower socioeconomic backgrounds, and therefore, have limited access to the internet or gay communities.

INTRODUCTION

Globally, declines in the number of new HIV infections have stalled. In 2021, there were around 1.5 million new cases of HIV of which 58% were in sub-Saharan Africa (SSA).¹ Since 2010, there has only been a decline of new cases by 31%, which is a far cry from the United Nations Programmes on HIV/AIDS (UNAIDS) target of 75% by 2020.² In SSA, one of the population's disproportionately affected by HIV are men who have sex with men (MSM), who are five times as likely to be living with HIV than men in the general population.³

Countries in the region have adopted a combination of structural, behavioural and biomedical HIV prevention interventions for MSM to varying degrees, but the absence of

an enabling environment such as inclusive policies and access to non-stigmatising health services are greatly reducing their impact.⁴ Notably, more than half of the countries in the SSA region have failed to create an enabling environment, as many have laws that criminalise same-sex relationships.⁵ Structural discrimination such as same-sex criminalisation laws violate human rights and causes psychological harm that impacts the development of a sense of self in MSM.⁶

A psychosocial factor of particular interest to researchers has been Internalised Homonegativity (IH), which encompasses the internalisation of negative attitudes and assumptions about homosexuality, leading to feelings of guilt, inferiority and lack of self-worth.^{7 8} Studies examining IH in MSM have reported associations with the legal environment and increased HIV-risk behaviours.^{6 8} In criminalised climates, MSM report higher levels of human rights violations such as harassment and extortions by law enforcement and experiences of social rejection.⁹ Processing these chronic stressors result in internalisation which leads to developing either protective or harmful coping mechanisms. Researchers in Europe and the USA have reported IH as playing significant roles in HIV-related health outcomes of MSM but there is still very little known about IH and its related health vulnerabilities in SSA.^{8 10} Literature on South African, Nigerian and Ugandan MSM have reported both protective and negative outcomes of IH.¹¹ MSM with IH can adopt avoidance as a coping mechanism, including not seeking care or avoiding affiliations with other MSM. Coping through avoidance has implications for HIV control programming for MSM as effective methods to reach these hidden populations with HIV interventions rely on community networks. MSM who are not linked to any community groups as a result of IH or fear of legal repercussions might not be reached with vital HIV intervention messaging. With limited progress being made in reducing the number of new infections, there is an urgent need to understand the role of IH in the HIV epidemic in SSA MSM.

Using data from the 2019 Global Lesbian, Gay, Bisexual, Transgender and Intersex (LGBTI+) Internet survey, we report findings from multilevel analyses of MSM in 44 SSA countries. We measured the level of IH in SSA and examined the association of IH with HIV testing and HIV-risk behaviours of MSM in SSA. We then assessed effect modification by the legal climate.

METHODS

Study design and setting

We conducted a secondary analysis of data collected from the 2019 Global LGBTI+ Internet Survey. The study was a combined project of the Joint UNAIDS, the LGBT Foundation, the University of Aix-Marseille and the Medical School of the University of Minnesota.¹² The methods for the study have been described in detail elsewhere.¹² Briefly, adult LGBTI participants were recruited through

their social networks, for example, the LGBT Foundation social networks, as well as national and regional LGBTI or human rights community networks, advocates and celebrities. Facebook, Instagram, Twitter, WeChat, Weibo and WhatsApp advertisements promoting the study were also used. Facebook was the main promotion platform for countries without LGBTI dating apps and UNAIDS country teams supported creating visibility of the study in these locations. The questionnaire was disseminated online from May to December 2019 without any geographical restrictions in 32 different languages, 7 of which are official languages in SSA. Participation was voluntary and no monetary incentives were given. Participants accessed the online anonymous survey on SurveyMonkey via an encrypted connection link. The survey exclusion criteria were participants who did not provide consent, were under the age of 18 or did not provide a numerical value for age and those who did not self-identify as LGBTI+.

Overall, data were collected online from 46 SSA countries, and in these secondary analyses, we looked at data from 44 SSA countries. The two SSA countries excluded did not have responses from MSM. Our inclusion criteria were self-identified HIV-negative MSM, age 18 and over; born male; gay/bisexual/unsure and living in countries with available national HIV policy documents covering the survey time frame.

Theoretical frameworks

Meyer's minority stress model and Krieger's ecosocial theory of disease distribution were used to frame the study and guide the selection of study covariates.^{7 13 14} The minority stress model provides a focused theory for conceptualising internalised homophobia and its relationships with other outcomes of individual stress coping mechanisms by minority groups in response to chronic negative social experiences.¹⁵ In the model, the pathways to health outcomes are direct and contingent (online supplemental figure 1). For the direct pathway, Meyer theorises proximal stressors such as IH have the strongest direct effect on health-related outcomes and coping in the contingent pathway is primarily linked to health-related outcomes but as a mediating factor. Krieger's ecosocial theory of disease distribution is a comprehensive theory that provides a framework for studying how discrimination affects health. This theory proposes that we biologically embody exposures arising from our social and ecological contexts, leading to the observed disease distribution in the population.^{13 14}

Measures

Outcomes

Our response variables are self-reported binary indicators of ever tested for HIV, recently tested in the past 6 months (from those who reported ever testing), transactional sex (paying for and being paid for sex in the past 12 months) and unprotected anal sex (ie, without a condom or pre-exposure prophylaxis (PrEP)) with a non-steady partner in

Table 1 Principal component analysis of the short Internalised Homonegativity (IH) scale

Item	n with IH score	Factor		Dimensions
		1	2	
6 Homosexuality is morally acceptable to me	2715	0.81	0.18	Personal comfort with a gay identity
5 I feel comfortable being a homosexual man	2708	0.78	0.19	
7 Even if I could change my sexual orientation, I wouldn't	2642	0.69	0.15	
3 I feel comfortable being seen in public with an obviously gay person	2655	0.20	0.80	Public identification as gay
4 I feel comfortable discussing homosexuality in a public situation	2666	0.27	0.76	
2* Social situations with gay men make me feel uncomfortable	2543	-0.16	0.50	Social comfort with gay men
1* I feel comfortable in gay bars	2357	0.36	0.43	

Extraction method; maximum likelihood; rotation method; Promax with Kaiser off. Loadings of 0.4 or larger are in bold.

*Measure not included in the final analysis.

the past 3 months (defined as a casual sexual partner or multiple partners).

Exposure variables

We included measures of country-level and individual-level covariates identified in the literature to have associations with IH and the study outcomes.^{16–18}

Main exposure

The main exposure variable IH is measured using a shorter five-item version of the validated seven-item IH scale with three factors.¹⁶ Each item is measured on a 7-point Likert scale (1=lowest IH score to 7=highest level of IH). We adapted this scale to a shortened five-item version for use in this study due to high levels of missingness in the data (see the Result section on IH). The five-item scale had two IH factors, namely (1) factor measuring personal comfort with homosexuality with three items and (2) factor measuring public identification as gay (PUBID) with two items (see table 1 for components of the items). The scores were additive, ranging from 1 (strongly agree) to 7 (strongly disagree). For example, the first item from the factor measuring personal comfort with homosexuality, 'even if I could change my sexual orientation, I would not'; denoted a positive attitude to a homosexual identity and was assigned a score of 1 for strongly agree, 4 for undecided and 7 for strongly disagree. All the scores were added, and the average was calculated. A higher IH score represents higher levels of IH. The scores were used as a continuous measure in the analysis. We conducted exploratory factor analyses 'principal component analysis (PCA)' with oblique rotation, to verify the factorial structure of the seven-item IH scale in the sample of SSA MSM (see the Results section for the full details).

Country-level variables

We included two country-level covariates in the models: legal climate and targeted HIV policy. Countries are classified as legal or illegal based on whether same-sex relationships are or are not criminalised, using the legal classification reported in the International Lesbian, Gay, Bisexual, Trans and Intersex Association.¹⁷ We included

targeted policy, measured as none, partial or full inclusion of the WHO recommended interventions for MSM in the national HIV policies covering the survey period.^{18 19}

Individual-level variables

All individual-level measures used in the analysis are based on self-reported data.

Covariates

Demographic, socioeconomic and geographical explanatory variables collected in the survey are used as covariates, such as age measured in four categories; education measured as none/primary school, Secondary/high school, university first degree and masters/doctorate; reports of economic pressure of respondents scored between 1 and 5 as ordinal categorical data. The higher the score, the lower the economic pressure and therefore presumed higher income; and size of settlement was measured on a 3-point scale ranging from 'a major city, a medium or small size city and a village/farm or isolated house.

Study size

Forty-four SSA countries and 3275 Adult MSM were potentially eligible. After we applied the eligibility criteria, 44 countries and 3191 MSM were retained. We could not access the HIV policy documents in six of the countries included in our analysis, so these were coded as providing no targeted interventions for MSM. The assumptions were that a lack of an HIV policy would mean that there would not be any targeting of key populations, and even if the policy had MSM-specific interventions, the fact that it is not widely available means that it is unlikely to be affecting policy.

Statistical methods

All statistical analyses were conducted on Stata/SE V.17.0.

We used descriptive statistics to summarise the distribution of our study outcomes and IH distribution by legal climate and sociodemographic characteristics of MSM including age, education, sexual orientation, income and type of place of residence.

We applied logistic two-level multilevel analyses to study the associations of IH with the study outcomes. The hierarchical structure had individuals at level 1 (n=3191) nested within 44 countries at level 2. Using multilevel models, we explored between-country variation in HIV-related behavioural outcomes. The estimation procedure used was the maximum likelihood estimation procedure using adaptive quadrature points (7 integration points used unless otherwise stated), which is the only procedure in Stata.²⁰

We performed bivariate multilevel analyses with country as random effects, to assess the associations of IH with the country-level and individual-level covariates. Keeping country as random effects, we included fixed effects adjusted for all country-level and individual-level explanatory variables (online supplemental appendix pp1, model equation 1). Finally, we performed a cross-level interaction. We allowed the effect of IH on HIV testing and risk behaviour outcomes to depend on the legal climate and include an interaction between IH and legal climate (online supplemental appendix pp1, model equation 2). For each model, we used the margins command to obtain predicted probabilities for ever testing by MSM with IH in countries where same-sex relationships are legal and illegal. These steps are then repeated for all outcome variables.

Missingness

We conducted a systematic assessment of missingness for each variable. We tabulated each item on the scale to assess the missingness and also reviewed patterns of missingness by covariates. All but the IH variables were considered to be missing completely at random with less than 4% missing data. We determined that the IH variable mechanism of missing data was missing at random (MAR). We applied multiple imputation (MI) using fixed effects suitable for multilevel models to handle the missing data in the variables used in the models (online supplemental appendix pp2).

Sensitivity analyses

We conducted sensitivity analyses for all the study outcomes by comparing complete case analysis results with those from MI analysis.

Patient and public involvement

Patients were not involved.

RESULTS

Internalised Homonegativity

There was large amount of missingness in the main study exposure IH using the initial 7-item scale with 3 factors (n=1079 (33.9%)). After tabulating each item on the IH scale, we found that the data were MAR and over 25% of the responders had missing values for the factor measure for 'social comfort with gay men (SC)', which included items 'I feel comfortable in gay bars' and 'social situations

with gay men make me feel uncomfortable'. The Kaiser-Meyer-Olkin (KMO) measure confirmed the sampling adequacy of the analysis, KMO=0.760. Bartlett test of sphericity $\chi^2(21)=2934.894$, $p<0.001$, indicated that the correlation structure was adequate for factor analysis.

In the PCA with promax rotation, 2 factors were extracted with good internal consistency, Cronbach's alpha=0.704 (see table 1). The results showed that the two items measuring SC do not correlate with each other or with the other items (online supplemental tables 1 and 2). The decision was made to drop these items and use the IH measure as a five-item scale. Retained factors included:

Factor 1: 'Personal comfort with a gay identity' includes the same two items from the original measure.

Factor 2: 'PUBID' includes the same three items from the original measure.

Overall, the mean IH scores using the 5-item scale were 5.3, SD 1.36, with national-level mean ranging from 4.1 to 7.0 (online supplemental table 3). We used multiple imputation to handle the remaining missing data (21.6%).

Descriptive analysis

Among the MSM included in the study, 2743/3188 (86.0%) were ever tested, 1818/2743 (66.3%) were recently tested in the past 6 months, 566/2759 (20.5%) reported paying for sex in the past 12 months, 688/2754 (25.0%) have been paid for sex in the past 12 months, and 1030/2,549 (40.4%) have had unprotected anal sex in the past 3 months. Mean IH level across SSA was 5.3 (SD 1.36), range 4.1–7.0, in non-criminalised countries, mean IH was 5.6 (SD 1.32), range 4.4–7.0. In criminalised countries, mean IH was 5.0 (SD 1.35), range 4.1–6.0. Table 2 describes the bivariate distribution of IH and key explanatory variables in the analytic sample. The median age category was 24–34, 1403/3185 (44.1%), the proportion of respondents with above secondary education 1670/3150 (53.0%), most of the respondents resided in major cities, 1896/3150 (60.2%) and most self-identified as single 1818/3073 (59.2%). There was strong evidence of a positive association of IH with increasing age, sexual orientation and being in a relationship. We observed a negative association of IH with increasing levels of education.

IH and HIV testing behaviours

In the models adjusted for country-level and individual-level covariates (see table 3 and online supplemental table 4), there was a strong evidence of a positive association of IH with increased odds of MSM having ever tested (adjusted OR (aOR) 1.18, 95% CI 1.03 to 1.35) and recently tested (aOR 1.19, 95% CI 1.07 to 1.32).

HIV risk behaviours

After adjusting for country-level and individual-level characteristics, there was no evidence of an association of IH with HIV risk behaviours of paying for sex (aOR 1.00, 95% CI 0.89 to 1.12), selling sex (aOR 1.06, 95% CI 0.95

Table 2 Study characteristics by Internalised Homonegativity (IH) (n=44 countries)

Sociodemographic factors	IH n=2503 (%)	5.36 (1.36)		P value*
	n (%)	M	SD	
Age	2501	5.32	1.36	0.002
18–24	969 (38.7)	5.27	1.38	
25–34	1102 (44.1)	5.26	1.33	
35–44	294 (11.8)	5.49	1.43	
45+	136 (5.4)	5.81	1.18	
Sexual orientation, n (%)	2485	5.33	1.36	<0.001
Gay	1853 (74.6)	5.51	1.29	
Bisexual	572 (23.0)	4.82	1.40	
I don't know	60 (2.4)	4.57	1.70	
Relationship status, n (%)	2445	5.33	1.36	<0.001
Single	1456 (59.6)	4.79	1.38	
In a relationship with a man	740 (30.3)	5.60	1.25	
In a relationship with both a man and woman, or woman or transgender person	250 (10.2)	5.28	1.37	
Socioeconomic status				
Education, n (%)	2496	5.32	1.36	0.002
None/primary school	159 (6.4)	5.29	1.25	
Secondary/high school	1014 (40.6)	5.44	1.31	
University first degree	974 (39.0)	5.30	1.36	
Masters/doctorate	349 (14.0)	5.05	1.47	
Income, n (%)	2466	5.32	1.36	0.218
Really struggling on present income	350 (14.2)	5.29	1.34	
Struggling on present income	663 (26.9)	5.23	1.31	
Neither comfortable nor struggling on present income	915 (37.1)	5.30	1.38	
Living comfortably on present income	328 (13.3)	5.49	1.36	
Living really comfortably on present income	210 (8.5)	5.48	1.44	
Type of place of residence				
Size of settlement, n(%)	2496	5.35	1.34	0.359
Farm/isolated house/village	200 (8.0)	5.28	1.33	
Medium or small size city	783 (31.4)	5.34	1.38	
Major city	1513 (60.6)	5.32	1.36	
Structural variables				
Legal climate	2503	5.32	1.36	0.011
Criminalised	1089 (43.5)	5.00	1.35	
Non-criminalised	1414 (56.5)	5.67	1.32	

Descriptive sample characteristics reported here are before multiple imputation to address missing data.

*In random effects model adjusted for country as random effect, P value was calculated using multivariate Wald test (joint χ^2).

to 1.20) and unprotected sex (aOR 0.99, 95% CI 0.89 to 1.09) (see [table 3](#) and online supplemental table 4).

Cross-level interaction between legal climate and IH

To assess if the legal climate modifies any of the relationships of IH with the study outcomes, we added an interaction term to the model (see [table 4](#) and online supplemental table 5). We found that the legal climate moderates the association between IH with transactional

sex in SSA MSM. IH was associated with reduced odds of paying for sex (aOR 0.75, 95% CI 0.60 to 0.94) by MSM in countries where same-sex relationships are legal and with increased odds of paying for sex (aOR 1.15, 95% CI 0.98 to 1.36) by MSM in same-sex criminalised settings. There was suggestive evidence where the CI crossed but were close to null that predicted odds of ever testing by MSM increased with increasing IH levels in countries where

Table 3 Multilevel logistic regression OR and 95% CI HIV testing and HIV risk behaviours

	Ever tested	Recent tested	Paid for sex	Sold sex	Unprotected sex
n (countries)	43	43	43	42	42
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
IH (range 1–7)*	1.18 (1.03 to 1.35)	1.19 (1.07 to 1.32)	1.00 (0.89 to 1.12)	1.06 (0.95 to 1.20)	0.99 (0.89 to 1.09)
Legal_climate: Ref=illegal					
Legal	2.36 (1.18 to 4.74)	1.16 (0.76 to 1.76)	0.88 (0.53 to 1.46)	1.39 (0.68 to 2.84)	1.10 (0.70 to 1.76)
Random effects variances					
Country level	2.41 (1.80 to 3.23)	1.70 (1.44 to 2.00)	1.79 (1.47 to 2.17)	2.69 (2.01 to 3.60)	1.84 (1.53 to 2.22)
Variance partition	0.211	0.139	0.166	0.231	0.156

Model adjusted for age, attraction, relationship status, education, income and size of settlement. Full results are available in online supplemental table 4.

*Standardised values of the IH score.

aOR, adjusted OR; IH, Internalised Homonegativity.

same-sex relationships are legal (aOR 1.29, 95% CI 0.98 to 1.69), compared with the increased predicted odds of ever testing (aOR 1.04, 95% CI 0.86 to 1.26) in countries where same-sex relationships are illegal. In contrast, we found suggestive evidence that MSM in countries where same-sex relationships are illegal had increased odds of recent testing (aOR 1.15, 95% CI 0.99 to 1.35), compared with the increased predicted odds in countries where same-sex relationships are legal (aOR 1.06, 95% CI 0.86 to 1.30).

Sensitivity analyses

In the sensitivity analyses, we observed minimal changes in the effect estimates using complete-case analysis (online supplemental tables 6 and 7). The strength of the effect modification by the legal climate on the association between IH with ever testing became stronger (aOR 1.40, 95% CI 1.07 to 1.85).

DISCUSSION

Our findings show high levels of IH in MSM across SSA. We found that with increasing IH levels, MSM living in SSA were more likely to have ever tested and recently tested. We found no associations of IH with transactional sex and unprotected anal sex in the population surveyed. However, after we account for the effect modification of the legal climate, we found that the legal climate modified

the effect of IH with transactional sex. We observed that as levels of IH increased, MSM in countries with legalised same-sex laws were less likely to pay for sex while MSM in countries where same-sex relationships are criminalised were more likely to pay for sex in the past 12 months. There was suggestive evidence of effect modification of the association between IH with ever testing and recent testing by the legal climate. Although the results did not achieve statistical significance at $\alpha=0.05$, the findings are in the expected direction, so could support additional inquiry on the topic. With increasing IH levels, MSM in countries where same-sex relationships are legal had higher odds of ever testing than those in countries where same-sex relationships are illegal but increased odds of recent testing by MSM in countries where same-sex relationships are illegal than those in countries where same-sex relationships are legal. No effect modification of the legal climate on selling sex or unprotected anal sex was observed.

Compared with the mean national level of IH found in SSA MSM, MSM across European countries (EMIS study) reported lower mean national levels of IH (range 1.22–2.58), although measured using the 7-item IH scale.⁸ Importantly, another study on the European data showed that the seven-item IH scale was useful for people who identified themselves as gay, but not for those who identified as bisexual, who presumably did not identify as

Table 4 Predicted margins for Ih interaction with legal climate and all study outcomes

	Ever tested	Recent tested	Paid for sex	Sold sex	Unprotected sex
	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)	aOR (95% CI)
IH×legal_climate	1.29 (0.98 to 1.69)	1.06 (0.86 to 1.30)	0.75 (0.60 to 0.94)	1.05 (0.83 to 1.33)	0.93 (0.77 to 1.13)
IH at legal	1.29 (0.98 to 1.69)	1.06 (0.86 to 1.30)	0.75 (0.60 to 0.94)	1.05 (0.83 to 1.33)	0.93 (0.77 to 1.13)
IH at illegal	1.04 (0.86 to 1.26)	1.15 (0.99 to 1.35)	1.15 (0.98 to 1.36)	1.05 (0.89 to 1.25)	1.02 (0.89 to 1.18)

Model adjusted for age, attraction, relationship status, education, income and size of settlement. Full results are available in online supplemental table 5.

aOR, adjusted OR; IH, Internalised Homonegativity.

homosexual leading to lower IH scores.¹⁶ In addition, our findings suggested that IH in SSA MSM resulted in a positive choice of coping with minority stress, evidenced by increased utilisation of HIV testing services. The effects of IH on MSM in the SSA context are different to MSM in the European context where increases in IH levels resulted in a reduction in HIV testing and increased condomless sex with non-steady partners.⁸ Studies in the USA comparing IH levels across different races found African American MSM to have higher IH levels compared with European American, Latino and MSM of other races/ethnicities, but the levels reported were still not as high as those we report in our SSA sample.¹⁰ This could be due to socio-cultural factors such as politics, religion, laws, culture and other historical factors that influence the gender norms that exist within societies and impact the daily interactions of SSA MSM.²¹ This is also in line with Meyer's assertion that IH is socially based and therefore unique to their minority status.⁷ Findings of the association of IH with HIV risk behaviours in SSA are varied. The impact on health seems to be determined by the legal climate, as this sets the boundaries for coping resources available to SSA MSM. As emphasised by the ecosocial theory, simultaneously focusing on exposure, susceptibility and resistance provide evidence on the important pathways of embodiment across multilevels, along with factors that affect susceptibility and resistance to exposure. In part, our findings on HIV-related risk behaviours are similar to those reported by other researchers in SSA. In a South African study, IH was found to have a protective effect on sexual risk behaviours of MSM.²² In contrast, studies of MSM in Nigeria and Uganda found that increasing levels of IH were associated with increased sexual-risk behaviour but not with transactional sex.^{11 23} It is important to note that studies on IH associations have used various scales in measuring IH with varying reliability and validity and there is still limited research related to the measure of IH in SSA MSM.

While high IH levels are reported in both legal and illegal climates in SSA, an important distinction influencing health outcomes could be the availability of social networks in countries where same-sex relationships are legal. Laws criminalising same-sex relationships can include the prohibition of any homosexual clubs or group gatherings, depriving MSM access to group support.¹⁷ LGBTI online networking sites could be a source for accessing peer support for MSM in hostile settings, but this also has limited accessibility for those from lower socioeconomic backgrounds or not in major cities.²⁴ Unsurprisingly, items measuring SC had the highest percentage of missingness in our data, which we theorise to be yet another outcome of the barriers in operating social spaces for LGBTI+ communities in countries that criminalise same-sex relationships. If there are not opportunities to mingle with other MSM safely, then these items may be too culturally bound to the assumed existence of a gay subculture. The findings from the PCA provided further evidence in support of the uniqueness of these

items measuring social comfort in our dataset. Complex social factors at the individual-level such as enacted and anticipated stigma and discrimination can also contribute to the high levels of IH in SSA MSM.²⁵ Many countries with legalised same-sex laws score quite low on their LGBT Global Acceptance Index, which is an index that combines a measure of public beliefs regarding LGBTI people and policies.²⁶ Such contrasts in legal climate and social climate can provide some understanding of why researchers still report high levels of violence and discrimination against MSM in countries with legalised same-sex relationships in SSA.^{27 28} Such contrasts between social and legal factors can also explain why MSM in our study living in countries where same-sex relationships are legal reported higher levels of IH compared with those in same-sex criminalised settings. In addition, the opportunities to socialise and to live openly could also mean that MSM in same-sex legalised settings are more likely to experience circumstances in the social environment that lead to exposure to minority stressors such as discrimination or violence as proposed in the minority stress model.⁷ Such experiences involve minority stress processes which are more proximal to the individual, resulting in IH.

IH has also been found to have associations with the selection of both positive and negative coping strategies.²⁹ While some LGBTI choose avoidance as a coping mechanism, others choose acceptance of their sexual identity. The type of coping mechanism chosen then determines if IH has a detrimental health impact or not. As such, MSM in our study from countries where same-sex relationships are legal most likely have greater opportunities to choose positive coping mechanisms. As an example, research suggests that the opportunities for and risks in engaging socially are more important determinants than the function of internalisation.^{10 15} In the minority stress model, access to social support is an important coping mechanism for dealing with minority stress.¹⁵ Belonging to a community can lessen the psychological aspect of stress process, most especially for single MSM.^{30 31} Research has shown that in the absence of group-level resources, even the most resourceful individuals have been found to struggle to cope.⁷ Furthermore, MSM will tend to hold themselves to the values of the group rather than that of the dominant culture.⁷ A study in South Africa found that sexual-risk behaviours of MSM were linked to MSM social network affiliation.³² Peers have been an effective way of reaching MSM with information on sexual health interventions and linkage to safe health facilities to access testing services.^{33–35} It is plausible that MSM that are disconnected from peers or LGBTQ+ networks are less likely to meet sexual partners socially and will also have less access to peer information/support for safer sex.³⁶

Important considerations should be applied in generalising our findings. A limitation of our study is the over representation of highly educated MSM and those from urban areas, which can be a result of this being an internet-based study using purposive sampling methods. MSM on the fringes are more likely to be living in poverty



and are the ones more likely to have less access to HIV prevention services, sell sex and have less power to negotiate condom use. Another limitation is that this study used cross-sectional data, which limits the ability to draw causal inferences. Nevertheless, this study expands the limited knowledge base of data on IH from SSA countries. Additionally, it is the first to use identical methods to collect data from a large sample of SSA countries and to use multilevel analysis to account for the hierarchical structure of the data and simultaneously account for country-level and individual-level explanatory variables.

Our study highlights that IH is high across SSA compared with European MSM populations. We highlight that structural homophobia, measured using IH, potentially defines the boundaries of MSM's ability to cope with minority-related stressors, resulting in sexual risk outcomes of increased likelihood of paying for sex compared with those in environments where same-sex relationships are legal. We emphasise that the removal of legal barriers is an essential important first step but the complex social factors at play within each country require a comprehensive approach to interventions for MSM in SSA. This includes integrating psychosocial support as an essential intervention for MSM in SSA.

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