



HIV Stigma, Homophobia, Sexual and Gender Minority Community Connectedness and HIV Testing Among Gay, Bisexual, and Other Men and Transgender People Who Have Sex with Men in Kazakhstan

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Abstract

Although HIV incidence is rising among gay, bisexual, and other men (MSM) and transgender people who have sex with men (TSM) in Kazakhstan, whether stigmatizing attitudes and connectedness are associated with HIV testing in this region is not known. We analyzed data from one-time interviews with 304 adult MSM and TSM conducted 2018–2019 in three cities in Kazakhstan. Logistic regression determined whether HIV stigma, internalized homophobia, sexual and gender minority (SGM) connectedness predicted HIV testing (within the lifetime, past year, and past 6 months) before and after adjustment for sociodemographic characteristics. 80% of participants reported ever receiving an HIV test. Gay-identified participants reported less HIV stigma and internalized homophobia as well as greater connectedness relative to those with bisexual or other identities. In adjusted models, those who had ever tested reported lower HIV stigma (aOR 0.83, 95% CI 0.76–0.91, $P < .001$) and higher connectedness (aOR 1.17, 95% CI 1.06–1.29, $P = .003$) than those who had not; those who had ever tested reported lower internalized homophobia in the unadjusted model only (OR 0.95, 95% CI 0.91–0.99, $P = .01$). Similar differences and trends were found in models examining testing in the past year and past 6 months. Addressing stigmatizing attitudes and connectedness may improve uptake of HIV testing among MSM and TSM in Kazakhstan.

Keywords Kazakhstan · HIV testing · MSM · Transgender populations · HIV stigma · Homophobia · Social connectedness

Resumen

Aunque la incidencia del VIH está aumentando entre homosexuales, bisexuales y otros hombres (HSH) y entre personas transgénero que tienen sexo con hombres (TSM) en Kazajistán, se desconoce si las actitudes estigmatizantes y la conexión están asociadas con las pruebas del VIH en esta región. Analizamos datos de entrevistas únicas con 304 HSH adultos y TSM realizadas en 2018–2019 en tres ciudades de Kazajistán. La regresión logística determinó si el estigma del VIH, la homofobia internalizada, la conexión de las minorías sexuales y de género (SGM) predijeron la prueba del VIH (durante la vida, el año pasado y los últimos 6 meses) antes y después del ajuste por características sociodemográficas. El 80% de los participantes informaron haber recibido alguna vez una prueba de VIH. Los participantes identificados como homosexuales informaron menos estigma del VIH y homofobia internalizada, así como una mayor conexión en relación con aquellos con identidades bisexuales u otras. En modelos ajustados, aquellos que alguna vez se habían hecho la prueba informaron un menor estigma

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del VIH (ORa 0,83, IC del 95% 0,76-0,91, $P < 0,001$) y una mayor conectividad (OR 1,17, IC del 95% 1,06-1,29, $P = 0,003$) que aquellos quien no lo había hecho; aquellos que alguna vez habían realizado la prueba informaron una menor homofobia internalizada solo en el modelo no ajustado (OR 0,95; IC del 95%: 0,91-0,99; $p = 0,01$). Se encontraron diferencias y tendencias similares en modelos que examinaron las pruebas en el último año y los últimos 6 meses. Abordar las actitudes estigmatizantes y la conexión pueden mejorar la aceptación de las pruebas del VIH entre los HSH y TSM en Kazajistán.

Introduction

In stark contrast to the reduction in HIV transmission and HIV/AIDS-related mortality achieved by public health efforts across most regions of the world since 2000, HIV incidence has risen in Kazakhstan among gay, bisexual, and other cisgender men as well as transgender individuals who have sex with men (MSM and TSM, respectively) [1, 2]. Studies suggest that between 2013 and 2017, prevalence among MSM jumped from 1.2 to 6.2%; additional estimates suggest that 10–20% of MSM in Kazakhstan may be living with HIV [1, 3, 4].

Increasing uptake of HIV testing so that 90% of people living with HIV (PLWH) are aware of their status constitutes the first step of the UNAIDS 90-90-90 strategy to end the epidemic [5]. Given the paucity of research in this region, however, rates of HIV testing among MSM and TSM are not well-established. Recent studies suggest that less than 50% of MSM in Kazakhstan have received an HIV test and up to half of those living with HIV may be unaware of their status [4, 6]. Additionally, MSM in this setting appear to be less likely to access testing compared to other populations [2].

Establishing how “internal and external stigma experienced by key populations most affected by the epidemic” shapes engagement with the care continuum, including HIV testing, is a priority laid out in the National Institutes of Health’s strategic plan for HIV and HIV-related research [7] [p.12]. Among MSM and TSM in other national contexts, multiple forms of stigma related to HIV [8, 9] as well as minority sexual and gender identities [9–13] are well-established barriers to engagement in HIV testing. Although HIV stigma is associated with less frequent HIV testing among women in Kazakhstan [14], to our knowledge no studies have examined how stigma is linked to testing among MSM and TSM in this context.

Negative attitudes about HIV/AIDS and PLWH—for example, the belief that HIV/AIDS only affects people who possess negative qualities, and that PLWH should be punished, avoided, or rejected—are a form of HIV stigma that is linked with lower rates of HIV testing across a variety of national contexts, including China [9], South Africa [15, 16], Tanzania [16], Zimbabwe [16], Thailand [16], and Sierra Leone [17]. Likewise, studies show that negative attitudes about one’s own minority sexual identities and behavior, commonly referred to as internalized homophobia or homonegativity, are associated with relatively lower uptake

of HIV testing in El Salvador [10], the US. [18], China [19], Canada [20], and across 38 European countries [21]

On the other hand, connectedness to sexual and gender minority communities is a psychosocial factor positively associated with engagement with prevention [22, 23] and HIV testing in Western contexts [24–27]. Qualitative research conducted with gay and bisexual men in Scotland suggests that this association is driven, in part, by SGM community testing norms, a sense of responsibility to other SGM people, and community-based social support [28]. To our knowledge, the significance of community connectedness among MSM and TSM in Kazakhstan has not been examined. Taken together, the dearth of research into how barriers and facilitators established in other contexts are associated with HIV testing in Kazakhstan critically limits knowledge and therefore efforts to improve uptake of HIV testing in this region.

The rapid rise in HIV incidence in recent years suggest that in order to improve uptake of HIV testing among MSM and TSM, the link between testing and stigma and connectedness must be examined, not assumed—especially given the unique evolution of Kazakhstan’s sociopolitical landscape. Under Russian Tsarist and later Soviet rule, forms of same-gender sexual activity and gender non-conformity among men that were previously commonplace became prohibited and then formally criminalized from 1934 to 1997 within now-Kazakhstan [29]. Today, sexual and gender minorities and PLWH are heavily stigmatized and face discrimination, harassment, and violence from employers, state actors such as politicians and police, and family members [29, 30]. Same-sex marriage is illegal and SGM people are not legally protected from discrimination [30]. Recent surveys suggest that up to 70% of people in Kazakhstan hold discriminatory views toward PLWH [2]. Although SGM people are becoming increasingly visible in Kazakhstan, access to SGM-specific NGOs and community centers remains low and stigmatization and changing political landscapes have led to inconsistent prioritization and provision of HIV testing and care [1]. Learning more about how stigma and connectedness relate to testing within MSM and TSM populations in Kazakhstan is necessary to increase rates of HIV testing to meet the goals put forth in the UNAIDS 90-90-90 plan [5].

We utilized data collected in 2018 and 2019 from 304 MSM and TSM in Kazakhstan to determine associations between HIV stigma, internalized homophobia, sexual and

gender minority community connectedness and HIV testing. In light of patterns established in other geopolitical contexts, we hypothesized that higher levels of HIV stigma and internalized homophobia would be associated with lower odds of HIV testing, whereas higher levels of connectedness to the SGM community would be associated with higher odds of testing.

Methods

Data were collected as part of an ongoing NIDA-funded clinical trial of an intervention designed to increase the engagement of MSM and TSM who use substances in Kazakhstan in the HIV care continuum. Briefly, the intervention is being tested in 3 cities—Almaty, Nur-Sultan (formerly Astana), and Shymkent—using a stepped wedge design. The main phase of the study began in 2018 with all cities in the “pre-implementation” phase, which was followed by implementation in each city, spaced 6 months apart.

Participants

Data reported herein represent data collected via structured baseline interviews with gay, bisexual, and other men and transgender individuals who have sex with men in all three cities—the first data collection point for study participants. All participants who completed baseline interviews between August 2018 and February 2019, before the intervention of interest was implemented in any city, were included in this study ($N = 304$).

Respondents were recruited from mapping-identified venues categorized as study field offices, community sites, and digital social networks. Examples of community sites include sexual health clinics, NGOs, bars, and saunas. Digital social network recruitment took place online through platforms such as VKontakte, Facebook, Grindr, and other apps or websites catering to or frequented by sexual and gender minorities. Enrolled participants also referred people from their social networks to study personnel for screening.

Eligible participants were 18 years and older, assigned male at birth or identified as men at any time, reported at least one incident of binge drinking or illicit substance use in the past 90 days, and reported non-coerced sex with a man within the past 12 months. Participants answered the last question using their own definitions of “sex” and “man,” and therefore this sample may include people who—for example—engaged in oral or genital sex with cisgender or transgender men.

Data Collection and Procedures

Trained research personnel administered computer assisted structured interviews (CASI) in Russian or Kazakh in each city. Baseline instruments utilized measures already developed and utilized in prior and ongoing HIV and substance use studies by the investigative team in Kazakhstan [31, 32]. New measures specifically for this study and target population were adapted from the English version, translated and back translated into Russian and Kazakh, and pilot tested with a small sample in Almaty.

Measures

HIV Testing

Participants self-reported HIV testing history. For this study, we examine three outcomes—whether a participant reported having: ever received an HIV test in their lifetime (yes or no); received an HIV test within the past 12 months (yes or no); and received an HIV test within the past 6 months (yes or no).

HIV Stigma

To measure HIV stigma, we used nine questions from Genberg and colleagues’ instrument to assess negative attitudes about HIV/AIDS and perceived discrimination toward PLWH [33]. The present study included items from the instrument with intra-item correlation equal to or above 0.70 in the original study; this criterion resulted in the exclusion of items designed to measure community-level stigma. Specifically, we included 6 questions Genberg and colleagues categorized as negative attitudes toward PLWH, such as “People living with HIV/AIDS deserve to be punished,” and three questions designed to capture attitudes about equity for PLWH, for example: “People living with HIV/AIDS should be treated the same as everyone else.” Participants responded to these questions along a 4-point Likert-scale (0–3; 0 = “Strongly disagree”; 1 = “Disagree”; 2 = “Agree”; 3 = “Strongly agree”). Three variables were reverse-coded so that across all nine statements, higher scores indicate endorsement of negative attitudes. Scores were summed to create a composite measure, *HIV stigma* ($\alpha = 0.93$; range = 0–27).

Internalized Homophobia

Likewise, a composite measure of internalized homophobia was created by summing the scores of participant responses along a 5-point Likert scale (0–4; 0 = “Strongly disagree”; 1 = “Disagree”; 2 = “Neither disagree nor agree”; 3 = “Agree”; 4 = “Strongly agree”) to nine questions

designed to assess negative attitudes about one's own minority sexual identity, attraction, and behavior using Herek and colleagues' [34] *internalized homophobia* scale ($\alpha = 0.88$; range = 0–36). Statements include questions such as “I have tried to stop being attracted to men in general” and “I feel that being [preferred sexual identity term] is a personal shortcoming for me”; higher scores correspond to agreement with statements indicative of internalized homophobia.

SGM Community Connectedness

This composite measure of perceived connectedness to the sexual and gender minority community was constructed using Frost and Meyer's 8-item instrument [35]. Participants responded along a 4-point Likert scale (0–3; 0 = “Strongly disagree”; 1 = “Disagree”; 2 = “Agree”; 3 = “Strongly agree”) to statements such as “I feel a bond with a sexual/gender minority community” and “I really feel that any problems faced by sexual/gender minority communities in [city of residence] are also my own problems.” Scores were summed to create the measure *SGM community connectedness* (8 items, $\alpha = 0.88$; range = 0–24), with higher scores indicating stronger and lower scores indicate weaker perceived connection to other sexual and gender minorities.

Covariates

To adjust for potential confounding factors in multivariable models, we included the following covariates (operationalized as): age group (18–24, 25–29, 30–34, and 35+); sexual orientation (gay, bisexual, or other); gender (cisgender man or transgender [or nonbinary] person); Kazakhstan citizenship (yes or no); city of current residence (Nur-Sultan, Almaty, or Shymkent); income; employment (full-time, part-time, student, and other); education (lower secondary or less completed, higher secondary or vocational completed, tertiary such as bachelor's degree or more completed); binge drinking (any compared to no instances of drinking five or more alcoholic beverages in a two hour period within the preceding 30 days); and substance use (any versus no non-prescription substance use within the preceding 30 days).

Statistical Analyses

For descriptive analyses, t-tests and one-way ANOVA with Tukey post-hoc tests were conducted to assess differences in mean HIV stigma, internalized homophobia, and SGM community connectedness by age group, gender, sexuality, income, employment, education, citizenship, city, binge alcohol and substance use. To evaluate the associations between independent variables and the outcomes of interest, HIV testing (0 = no/1 = yes), we used bivariate and multivariable logistic regression. Participants who reported receiving a positive HIV

test prior to 12 months before survey were excluded from models estimating associations between independent variables and testing within the past 12 months ($n = 283$); likewise, those who received a positive HIV test prior to 6 months before baseline were excluded from models estimating associations between independent variables and testing within the past 6 months ($n = 279$). In bivariate as well as multivariable models (adjusting for age group, gender, sexual identity, income, employment, education, citizenship, city, binge drinking, and substance use), odds ratios (OR) and 95% confidence intervals (CIs) were calculated for a one-unit increase in the scores of the continuous independent variables. Analyses indicated that responses and associations were not clustered by city, and therefore city was treated as a fixed effect. To develop confidence that findings captured associations with *intentional* HIV testing, we also assessed associations between independent variables and testing only at a regional HIV/AIDS Center (in Kazakhstan, we believe this serves as a proxy for voluntary testing) compared to not testing for HIV (lifetime, in the prior 12 months, and prior 6 months).

Results

Population Characteristics

Of the 304 participants, the vast majority were cisgender men (92%), with a smaller proportion being people who are transgender or another gender (e.g., nonbinary, genderfluid) (8%). People under 25 made up the largest age group (33%), although over a quarter of participants were age 35 or older. More than half of the participants identified as gay (54%), a little less than half identified as bisexual (42%), and a small group (4%) identified as something else (e.g., heterosexual or straight). In terms of socioeconomic status, half of participants were working full-time (51%), almost half had completed higher secondary education (49%), and a less than half had completed a bachelor's or higher degree (45%). Two fifths (42%), however, reported making less than 100,000 Kazakhstani Tenge (KZT)—equivalent to ~276 U.S. dollars at the time of data collection—per month. Almost all participants reported Kazakhstan citizenship (96%), and the largest proportion of participants resided in Almaty (46%). About two thirds (68%) of participants reported binge drinking in the preceding 30 days, and less than half (40%) reported non-prescription substance use during that time period (see Table 1).

HIV Stigma, Internalized Homophobia, and Connection to the SGM Community

The sample mean for HIV stigma scale score was 6.71 (SD 4.43; range 0–27), 15.07 (SD 7.27; range 0–36) for internalized homophobia, and 13.10 (SD 3.69; range 0–24) for

Table 1 Population characteristics and associations with HIV Stigma, Internalized Homophobia, and Connectedness to the Sexual and Gender Minority Community: MSM and TSM in Kazakhstan, 2018–2019 (N = 304)

	HIV Stigma			Internalized Homophobia			Connectedness to SGM Community		
	N (%)	Mean (SD)	t-test or ANOVA P value	Mean (SD)	t-test or ANOVA	P value	Mean (SD)	t-test or ANOVA	P value
Overall	304	6.71 (4.43)		15.07 (7.27)			13.10 (3.69)		
Age									
< 25 years old	101 (33.2)	6.45 (4.47)	$F_{3,300} = 0.79$	14.96 (7.25)	$F_{3,300} = 1.66$	.18	13.36 (3.33)	$F_{3,300} = 0.24$	.87
25–29 years old	72 (23.7)	6.87 (5.00)		16.64 (7.03)			12.93 (3.92)		
30–34 years old	48 (15.8)	6.14 (4.18)		14.06 (7.59)			12.98 (3.83)		
≥ 35 years old	83 (27.3)	7.23 (4.01)		14.43 (7.22)			13.01 (3.87)		
Gender									
Cisgender man	279 (91.8)	6.61 (4.44)	$t_{302} = 1.42$	14.99 (7.16)	$t_{302} = 0.69$	.49	13.11 (3.72)	$t_{302} = 0.09$	.93
Transgender or nonbinary person	25 (8.2)	7.92 (4.21)		16.04 (8.56)			13.04 (3.43)		
Sexual orientation									
Gay	164 (53.9)	5.52 (4.39)	$F_{2,301} = 14.57$	12.26 (6.53)	$F_{2,301} = 32.64$	< .001	13.93 (3.51)	$F_{2,301} = 10.19$	< .001
Bisexual	128 (42.1)	8.01 (4.04)		18.53 (6.72)			12.25 (3.48)		
Other	12 (3.9)	9.25 (4.35)		16.58 (6.33)			10.92 (5.38)		
Monthly Income									
< 100,000 KZT	127 (41.8)	6.86 (4.42)	$F_{3,300} = 0.74$	15.03 (7.18)	$F_{3,300} = 1.55$	.20	13.32 (3.70)	$F_{3,300} = 1.26$	.29
100,001–150,000 KZT	66 (21.7)	7.21 (4.65)		16.62 (6.54)			12.33 (3.41)		
150,001–200,000 KZT	42 (13.8)	6.38 (3.88)		14.33 (7.71)			13.48 (3.96)		
> 200,000 KZT	69 (22.7)	6.17 (4.57)		14.12 (7.72)			13.22 (3.74)		
Employment									
Full-time	154 (50.7)	6.90 (4.50)	$F_{3,300} = 3.39$	15.42 (7.23)	$F_{3,300} = 0.52$	.67	12.77 (3.70)	$F_{3,300} = 0.89$	.45
Part-time	82 (27.0)	7.17 (4.31)		15.02 (7.15)			13.42 (3.97)		
Student	35 (11.5)	4.51 (4.30)		13.71 (7.95)			13.37 (3.20)		
Other	33 (10.9)	7.03 (4.04)		15.03 (7.17)			13.61 (3.45)		
Education									
Lower secondary	18 (5.9)	9.78 (3.57)	$F_{2,301} = 7.96$	18.33 (5.88)	$F_{2,301} = 2.66$	.07	12.89 (2.37)	$F_{2,301} = 0.49$	.62
Higher secondary	149 (49.0)	7.14 (4.26)		14.38 (6.62)			13.32 (3.76)		
Bachelor's and above	137 (45.1)	5.85 (4.50)		15.40 (7.98)			12.90 (3.77)		
Citizen of Kazakhstan									
Yes	291 (95.7)	6.61 (4.48)	$t_{302} = 1.91$	14.96 (7.21)	$t_{302} = 1.29$	.20	13.15 (3.73)	$t_{302} = -1.02$	.31
No	13 (4.3)	9.00 (2.12)		17.62 (8.33)			12.08 (2.69)		
City									
Nur-Sultan	63 (20.7)	4.19 (4.33)	$F_{2,301} = 32.66$	13.43 (8.49)	$F_{2,301} = 3.21$	.04	13.63 (3.94)	$F_{2,301} = 0.84$	.43
Almaty	139 (45.7)	6.07 (4.44)		14.90 (7.14)			12.99 (3.96)		
Shymkent	102 (33.6)	9.15 (3.15)		16.32 (6.43)			12.92 (3.11)		

Table 2 Associations between HIV stigma, internalized homophobia, and connectedness to the sexual and gender minority community and HIV testing: MSM and TSM in Kazakhstan, 2018–2019

HIV testing	HIV stigma			Internalized homophobia			SGM Connectedness						
	Overall	OR (95% CI)	P value	aOR (95% CI)	P value	aOR (95% CI)	P value	aOR (95% CI)	P value				
Lifetime (N = 304)	243 (79.9%)	0.84 (0.77–0.90)	<.001	0.83 (0.76–0.91)	<.001	0.95 (0.91–0.99)	.01	0.96 (0.92–1.01)	.14	1.13 (1.04–1.23)	.003	1.17 (1.06–1.29)	.003
Past 12 mo. (n = 283 ^a)	173 (61.1%)	0.90 (0.85–0.95)	<.001	0.93 (0.86–0.99)	.03	0.97 (.94–1.00)	.06	0.99 (.95–1.03)	.75	1.11 (1.04–1.19)	.003	1.10 (1.01–1.19)	.02
Past 6 mo. (n = 279 ^b)	121 (43.4%)	0.94 (0.89–0.99)	.03	0.98 (0.92–1.05)	.61	0.98 (0.95–1.01)	.15	0.99 (.95–1.03)	.64	1.05 (.98–1.12)	.18	1.03 (.95–1.11)	.54

OR: Odds ratio. aOR: OR adjusted for age group, gender, sexual identity, income, employment, education, citizenship, city, binge drinking, and substance use. CI: Confidence interval

^aExcludes those reporting positive HIV tests prior to 12 months before baseline

^bExcludes those reporting positive HIV tests prior to 6 months before baseline

At the bivariate level, participants who endorsed more homonegative attitudes had significantly lower odds of ever testing for HIV (OR 0.95, 95% CI 0.91–0.99, $P = .01$). This association remained negative in the adjusted model (aOR 0.96, 95% CI 0.92–1.01, $P = .14$), but not statistically significant. Similar results were found in the models analyzing associations within the past 12 months (OR 0.97, 95% CI 0.94–1.00, $P = .06$; aOR 0.99, 95% CI 0.95–1.03, $P = .75$) and within the past 6 months (OR 0.98, 95% CI 0.95–1.01, $P = .15$; aOR 0.99, 95% CI 0.95–1.03, $P = .64$).

In contrast, participants who perceived themselves to be relatively more connected with the SGM community had higher odds of ever testing for HIV (OR 1.13, 95% CI 1.04–1.23, $P = .003$). This positive, significant association remained after adjustment (aOR 1.17, 95% CI 1.06–1.29, $P = .003$). For every one unit increase in perceived connectedness to sexual and gender minority communities, ranging from 0 to 24—the difference, for example, between answering “agree” and “strongly agree” on just one of 8 items assessing closeness—the odds of having received an HIV test increased 17%. Similarly, participants reporting feeling more connected had significantly higher odds of testing in the past 12 months according to bivariate (OR 1.11, 95% CI 1.04–1.19, $P = .003$) and adjusted (aOR 1.10, 95% CI 1.01–1.19, $P = .02$) models. Estimates of associations between connection with other sexual and gender minorities and testing within the past 6 months suggest a similar trend (OR 1.05, 95% CI 0.98–1.12, $P = .18$; aOR 1.03, 95% CI 0.95–1.11, $P = .54$).

Models with the constrained sample (excluding those who tested outside a regional/city AIDS Center) produced the same or very similar odds ratios as our primary models, in some cases with slightly lower p values (results available upon request). This provides evidence that study results are robust and likely to be conservative estimates of associations between independent variables and voluntary HIV testing within our sample.

Discussion

To our knowledge, this is the first study to investigate whether HIV stigma, internalized homophobia, and connectedness to the SGM community—known barriers and facilitators to HIV testing for MSM and TSM in other regions—are associated with HIV testing for these key populations in Kazakhstan. We found that in our sample, these psychosocial factors were associated with testing, which approximately 80% of our sample reported having ever received.

Specifically, in line with findings from studies examining a variety of different national contexts, we found a significant negative association between HIV stigma and HIV testing within one’s lifetime and the past year, as well as a

mirror, positive association between SGM community connectedness and lifetime and past year testing. Associations between stigma, connectedness and HIV testing within the past 6 months suggested similar trends and were not statistically significant (excepting the case of HIV stigma). Overall, these findings offer support that MSM and TSM in Kazakhstan who endorse stigmatizing attitudes about HIV are less likely to test for HIV, whereas those who perceive connectedness with sexual and gender communities are more likely to test for HIV.

Additionally, internalized homophobia had a smaller negative association with having ever been tested, which was not significant when adjusted for sociodemographic covariates. Similar results were found in models with HIV testing in the past 12 and 6 months. Our results suggest that MSM and TSM who internalize negative attitudes about their sexual and gender minority identities may be less likely to access testing in Kazakhstan.

HIV testing is the first pillar in the UNAIDS plan to end-the-epidemic [5]. Overall, MSM and TSM are engaging in HIV testing at suboptimal levels in Kazakhstan. Our findings suggest that HIV stigma and internalized homophobia are salient psychosocial factors that may be suppressing engagement in HIV testing in these key populations. Likewise, connection with other sexual and gender minorities may be bolstering testing among MSM and TSM in this region. These findings align with minority stress frameworks suggesting that relatively lower self-concept and social support as well as fear of acquiring a stigmatized social status partially drive negative associations between HIV stigma, internalized homophobia and HIV testing among SGM populations [8, 10, 12, 15, 34]. On the other hand, cultivating positive ties with other sexual and gender minorities is understood to encourage testing by improving social support and self-concept as well promoting testing as a community norm [10, 24, 28, 34]. Given that negative attitudes about PLWH, internalized homophobia, and level of connection to other sexual and gender minorities are psychosocial factors that are modifiable (or amenable to intervention), these findings hold implications for efforts to improve MSM and TSM engagement in the HIV care continuum in this region. Specifically, our study suggests that such efforts should address connectedness as well as attitudes about people living with HIV/AIDS and sexual and gender minorities.

Given that this is a retrospective cross-sectional study, however, we cannot say with absolute certainty that these factors are impacting testing behaviors. A plausible alternative explanation, for example, is that participants with higher levels of HIV stigma and internalized homophobia had been tested, but were less likely to disclose testing histories to interviewers. Likewise, if the local SGM community values regular HIV testing, people who are more connected to other SGM people may be relatively more likely to falsely report

HIV testing. In short, we cannot positively say that our findings reflect more than associations between psychosocial factors of interest and odds of self-reporting HIV testing among MSM and TSM. Past research, including qualitative research, however, suggests that this alternative explanation is unlikely [28]. Additionally, stigmatizing attitudes and perceived connection reported at the time of interview may vary from those held at the time of past testing. Further longitudinal and bio-behavioral research is therefore necessary to establish causality. Criteria for enrollment into this study included at least one incident of binge drinking or substance use in the past 90 days. Although we are not aware of evidence suggesting that drinking and substance use moderate the association between our factors of interest and HIV testing, it is possible that a study including MSM and TSM who do not meet our criteria may produce different results.

Between 2010 and 2020, the number of people living with HIV in Kazakhstan is estimated to have almost tripled [36]. As in many other national contexts, gay, bisexual, and other men as well as transgender people who have sex with men in Kazakhstan disproportionately shoulder the burden of HIV prevalence [1, 2]. Efforts to end the epidemic for MSM and TSM in Kazakhstan, however, are limited by a dearth of research and therefore insight into factors that shape engagement in the HIV care continuum. This study begins to address knowledge gaps particular to these populations by contributing urgently needed foundational insight into how core psychosocial factors impacting engagement in the HIV care continuum in other nations—HIV stigma, internalized homophobia, and community connectedness—are associated with HIV testing among MSM and TSM in this region. Our findings, contextualized within broader knowledge of how stigma, homophobia, and connectedness shape testing behaviors elsewhere, suggest that addressing HIV- and SGM-based stigma and cultivating sexual and gender minority community ties may bolster efforts to increase testing rates within these key populations in Kazakhstan.

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Declaration

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

Ethical Approval Approval was obtained from the Columbia University Human Subjects Review Committee and the Kazakhstan School of Public Health in Almaty, Kazakhstan.

Informed Consent Informed consent was obtained from all individual participants included in the study.

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