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The Relationship Between Sexual Behavior Stigma and Depression Among Men Who have Sex with Men and Transgender Women in Kigali, Rwanda: a Cross-sectional Study

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Abstract

To evaluate the role of sexual behavior stigma as a determinant of depressive symptoms among men who have sex with men (MSM) and transgender women (TGW) in Kigali, Rwanda. MSM/TGW aged 18 years were recruited using respondent-driven sampling (RDS) between March–August, 2018. Mental health was assessed using the Patient Health Questionnaire (PHQ-9). Sexual behavior stigma from friends and family, healthcare workers, and community members was assessed using a validated instrument. Multinomial logistic regression models were used to determine the association between sexual behavior stigma and depressive symptoms and depression. Secondary analyses further compared depression and depressive symptoms among MSM and TGW. Among the 736 participants included, 14% (106/736) identified as TGW. Depression 8.9% (RDS-adjusted, 7.6%; 95% CI, 4.6–10.6) and mild/moderate symptoms of depression 26.4% (RDS-adjusted, 24.1%; 95% CI, 19.4–28.7) were common and higher among TGW compared to MSM ($p < 0.001$). Anticipated (41%), perceived (36%), and enacted (45%) stigmas were highly prevalent, and were also significantly higher among TGW ($p < 0.001$). In multivariable RDS-adjusted analysis, anticipated (relative risk ratio (RRR), 1.88; 95% CI, 1.11–3.19) and perceived (RRR, 2.06; 95% CI, 1.12–3.79) stigmas were associated with a higher prevalence of depressive symptoms. Anticipated (RRR, 4.78; 95% CI, 1.74–13.13) and enacted (RRR, 3.09; 95% CI, 1.61–5.93) stigmas were also associated with a higher prevalence of depression. In secondary analyses, the significant differences between MSM and TGW were

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lost after adjusting for stigma. These data demonstrate a high burden of depressive symptoms and depression among MSM/TGW in Kigali. Conceptually, stigma is a likely antecedent of mental health stress among MSM and TGW suggesting the potential utility of scaling up stigma mitigation interventions to improve the quality of life and mental health outcomes among sexual and gender minority communities in Rwanda.

Keywords

Depression; Stigma; MSM (men who have sex with men); TGW (transgender women); Mental health; Rwanda

Introduction

Depression is a leading cause of disability and ill health worldwide, affecting more than 264 million people across all age groups (Friedrich, 2017). Up to 85% of affected people across low- and middle-income countries (LMICs) report not having access to treatment for depression and other mental health conditions despite existence of effective treatment modalities (Wang et al., 2007). Research in many high-income countries have shown a disproportionate burden of depression among members of sexual and gender minority communities. In the USA, one study found that cisgender men who have sex with men (MSM) were three times more likely to have symptoms of major depression than heterosexual men (Cochran, Mays, & Sullivan, 2003). Another study in the Netherlands found a 3-fold increased odds of depression and other mood disorders among MSM (T. G. Sandfort, Graaf, Bijl, & Schnabel, 2001), and a meta-analysis of studies in China found a pooled prevalence of depression among MSM that was 2.6 times that of the general population (Wei et al., 2020). Although not as extensively studied among MSM in Sub-Saharan Africa (SSA), high prevalence of depression has been reported ranging from 16% in Lesotho to 48% in Côte d'Ivoire (Ahaneku et al., 2016; Stahlman et al., 2015; Stoloff et al., 2013; Ulanja et al., 2019). This high prevalence of depression has been explained using the minority stress model suggesting that the excess of social stressors, such as discrimination and stigma, experienced by members of sexual minority communities leads to an excess in mental health disorders, including depression (Dentato, 2012; Meyer, 2003).

Sexual behavior stigma has been defined as the negative outlook and inferior status conferred by society on members of non-heterosexual groups (Herek, Gillis, & Cogan, 2009). Individual manifestations of sexual behavior stigma have been classified into three broad groups: enacted, felt (anticipated and perceived), and internalized stigmas (Herek et al., 2009). Enacted sexual stigma involves overt discriminatory actions; felt stigma entails the expectation of sexual stigma due to knowledge of how one's minority group is perceived; and internalized stigma, also referred to as self-stigma or internalized homonegativity, refers to the acceptance of sexual stigma as part of one's sense of self and values (Chi, Li, Zhao, & Zhao, 2014; Herek et al., 2009; Kane et al., 2019). All three forms of stigma have been reported to be associated with depressive symptoms among MSM and TGW in higher income countries; however, data supporting this association in SSA remains limited (Scheim et al., 2019; Secor et al., 2015; Stahlman et al., 2015). In Rwanda,

same-sex behaviors are not criminalized and there are no legal barriers to providing mental health screening and other health services for MSM and TGW (Mendos^o, 2019). Despite the non-criminalization, high levels of sexual behavior stigma and depressive symptoms have been described among MSM and TGW, especially among TGW in Kigali (Rwema, Lyons, et al., 2020). This increased burden of depression measured among TGW when compared with MSM have been explained by experiences of intersectional stigmas attributed to sexual behavior and gender identity. A study of MSM and TGW in Côte d'Ivoire described a relative risk of depression attributable to transgender identity of 1.68 and 70 % of the effect mediated by sexual behavior stigma (Schein et al., 2019).

Understanding the effects of stigma on depression outcomes has been described as being relevant for informing treatment and characterizing the relationship between depression and other mental health disorders such as anxiety disorders, and increased sexual risk-taking behaviors (Hill et al., 2018; Semple, Patterson, & Grant, 2000; Tucker et al., 2014). Depression has been associated with lower levels of condom use and increased rates of condomless anal intercourse (CAI) (Crepaz et al., 2009; Tucker et al., 2014), which increase the risk of acquiring sexually transmitted infections (STI) including HIV (Baral, Grosso, Holland, & Papworth, 2014; Beyrer et al., 2012; Keshinro et al., 2016; Kunzweiler et al., 2017; Mmbaga, Moen, Leyna, Mpembeni, & Leshabari, 2018). Finally, depression and depressive symptoms are also associated with alcohol and other substance use disorders, and MSM/TGW have higher levels of alcohol and other substance use compared to the broader population (Korhonen et al., 2018; T. G. M. Sandfort et al., 2017). Alcohol and substance use in turn have been associated with other risk factors for HIV infection such as violence and transactional sex (Korhonen et al., 2018). As MSM and TGW bear a higher burden of HIV (Baral et al., 2014; Beyrer et al., 2012; Keshinro et al., 2016; Kunzweiler et al., 2017; Mmbaga et al., 2018), addressing the syndemics of psychosocial health problems including depression, alcohol, and substance use disorders has significant potential for improving HIV-related outcomes and quality of life (Viswasam, Schwartz, & Baral, 2020).

Data on depression among key populations in SSA are needed to inform better mental and sexual health programming. Thus, the objective of this study was to evaluate the role of stigma as an independent determinant of depressive symptoms and depression among members of these key populations in Kigali, Rwanda. We hypothesized that stigma would be independently associated with a higher prevalence of depressive symptoms and depression among MSM/TGW. We further hypothesized that the higher levels of depressive symptoms and depression among TGW compared to MSM could be explained by the higher burden of stigma they experience.

Methods

Study Population and Procedures

Details on recruitment and study procedures for this study have been previously reported (Rwema, Lyons, et al., 2020). Briefly, from March to August 2018, individuals who self-identify as cisgender MSM or TGW were recruited in a cross-sectional study using respondent-driven sampling (RDS), a method designed to recruit marginalized populations (Heckathorn, 2014). Eligible participants were individuals aged 18 years, who were

assigned the male sex at birth, had lived in Kigali for at least 3 months prior to the study, reported insertive and/or receptive anal sex with a man in the preceding 12 months, and could provide written informed consent. Recruitment was initiated by two seeds, who were MSM who had extensive connections in the community. A third seed was recruited in the middle of the study to enhance recruitment of older individuals. At the end of each study visit, eligible participants were in turn given a maximum of three coupons to recruit peers from their networks, and the process was repeated until the targeted sample size was reached.

During study visits, trained nurse counselors assessed eligibility and obtained written informed consent. Participants then underwent structured interviews using a questionnaire which included questions assessing sociodemographic characteristics, stigma experiences, and mental and sexual health history. Participants also received HIV testing, and viral load measurements were done for individuals living with HIV as per the Rwanda National guidelines. STI testing included *Treponema pallidum*, *Chlamydia trachomatis*, and *Neisseria gonorrhoea* testing. Details on laboratory procedures and prevalence proportions of each of these infections have been previously reported (Rwema, Herbst, et al., 2020).

Participants were compensated with 3000Frw (approximately USD 3.50), with the same amount redeemable for each eligible peer who was successfully recruited. Data collection was approved by the Institutional Review Board of Emory University (IRB0089599) and the Rwanda National Research Ethics Committee with secondary data analysis approved by the Johns Hopkins School of Public Health.

Measures

Outcome—Symptoms of depression were assessed using the Patient Health Questionnaire (PHQ-9) which has previously been employed in communities across Sub-Saharan Africa (Adewuya, Ola, & Afolabi, 2006; Anderson, Ross, Nyoni, & McCurdy, 2015; Lyons et al., 2019). The PHQ-9 scores were used to classify participants into three groups: “no depression” (PHQ-9 = 0–4), “mild/moderate symptoms of depression” (PHQ-9 = 5–9) and “depression” (PHQ-9 = 10) (Kroenke, Spitzer, & Williams, 2001; Monahan et al., 2009).

Exposure—The exposure of interest for this study was sexual behavior stigma. Sexual behavior stigma was assessed at different levels including from friends and family, uniformed officers, healthcare workers, and other members of the community using a series of items that have been validated for stigma assessment among MSM and TGW and have been used in several studies of MSM and TGW in SSA and other parts of the world (Grosso et al., 2019; Lyons et al., 2019; Stahlman, Liestman, et al., 2016; Stahlman, Sanchez, et al., 2016). These items were used to construct three types of stigma: anticipated, perceived, and enacted as previously described, and are shown in Supplemental Table I (Rwema, Lyons, et al., 2020). For each stigma type, a score was created based on answers to stigma questions. Cronbach’s alpha coefficients for each subscale were estimated. These scores were dichotomized such that a score of 1 equated to having experienced that form of stigma and a score of 0 as not having experienced that type of stigma. The choice to dichotomize the scores of the stigma variables was based on the distribution of the three

stigma scores. For all three scores, the median score was 0 demonstrating that the majority of participants did not report any of the items used to make the subscales. However, those who answered positively to one were more likely to report experiencing other forms of stigma. Thus, we compared those who did not report any of the stigma items (score of zero) to those who experienced at least one (score = 1).

Other Covariates of Interest—Other variables considered in the analysis included age, education level, income, occupation, hazardous alcohol use, gender identity, and HIV status. The hypothesized relationships between these variables with stigma and mental health are shown in the conceptual model (Fig. 1). These sociodemographic and health-related covariates of interest are detailed in Table 1. HIV status was defined as negative or positive based on biological testing performed in the study. Gender identity was determined using the two-step gender assessment method based on gender assignment at birth and current gender identity, and was dichotomized into cisgender MSM and TGW (Tate, Ledbetter, & Youssef, 2013). Hazardous alcohol use was assessed using the AUDIT-C, and a score of 4 or higher was used as a cut-off for hazardous alcohol use (Bush et al., 2020).

Statistical Analysis

Crude and RDS-adjusted 95% confidence interval proportions for the exposure variables, outcome, and other covariates of interest were calculated. We then used Pearson's Chi-squared tests (χ^2) to compare mental health status by age group, gender identity, HIV status, alcohol use, and other covariates specified in the conceptual model. A *P* value of <0.05 was used as a cutoff of statistical significance.

In the primary analyses, we evaluated the independent association of each type of stigma, anticipated, perceived, and enacted stigma, with mental health status. To do this, we fitted unadjusted bivariable multinomial logistic regression models to assess the association between each stigma type with mental health status separately; and relative risk ratios (RRR) and 95% confidence intervals (CI) were computed. In the multivariable analyses, we constructed a separate model for each type of stigma by adjusting for the variables specified in the conceptual model irrespective of statistical significance; and other types of stigma. In all models, individuals with no depressive symptoms were the comparison group.

In the secondary analyses, we performed a crude analysis comparing depressive symptoms and depression among MSM and TGW using an unadjusted multinomial model. Furthermore, we constructed two separate multivariable multinomial models by first adjusting for all covariates of interest in our conceptual model only; and second by including the three types of stigma variables.

We performed RDS adjustments for all multivariable models in the primary and secondary analyses using the RDS estimator II. All the analyses were performed with Stata Version 15 (StataCorp, College Station, TX) statistical package.

Results

Participant Characteristics

A total of 738 participants were recruited into the study and 736 participants with complete data were included in these analyses. Among them, 14.4% (RDS-adjusted, 10.6; 95% CI, 7.8–13.5) identified as TGW. The overall HIV prevalence was 10.1% (RDS-adjusted, 9.2%; 95% CI, 6.3–12.1). Most participants reported hazardous alcohol use (561/736, 76.2%). Overall, 41% of participants reported anticipated stigma, 36% reported perceived stigma, and 45% reported enacted stigma. All types of stigma were higher among TGW ($p < 0.001$) compared to cisgender MSM. Details on other experiences of stigma are in Supplemental Table I.

Depressive Symptoms and Depression

Overall, 26.4% (RDS-adjusted, 24.1%; 95% CI, 19.4–28.7) of participants had mild/moderate symptoms of depression and 9% (RDS-adjusted, 7.6%; 95% CI, 4.6–10.6) had depression. Depression and depressive symptoms were significantly more prevalent among older participants ($\chi^2 P < 0.001$) and TGW ($\chi^2 P < 0.001$); and were significantly associated with hazardous alcohol use ($\chi^2 P = 0.005$). However, there were no significant associations between mental health status and education level, income, employment status, and HIV status.

Sexual Behavior Stigma and Mental Health

In the unadjusted (bivariable) primary analyses, we found significant positive associations between all types of sexual behavior stigma and depressive symptoms and depression. Reporting anticipated stigma was significantly associated with a higher prevalence of mild/moderate symptoms of depression (RRR, 2.54; 95% CI, 1.81–3.58) and depression (RRR, 3.25; 95% CI, 1.91–5.52). Reporting perceived stigma was also significantly associated with mild/moderate symptoms of depression (RRR, 3.32; 95% CI, 2.34–4.71) and depression (RRR, 3.98; 95% CI, 2.34–6.76). Likewise, reporting enacted stigma was significantly associated with both mild/moderate symptoms of depression (RRR, 2.41; 95% CI, 1.71–3.38) and depression (RRR, 4.80; 95% CI, 2.71–8.52).

In RDS-adjusted analyses (Table 2), adjusting for age, education level, income, occupation, hazardous alcohol use, transgender status, and HIV status, MSM/TGW who reported anticipated stigma had significantly higher mild/moderate symptoms of depression (RRR, 1.88; 95% CI, 1.11–3.19) and depression (RRR, 4.78; 95% CI, 1.74–13.13) compared to those with no anticipated stigma. Perceived stigma was also significantly associated with mild/moderate symptoms of depression (RRR, 2.06; 95% CI, 1.12–3.79) but not with depression (RRR, 1.42; 95% CI, 0.57–3.55). Lastly, enacted stigma was significantly associated with depression (RRR, 3.09; 95% CI, 1.61–5.93), but the association was not significant with mild/moderate symptoms of depression (RRR, 1.38; 95% CI, 0.93–2.05).

Secondary Analyses: Comparing Mental Health among Cisgender MSM and TGW

In the unadjusted secondary analysis, we found that TGW had a higher prevalence of mild/moderate symptoms of depression (RRR, 2.59; 95% CI, 1.65–4.08) and depression (RRR, 2.91; 95% CI, 1.54–5.52) compared to cisgender MSM.

In the first multivariable model adjusting for all other covariates of interest except stigma, these significant associations remained after adjusting for mild/moderate depressive symptoms (RRR, 2.02; 95% CI, 1.02–4.00), but not for depression (RRR, 1.39; 95% CI, 0.56–3.44) (Table 3). In the second multivariable model adjusting for all covariates of interest including all forms of stigma, the association between gender identity was no longer significant with mild/moderate depressive symptoms (RRR, 1.72; 95% CI, 0.84–3.53) and with depression (RRR, 0.83; 95% CI, 0.28–2.47) (Table 4).

Discussion

In this study, we found that one in four and nearly one in ten MSM/TGW in Kigali had mild/moderate symptoms of depression and depression respectively. These findings are consistent with other studies of MSM and TGW which have shown a high burden of depression (Ahaneku et al., 2016; Scheim et al., 2019; Stahlman et al., 2015; Stoloff et al., 2013; Ulanja et al., 2019). Additionally, consistent with previous studies, we found a high prevalence of all three forms of stigma, which were independently associated with higher depressive symptoms and depression prevalence. These findings contribute to the understanding of the effects of stigma on depression among MSM and TGW in Rwanda and highlight the importance of addressing mental health needs by mitigating stigma.

Anticipated, perceived, and enacted stigma were highly prevalent in this study, with each type of stigma independently associated with a higher prevalence of depressive symptoms and depression. Notably, all forms of stigma were particularly prevalent among TGW, who also experienced a higher burden of depression compared to MSM. Furthermore, the loss of significance of the positive association between gender identity and mental health status after adjusting for all types of stigma demonstrates that stigma plays an important role in the disproportionate burden of mental health issues among transgender individuals compared to cisgender MSM. These results are consistent with other studies of MSM and TGW in SSA (Lyons et al., 2019; Scheim et al., 2019). The higher burden of stigma among TGW could be attributed to the composite effects of stigma related to gender identity and sexual behavior stigma. Additionally, studies have shown that secondary to more economic exclusion, TGW are more likely to engage in sex work, which could be contributory to experiences of intersectional stigma burden (Rwema, Lyons, et al., 2020). However, more studies focusing on TGW are needed to examine the mechanisms of the relationship between stigma and mental health outcomes. Nonetheless, the need for increased stigma mitigation interventions are consistent, as they could be critical in efforts to decrease the burden of depression among both MSM and TGW.

The high burden of depressive symptoms and depression measured in this study reinforces the need for a greater investment in integrating mental health services into the routine packages of services for MSM and TGW. Although widely recognized as essential,

comprehensive mental health services remain unavailable for many people living in LMICs (“Depression,” 2020; Wang et al., 2007). Recently, the World Health Organization (WHO) and other international normative and technical agencies developed mental health intervention packages and guidelines to address these unmet need (“WHO | WHO Mental Health Gap Action Programme (mhGAP),” 2020). However, data characterizing implementation of mental health service packages remain limited, suggesting inadequate funding, implementation, uptake, or insufficient dissemination of evaluations (Keynejad, Dua, Barbui, & Thornicroft, 2018). For MSM and TGW, most of the available evidence in LMICs is from mental health interventions in the context of HIV treatment. A meta-analysis of the effectiveness of depression interventions on the psychological and immunological outcomes of people living with HIV across SSA reported large reductions in depression scores following pharmacological and psychological treatment (Passchier, Abas, Ebuenyi, & Pariante, 2018). Although these studies show great promise, MSM and TGW who are not living with HIV generally do not have access to those mental health services. Given the establishment of MSM and TGW as populations at high risk of depression and other mental health illnesses, interventions specifically geared toward addressing their mental health needs, as well as associated factors, such as stigma, are crucial.

Increased burden of depression has far-reaching consequences on both mental, physical, and social wellbeing of MSM and TGW. Data suggests that depression exists within a syndemic of other psychosocial illnesses including alcohol and other drug use disorders, and risky sexual behavior, all of which further increase morbidity and mortality among MSM and TGW (Chakrapani, Willie, Shunmugam, & Kershaw, 2019; Mwangi, Karanja, Gachohi, Wanjihia, & Ngang’a, 2019). Depression has been associated with a higher prevalence of hazardous alcohol use (Kunzweiler et al., 2018), which increases the risk for alcoholic-induced liver disease, as well as other illnesses secondary to excess alcohol use (Askgaard, Grønbaek, Kjær, Tjønneland, & Tolstrup, 2015). In this study, we found a high prevalence of hazardous alcohol use, and alcohol use was significantly associated with depressive symptoms. This high burden of hazardous alcohol use warrants screening for alcohol associated diseases among MSM and TGW in Kigali, Rwanda. Further studies are needed to elucidate the potential syndemic of hazardous alcohol use and mental health illnesses among MSM and TGW to inform prevention, screening, and treatment recommendations for these conditions.

Positive associations between depression and sexual risk-taking behaviors including condomless anal intercourse (CAI) have also been reported (Defechereux et al., 2016; Hill et al., 2018; Semple et al., 2000; Tucker et al., 2014). CAI greatly increases one’s risk of HIV infection. In addition, depression and other forms of psychological distress further potentiate the risk of HIV infection and mortality through direct adverse effects on immunity (Passchier et al., 2018), as well as their association with non-adherence to antiretroviral treatment (Nakimuli-Mpungu, Mutamba, Othengo, & Musisi, 2009). These barriers to HIV prevention and treatment continue to hinder efforts to tackle the HIV epidemic among key populations. Further studies exploring the associations between depression, stigma, and HIV risk among MSM and TGW across SSA are needed. Nonetheless, these results suggest that addressing the mental health needs of MSM and TGW is a priority as it would not only improve quality of life but may also prove beneficial in reducing the burden of associated

disorders including alcohol and other substance use disorder and their sequelae, and HIV and other sexually transmitted infections.

There are several limitations of note in these analyses. First, a temporal relationship between stigma and depression cannot be established due to the cross-sectional nature of these data. Second, the results may not be generalizable to the entire MSM or TGW populations in Rwanda because of recruitment being restricted to Kigali city. Third, the RDS estimator II used to compute RDS adjustments in the multivariable models used self-reported individual network size to construct weights; thus, any biases in reporting network size may have introduced bias in the RDS-adjusted estimates (Wirtz & Latkin, 2015). Finally, there is potential for recall bias especially for questions assessing past stigma experiences and other questions assessing past events (Coughlin, 1990). Despite these limitations however, this study provides consistent data reinforcing the need for dedicated programs to address the high burden of both stigma and depression among MSM and TGW in Kigali, Rwanda.

Conclusion

Taken together, the results presented here describe a high burden of stigma, hazardous alcohol use, and depressive symptoms among both cisgender men who have sex with men and transgender women in Kigali, Rwanda. The intersections between health and social problems necessitate comprehensive programs addressing unmet mental health needs to significantly improve quality of life and prevent further illness. Given the association between stigma and depression described, stigma mitigation strategies are also needed to ensure the success of these programs.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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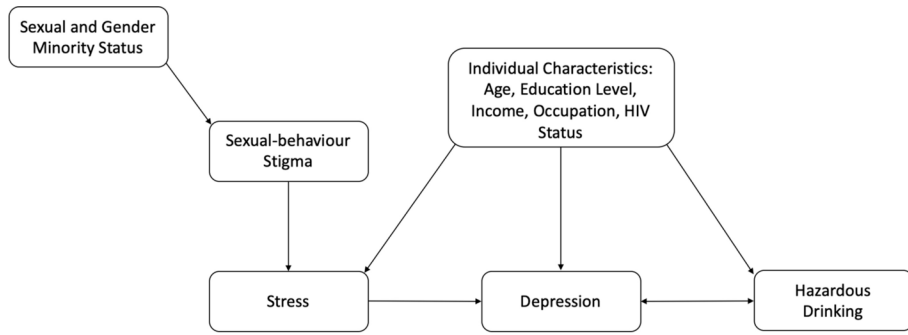


Fig. 1.
Conceptual framework

Table 1Characteristics of MSM and TGW enrolled in Kigali, Rwanda, 2018 ($N = 736$)

Characteristic	<i>N</i>	Crude %	RDS ^b adjusted %	95% CI
Age in years				
18 to 24	335	45.6	48.9	43.8–54.1
25 to 34	296	40.0	35.9	30.9–41.1
>35	105	14.4	15.2	11.5–18.5
Education				
Never attended school	24	3.3	4.5	2.0–6.9
Primary	185	25.2	30.3	25.6–35.1
Some secondary	245	33.2	31.5	26.7–36.4
Secondary or above	282	38.3	33.7	28.7–38.6
Occupation				
Unemployed	130	17.6	15.1	11.4–18.8
Student	89	12.1	12.1	8.4–15.8
Employed/Self employed	517	70.3	72.8	68.1–77.6
Monthly income (FRW)				
Less than 50,000	482	65.5	70.3	65.5–75.1
50,000 to 100,000	178	24.2	23.6	18.8–27.9
Over 100,000	76	10.3	6.3	4.3–8.3
Self-reported gender identity				
Cis-MSM	630	85.6	89.4	86.4–92.2
Transgender	106	14.4	10.6	7.8–13.5
Alcohol use				
Non-hazardous alcohol use	175	23.8	23.6	19.1–28.1
Hazardous alcohol use	561	76.2	76.4	71.9–80.9
HIV status				
Negative	662	89.9	90.8	87.9–93.6
Positive	74	10.1	9.2	6.4–12.1

^bRDS, respondent-driven sampling

Table 2

Association between stigma and categorized depression among MSM and TGW, Kigali, Rwanda, 2018

Variable	Unadjusted RRR	95% CI	<i>p</i>	Adjusted RRR ^a	95% CI	<i>p</i>	RDS-adjusted RRR ^a	95% CI	<i>p</i>
Anticipated stigma									
No symptoms	1		Ref	Ref		Ref	Ref		Ref
Mild/moderate symptoms	2.54	1.81–3.58	0.0001	1.82	1.26–2.64	0.002	1.88	1.11–3.19	0.019
Depression	3.25	1.91–5.52	0.0001	1.91	1.08–3.40	0.027	4.78	1.74–13.13	0.002
Perceived stigma									
No symptoms	1		Ref	Ref		Ref	Ref		Ref
Mild/moderate symptoms	3.32	2.34–4.71	0.0001	2.28	1.53–3.42	0.0001	2.06	1.12–3.79	0.020
Depression	3.98	2.34–6.76	0.0001	2.03	1.10–3.75	0.024	1.42	0.57–3.55	0.447
Enacted stigma									
No symptoms	1		Ref	Ref		Ref	Ref		Ref
Mild/moderate symptoms	2.41	1.71–3.38	0.0001	1.45	0.97–2.17	0.068	1.38	0.93–2.05	0.111
Depression	4.80	2.71–8.52	0.0001	3.36	1.75–6.46	0.0001	3.09	1.61–5.93	0.001

^aThe models were adjusted for age, education level, income, occupation, hazardous alcohol use, gender identity, and HIV status

Ref: Depression: no depression

The bolded *p* values imply significance

Cronbach's alpha coefficients were (1): anticipated stigma: 0.69, perceived stigma: 0.68 and for enacted stigma: 0.52

Table 3

Depressive symptoms and depression among TGW compared with MSM, Kigali, Rwanda, 2018

Variable	Unadjusted RRR	95% CI	<i>p</i>	RRR ^a	95% CI	<i>p</i>	RDS-adjusted RRR ^a	95% CI	<i>p</i>
Mild/moderate symptoms (MSM)	1		Ref	Ref		Ref	Ref		Ref
Mild/moderate symptoms (TGW)	2.59	1.65–4.08	0.0001	2.58	1.63–4.08	0.0001	2.02	1.02–4.00	0.045
Depression (MSM)	1		Ref	Ref		Ref	Ref		Ref
Depression (TGW)	2.91	1.54–5.52	0.001	2.84	1.48–5.43	0.002	1.39	0.56–3.44	0.480

^aThese models were adjusted for age, education level, income, occupation, hazardous alcohol use, gender identity, and HIV status

Ref: MSM

The bolded *p* value imply significance

Table 4

Depressive symptoms and depression among TGW compared with MSM, Kigali, Rwanda, 2018

Variable	Unadjusted RRR	95% CI	<i>p</i>	RRR ^a	95% CI	<i>p</i>	RDS-adjusted RRR ^a	95% CI	<i>p</i>
Mild/moderate symptoms (MSM)	1		Ref	Ref		Ref	Ref		Ref
Mild/moderate symptoms (TGW)	2.59	1.65–4.08	0.0001	1.76	1.08–2.86	0.023	1.72	0.84–3.53	0.137
Depression (MSM)	1		Ref	Ref		Ref	Ref		Ref
Depression (TGW)	2.91	1.54–5.52	0.001	1.79	0.90–3.55	0.098	0.83	0.28–2.47	0.740

^aThese models were adjusted for age, education level, income, occupation, hazardous alcohol use, gender identity, HIV status, and all three types of stigma

Ref: MSM

The bolded *p* value imply significance