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## The associations between HIV stigma and mental health symptoms, life satisfaction, and quality of life among Black sexual minority men with HIV

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### Abstract

**Purpose**—With the advancement of antiretroviral therapy (ART), HIV/AIDS has become a manageable illness, similar to other chronic conditions. This study examined the associations between HIV stigma and patient-reported outcomes including mental health symptoms, life satisfaction, and quality of life among Black sexual minority men with HIV.

**Methods**—We analyzed baseline data from a randomized comparison trial of a mobile app intervention aimed to address the social work and legal needs of Black sexual minority men with HIV in Los Angeles County. We used validated scales including the Berger HIV stigma scale, the Patient Health Questionnaire-9 & the General Anxiety Disorder-7, the Satisfaction with Life Scale, and the Ladder Scale to assess HIV stigma, depressive symptoms, anxiety, life satisfaction, and quality of life, and we conducted multivariable linear regression to examine their associations.

**Results**—Participants experienced HIV stigma especially about disclosure concerns (e.g., 81.9% participants indicated “*I am very careful who I tell that I have HIV*”) and public attitudes (52.3% believed “*Most people with HIV are rejected when others find out*”). In the multivariable models, higher overall stigma scores were associated with higher likelihood of experiencing depression (adjusted  $b = 0.235$ ,  $p < 0.001$ ) and anxiety (adjusted  $b = 0.188$ ,  $p = 0.002$ ), and lower life

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**Author contributions** CH conceptualized the research questions, conducted the literature review, analyzed the data, and written up the manuscript. IWH and AOM are the principal investigators of the project. All other authors provided feedback on data analysis, analysis interpretation, and manuscript revisions. All authors provided intellectual content to the paper and reviewed and approved the final manuscript.

Declarations

**Conflict of interest** All authors declared no conflict of interest.

**Ethical approval** Study procedures were reviewed and approved by the Institute of Review Board at the University of California Los Angeles.

**Informed consent** All participants agreed to participate after reviewing the study’s informational letter and provided informed consent.

**Consent for publication** Not applicable.

satisfaction (adjusted  $b = -0.236$ ,  $p < 0.001$ ) and quality of life (adjusted  $b = -0.053$ ,  $p = 0.013$ ), adjusting for clinical characteristics including ART initiation, viral load suppression, and medication adherence. In addition, being attacked or harassed in the past year were significantly associated with lower life satisfaction and quality of life (adjusted  $b = -3.028$ ,  $p = 0.046$ ; adjusted  $b = -1.438$ ,  $p = 0.002$ ).

**Conclusion**—Our findings highlight the need for focused HIV stigma reduction interventions to promote the overall well-being of Black sexual minority men with HIV. Strategies to promote the patient-reported outcomes may benefit from trauma-informed approaches.

### Keywords

HIV stigma; Depression; Anxiety; Life satisfaction; Quality of life; Black sexual minority men

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### Introduction

With the advancement of antiretroviral therapy (ART), HIV/AIDS has become a manageable illness, similar to other chronic conditions. People living with HIV (PLWH) who initiate ART and sustain virologic suppression now have a similar life expectancy as those in the general population [1, 2]. In the past decade, significant progress has been made toward the 95–95–95 target of ending the HIV/AIDS epidemic in 2030 [3]. This refers to 95% of PLWH who knowing their HIV status, 95% of PLWH receiving ART, and 95% of PLWH receiving ART achieving viral suppression [4]. This Fast-Track approach also includes ambitious target for zero discrimination. Now researchers propose a ‘fourth target’—PLWH with viral suppression having good health-related quality of life, which entails attention to two domains—comorbidities and self-perceived quality of life [5]. The newly added target emphasizes the social and psychological well-being of PLWH beyond clinical treatment outcomes. In fact, there has been ongoing research on patient-reported outcomes (PROs) among PLWH in many settings, and it has been gradually recognized as an essential indicator of assessing the overall well-being of PLWH [6–8]. Such PROs include life satisfaction, mental health outcomes, weight and pain management, and self-efficacy [9].

In the past, researchers have examined and identified factors associated with patient-reported outcomes among PLWH, which include demographic characteristics and behavioral health factors [7, 10, 11]. Among these, one factor that plays a persistent role is HIV stigma [12, 13], which refers to prejudice and discrimination directed at people perceived to have HIV/AIDS and individuals, groups, and communities associated with the disease [14]. Herek (2002) noted that HIV stigma is a construct that explains both the negative attitudes toward people with HIV, often manifested by discrimination, and internalized negative beliefs, views, and feelings experienced by those living with HIV [15]. Turan et al. also emphasized that HIV stigma is a multi-dimensional phenomenon consisting of internalized, perceived, anticipated, and experienced stigma [16]. Indeed, prior studies have demonstrated that HIV stigma is a considerable barrier to accessing HIV treatment and prevention services and a major factor for the overall health-related quality of life among PLWH [17, 18]. For example, HIV stigma has been associated with never having received an HIV test, delayed ART initiation, and lower ART adherence and retention in HIV care [19, 20]. Moreover, stigmatization in different forms could also materialize into discriminative actions and

pose obstacles that eliminate or exclude PLWH from accessing equal opportunities such as employment, education, and legal services [18]. A comprehensive systematic review and meta-analysis of the literature in the past 40 years suggested that HIV/AIDS stigma was negatively associated with well-being among PLWH and these associations were stronger among older PLWH [21]. In recent years, standardized measurement tools were also developed to assess stigma as a domain of quality of life among people living with HIV [22, 23]. Another recently published systematic review revealed despite the growing numbers of interventions on reducing stigma, there is a lack of well-designed interventions that documented stigma reduction among PLWH and few studies measured such effects on improving patient outcomes [18].

In the United States, Black sexual minority men living with HIV are disproportionately impacted by HIV and have poor treatment outcomes along the HIV care continuum compared to their White and Latino counterparts [24]. For instance, compared to White sexual minority men, Black sexual minority men living with HIV have 8.2 times higher HIV incidence, and 6.5 times greater HIV mortality [25]. Studies also suggest that Black sexual minority men with HIV have lower retention in HIV care [26] and are less likely to be virally suppressed than their White counterparts [27, 28]. Individual and structural barriers, including HIV stigma, may increase morbidity, leading to worse patient outcomes among this population at the intersection of multiple vulnerabilities. Furthermore, the effects of HIV stigma may be pronounced among Black sexual minority men with HIV who also experience other forms of stigmatization and marginalization based on other identities, including sexual orientation and race, compared to the general population of PLWH.

### **The current study**

To better understand the mechanisms by which HIV stigma influences the social and psychological well-being of Black sexual minority men living with HIV and provide insights into the development of stigma reduction interventions, this study aims to document HIV stigma using a validated instrument, and to examine the associations between HIV stigma and patient-reported outcomes (PROs) in a sample ( $n = 122$ ) of Black sexual minority men living with HIV in Los Angeles County, California. Specifically, we hypothesized that higher levels of HIV stigma would be associated with higher levels depression and anxiety, lower life satisfaction, and lower quality of life.

## **Materials and methods**

### **Study procedures**

We analyzed baseline data from a randomized comparison trial of a community-developed, web-based mobile app intervention that aimed to address the social work and legal needs of Black sexual minority men living with HIV, described elsewhere[29]. Briefly, Black sexual minority men living with HIV were recruited via online social media and community outreach events. To be eligible for the study, participants were required to: (1) be 18 years old or above, (2) self-identify male, (3) identify as Black/African American, (4) identify as gay, bisexual, or another sexual minority, and (5) and be living in Los Angeles County. Participants were also required to have a smartphone and be able to provide informed

consent. Study procedures were reviewed and approved by the Institutional Review Board at the University of California Los Angeles. All respondents provided informed consent and were offered monetary compensation of up to USD 130 for their participation in the research.

## Measures

**Sociodemographic and clinical characteristics.**—Study participants were asked to report their age, birthplace, education and income level, number of children, and insurance status. In addition, participants were asked about their most recent CD4 and viral load, whether they were currently taking antiretroviral therapy (ART), and if so, how long they had received ART. Participants were also asked to self-report their ability to take all HIV medications as prescribed (options from very poor to excellent). See Table 1 for a complete list of demographic characteristics.

**HIV stigma.** HIV stigma was assessed using the adapted Berger HIV stigma scale [30]. This 10-item scale assessed four stigma subscales: (1) personalized stigma, (2) disclosure concerns, (3) negative self-image, and (4) public attitudes. All questions were rated on a five-point scale from “strongly disagree (0)” to “strongly agree (4)”, with a total possible score ranging from 0 to 40. A full description of the 10 items and distributions are presented in Table 2. The abbreviated scale was validated and showed good internal consistency in previous studies among PLWH [31, 32]. In the current sample internal consistency on the adapted Berger HIV stigma scale was also high (Cronbach’s alpha = 0.87).

## Patient-reported outcomes

**Depression.**—We used the Patient Health Questionnaire-9 (PHQ-9) to measure depression [33]. This 9-item measure assessed how often the participant had experienced depressive symptoms over in the past 2 weeks, including “*feeling down, depressed, or hopeless*” and “*Feeling bad about yourself—or that you are a failure or have let yourself or your family down?*”. Response options included “not at all” (0), “several days” (1), “more than half the days” (2), and “nearly every day” (3). A total score was summed and presented from 0 to 27, and scores of 5, 10, 15, and 20 represent cut-off points for mild, moderate, moderately severe, and severe depression. To screen for depression, a PHQ-9 of 10 or greater is recommended for referral for further evaluation [33]. The Cronbach’s alpha for PHQ-9 among the study sample was 0.86.

**Anxiety.**—The General Anxiety Disorder-7 (GAD-7) was used to measure anxiety among the participants<sup>30</sup>. The 7-item survey asked the participants questions about how often they were bothered by a list of anxiety-related symptoms over the past 2 weeks (e.g., *feeling nervous, anxious, or on edge*). A score of 10 or higher was considered experiencing anxiety [34]. The Cronbach’s alpha for GAD-7 among our study participants were 0.89.

**Life Satisfaction.**—The Satisfaction With Life Scale (SWLS) was used to evaluate participants’ global life satisfaction [35]. This 5-item measure assessed life satisfaction using questions that included, “*In most ways my life is close to my ideal*”. Participants answered using a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The

possible range of SWLS scores was 5–35. Based on prior literature [35], a SWLS score greater than 25 was used to indicate life satisfaction. The Cronbach's alpha of SWLS in the current sample was 0.83.

**Quality of Life.**—Quality of life was measured using an abbreviated one-item Cantril Ladder Scale [36]. Specifically, participants were asked, “*Suppose the top of the ladder represents the best possible life for you and the bottom of the ladder the worst possible life. Where on the ladder do you feel you stand at the present time?*”. Consistent with prior work, the 0–10 Likert scale was divided into three levels of well-being: *Thriving* (7–10), *Struggling* (5–6), and *Suffering* (< 5) [37]. Thriving indicates that well-being is strong, consistent, and progressing, and has been previously associated with fewer health problems and more happiness and enjoyment [36].

### Study covariates

We consider including study covariates given the evidence in the literature or the theoretical plausibility of their associations with the study exposures and outcomes. Social support has been previously associated with both HIV stigma and mental health outcomes among people with HIV [38, 39] as have histories of victimization and incarceration [40, 41]. These variables were therefore included in the adjusted model.

**Social support.**—Social support was measured using the Multidimensional Scale of Perceived Social Support (MSPSS) [42]. The MSPSS measures three different sources of support: (1) family, (2) friends, and (3) significant others, with questions like “*There is a special person who is around when I am in need.*” and “*My family is willing to help me to make decisions?*”. Each item was measured on a 7-point Likert scale and all items were summed to create a total score where higher values indicated greater social support (range: 12–84). The Cronbach's alpha coefficient for the MSSPS in this sample was 0.92.

**Experiences of victimization and incarceration.**—We assessed victimization by asking participants a set of questions including “*Were you attacked or harassed?*”, “*Were you attacked with violence?*”, and “*have you been a victim of another crime?*” in the past year. We also asked if participants whether they had ever been incarcerated in the past 5 years. All four of these variables were coded 1 = *yes* and 0 = *no*, and each variable represented a history of victimization or incarceration.

### Statistical analysis

We used descriptive statistics to summarize the characteristics of the study participants. Bivariate correlation coefficients were calculated between HIV stigma, PROs, and other covariates. To assess the association between HIV stigma and each PRO, we conducted multivariable linear regression controlling for sociodemographic and clinical characteristics and study covariates. All PROs were used as continuous variables. Results are reported as beta coefficient (*b*) with corresponding standard error (SE), and a *p*-value less than 0.05 was considered statistically significant.

## Results

### Characteristics

Among all participants ( $n = 122$ ), the mean age was 37.2 (SD = 12.7, range: 18–74), and 43.4% were born in Los Angeles. About one-third (36.1%) were currently employed, and 37.7% had an annual income of \$12,000 or less. Over sixty percent (61.5%) had at least some college education. Nearly all (94.3%) were receiving ART, and over half of those participants (58.3%) had been on ART for more than 5 years. Less than two-thirds (61.7%) reported having a viral load of fewer than 200 copies/ml, and 71.3% indicated being excellent or very good at taking HIV medications. One in three (36.9%) reported being attacked or harassed in the past year, and over a quarter (25.4%) reported that they had been incarcerated in the past 5 years (Table 1).

### HIV stigma and associated factors

Participants scored high on HIV stigma measures (Table 2). Specifically, participants indicated high rates of *Disclosure Concerns*—a majority (81.9%) noted that they were very careful about to whom they tell their HIV status, and over half (56.5%) indicated that they worried that people who know they have HIV would tell others. Regarding *Public Attitude*, over half (52.3%) (strongly) agreed that most people with HIV are rejected when others find out. Nearly half (47.5%) noted that most people think that a person with HIV is disgusting; 45.9% indicated they had been hurt by how people reacted to learning that they had HIV; and 41.8% reported stopping socializing with some people because of their reactions to the participant's HIV disclosure. The correlation coefficients of HIV stigma and all other study key variables are presented in Table 3.

### Patient-Reported outcomes and associated factors

As presented in Table 1, more than one-third (37.7%) of participants screened positive for depression based on PHQ-9 score, and about the same percentage screened positive for anxiety (36.8%). Based on the SWLS, less than one-third (28.7%) of the participants reported being satisfied or extremely satisfied with life. Meanwhile, half (50%) indicated *thriving* in terms of quality of life.

The associations between HIV stigma with PROs are presented in Table 4. In multivariable models, participants who experienced higher HIV stigma were more likely to experiencing depression and anxiety ( $b = 0.235, p < 0.001$ ;  $b = 0.188, p = 0.002$ ). Conversely, higher HIV stigma was also associated with lower life satisfaction and quality of life ( $b = -0.236, p < 0.001$ ;  $b = -0.053, p = 0.013$ ). Notably, in adjusted models, currently receiving ART was associated with higher GAD-7 score ( $b = -5.251, p = 0.048$ ), higher life satisfaction and quality of life ( $b = 4.960, p = 0.001$ ;  $b = 1.965, p = 0.042$ ). In addition, being attacked or harassed in the past year were significantly associated with lower life satisfaction and quality of life ( $b = -3.028, p = 0.046$ ;  $b = -1.438, p = 0.002$ ). We tested multicollinearity by computing the variance inflation factors for the multivariable model with a cutoff point of 10 and we did not any violations.



## Discussion

This study examined the associations between HIV stigma with patient-reported outcomes among a sample of Black sexual minority men living with HIV. Findings revealed high levels of HIV stigma in this sample of Black sexual minority men living with HIV, which are comparable to those found in other studies examining stigma in the lives of PLWH [20, 43]. We also found that higher levels of HIV stigma were associated with higher likelihood of experiencing depression and anxiety, and lower life satisfaction and quality of life among Black sexual minority men living with HIV.

Participants expressed high levels of concern about HIV disclosure and public attitudes about HIV, similar to a study conducted Quinn et al. among young Black men who have sex with men [44]. Unlike experienced or enacted stigma (e.g., *I have been hurt by how people reacted to learning I have HIV*), both disclosure concerns and public attitudes are *perceived* or *anticipated* stigma, which refer to the degree to which individuals expect that they will experience prejudice, judgment, and discrimination from the community [17]. Another study in San Francisco also noted that compared to their White counterparts, African Americans living with HIV (97% of which were identified as men) were more likely to have higher disclosure and public attitude concerns. They also found that these stigmas were associated with poorer physical and mental health status [43].

The relationship between HIV disclosure stigma and HIV viral suppression is likely complicated and requires more study. For example, a study in South Texas among a primarily Hispanic sample, found that HIV disclosure stigma was positively significantly associated with viral suppression [45]. Future research should examine the effects of different types of HIV stigma on patient-reported outcomes among people with HIV from diverse racial/ethnic backgrounds and the mechanisms driving these associations. In this analysis, higher levels of HIV stigma were associated with adverse mental health outcomes, lower life satisfaction, and poor quality of life after controlling for clinical characteristics including ART initiation, viral load suppression, and medication adherence. These results suggest that HIV stigma may affect patient-reported outcomes independent of treatment outcomes and highlights the need for tailored stigma reduction interventions among Black sexual minority men with HIV. Given the high levels of HIV stigma experienced among Black sexual minority males living with HIV as well as its negative impact on PROs including mental health outcomes, life satisfaction and quality of life, there is an urgent need to design, test, implement, and evaluate tailored stigma reduction interventions among this population. Such interventions must consider the intersectional stigma and discrimination that Black sexual minority males living with may encounter and integrate culturally specific components.

Black sexual minority men living with HIV in this study experienced high rates of mental health challenges. About one in three screened positive for depression and about the same proportion were screened for anxiety, similar to findings from two prior studies [46, 47]. Recent literature suggests that psychological distress such as depression and anxiety are associated with worse HIV treatment outcomes, such as lower medication adherence and likelihood of initiating ART [48, 49]. Therefore, it is critical to provide mental health



screening and treatment services for Black sexual minority men with HIV in order to improve their overall mental well-being and minimize adverse HIV treatment outcomes [50]. Our results also suggest that only about a quarter of participants were satisfied with their current life, and half were struggling or suffering in terms of quality of life. These results signal the need to provide comprehensive support along HIV care continuum to address the physical, mental, and social needs of PLWH. Focusing on life satisfaction and quality of life reflect holistic HIV treatment and can be determined by multiple factors, from individual to societal. A longitudinal study conducted in five African countries also noted that increased HIV stigma was related to decreased life satisfaction over time [51]. While romantic partnership [52, 53], higher education and income level [10, 52], sleep quality [11], and social capital [54] have all been correlated with higher quality of life, these factors have not been well studied among Black sexual minority men with HIV. Notably, more than half of study participants received ART for more than 5 years. Future interventions must address these correlates of life satisfaction and quality of life.

The strengths of the current analysis include the unique characteristics of the study participants and the diversity of the patient-reported outcomes (PROs). However, our study has several important limitations. The small sample size may limit the statistical power. PROs were all self-reported and are subject to recall bias. However, researchers also argue that PROs have the advantage of providing a subjective view of patient's health [9]. Another limitation is that almost all participants in this study were receiving ART. Therefore, the results are not generalizable to Black sexual minority men living with HIV who have not initiated ART. Further studies may consider focusing more on those who do not receive ART as they may experience adverse health outcomes due to the natural progression of HIV/AIDS. In addition, the current study did not assess the intersectional effects such as the syndemics among this population. Future studies should consider applying intersectionality in HIV research among Black sexual minority men living with HIV. Finally, the cross-sectional nature of the study prevents causal inference. Future longitudinal research is needed to examine the unique effect of HIV stigma on PROs among PLWH over time.

## Conclusions

HIV stigma is a painful reality in the lives of PLWH, and here, among Black sexual minority men living with HIV, it was statistically significantly associated with adverse patient-reported outcomes. Further research should focus on understanding the mechanisms by which HIV stigma impacts health outcomes among this population and to inform tailored stigma reduction interventions that take a holistic view of the health of Black sexual minority men living with HIV. Tackling stigma and reducing its effects are levers to improving patient outcomes, which is imperative to achieve the UNAIDS 4th 90% target among Black sexual minority men living with HIV.

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### Data availability

The data supporting this study's findings are available from the senior author upon reasonable request.

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**Table 1**Characteristics of Black sexual minority men with HIV in Los Angeles County, California ( $n = 122$ )

	<i>n</i> (%)
Social behavioral characteristics	
Age (range: 18 – 74; mean = 37.2; SD = 12.7)	
18–24	19 (15.6%)
25–34	43 (35.2%)
35–44	24 (19.7%)
45 and above	36 (29.5%)
Born in Los Angeles	53 (43.4%)
Born in the U.S	107 (87.7%)
Employment status	
Employed	44 (36.1%)
Unemployed	29 (23.8%)
Retired	6 (4.9%)
Disabled	40 (32.8%)
Decline to answer	3 (2.5%)
Income level	
< \$12,000	46 (37.7%)
> = \$12,000	69 (56.6%)
Decline to answer	7 (5.7%)
Education	
College and above	18 (14.8%)
Some college	57 (46.7%)
High school and below	47 (38.5%)
Have at least one child	14 (11.5%)
Always have insurance in the past 5 years	91 (74.6%)
Did not get medical care when you needed it in the past year	15 (12.3%)
Did not get medication when you needed it in the past year	21 (17.2%)
Had been attacked or harassed in the past year	45 (36.9%)
Had been attacked with violence in the past year	28 (23.0%)
Had been a victim of any other crime in the past year	25 (20.5%)
Had been incarcerated in the past 5 years	31 (25.4%)
Clinical characteristics	
Receiving ART	115 (94.3%)
Started ART within 5 years	48 (41.7%) <sup>1</sup>
Viral load less than 200 copies/ml	71 (61.7%) <sup>1</sup>
Self-report very good medication adherence	82 (71.3%) <sup>1</sup>
Patient-reported outcomes	
Depression ( <i>PHQ9</i> > 9)	46 (37.7%)
Anxiety ( <i>GAD7</i> > 9)	45 (36.8%)
Satisfaction with Life ( <i>SWLS</i> > 25)	35 (28.7%)

	<i>n</i> (%)
Quality of life ( <i>Cantril's ladder scale</i> )	
Thriving	61 (50.0%)
Struggling	45 (36.9%)
Suffering	16 (13.1%)

*SD*: standard deviation *ART*: antiretroviral therapy *PHQ9*: Patient Health Questionnaire-9 *GAD7*: General Anxiety Disorder-7 *SWLS*: Satisfaction with Life Scale

<sup>a</sup>Percentage among those who initiated ART

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**Table 2**  
HIV stigma score among Black sexual minority men with HIV in Los Angeles ( $n = 122$ )

	Mean (SD)	Strongly agree or agree $n$ (%)
<i>Personalized stigma (range 0 – 12)</i>	5.148 (4.159)	
I have been hurt by how people reacted to learning I have HIV	1.943 (1.607)	56 (45.9)
I have stopped socializing with some people because of their reactions to my having HIV	1.828 (1.650)	51 (41.8)
I have lost friends by telling them I have HIV	1.377 (1.496)	35 (28.7)
<i>Disclosure concerns (range 0 – 8)</i>	5.779 (2.262)	
I am very careful who I tell that I have HIV	3.352 (1.149)	100 (81.9)
I worry that people who know I have HIV will tell others	2.426 (1.526)	69 (56.5)
<i>Negative self-image (range 0 – 12)</i>	2.893 (3.468)	
I feel that I am not as good a person as others because I have HIV	0.951 (1.316)	21 (17.2)
Having HIV makes me feel unclean	1.213 (1.506)	32 (26.3)
Having HIV makes me feel that I'm a bad person	0.730 (1.172)	15 (12.3)
<i>Public Attitude (range 0 – 8)</i>	4.574 (2.479)	
Most people think that a person with HIV is disgusting	2.148 (1.441)	58 (47.5)
Most people with HIV are rejected when others find out	2.426 (1.354)	65 (52.3)
<i>Total score (range 0 – 40)</i>	18.393 (9.760)	–

**Table 3**

Descriptive statistics and correlation matrix of main measures

	1	1a	1b	1c	1d	2	3	4	5	6	Skewness	Kurtosis	Mean (SD)
1 HIV stigma	-										0.31	-0.63	1.84 (0.98)
1a Personalized stigma	0.85***	-									0.16	-1.27	5.15 (4.16)
1b Disclosure concerns	0.69***	0.46***	-								-0.92	0.08	5.78 (2.26)
1c Negative self-image	0.78***	0.48***	0.36***	-							0.93	-0.26	2.89 (3.47)
1d Public Attitude	0.80***	0.57***	0.52***	0.53***	-						-0.29	-0.92	4.57 (2.48)
2 MSSPS	-0.02*	-0.14*	-0.21*	-0.18	-0.21*	-					0.74	0.31	8.07 (5.90)
3 PHQ9	0.44***	0.32***	0.22*	0.41***	0.41***	-0.25**	-				0.68	-0.26	8.31 (6.43)
4 GAD7	0.32***	0.25**	0.20*	0.26**	0.32**	0.74**	-0.21*	-			-0.08	-0.83	20.5 (7.63)
5 SWLS	-0.36***	-0.25**	-0.20*	-0.33**	-0.37**	-0.48**	-0.36**	0.20*	-		-0.46	0.47	6.46 (2.23)
6 Ladder Scale	-0.29**	-0.26**	-0.12	-0.23*	-0.29**	-0.47**	-0.43**	-0.58**	0.33**	-			

\*  $P < 0.05$

\*\*  $P < 0.01$

MSPSS: Multidimensional Scale of Perceived Social Support

PHQ9: Patient Health Questionnaire-9

GAD7: General Anxiety Disorder-7

SWLS: Satisfaction with Life Scale

Associations between HIV stigma and patient-reported quality of life measures among Black sexual minority men with HIV ( $n = 122$ )

Table 4

	PHQ-9		GAD-7		SWLS		Ladder scale	
	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>
HIV stigma	<b>0.235 (0.054)</b>	< 0.001	<b>0.188 (0.061)</b>	0.002	<b>-0.236 (0.069)</b>	< 0.001	<b>-0.053 (0.021)</b>	0.013
Social support	-0.061 (0.035)	0.140	-0.067 (0.040)	0.122	0.131 (0.045)	0.069	0.011 (0.014)	0.658
Age								
18–24	–	–	–	–	–	–	–	–
25–34	1.419 (1.574)	0.230	1.633 (1.760)	0.301	4.012 (1.998)	0.094	0.368 (0.626)	0.918
35–44	2.181 (1.757)	0.144	2.464 (1.964)	0.185	1.369 (2.229)	0.702	-0.045 (0.699)	0.666
45 and above	1.625 (1.844)	0.196	-0.070 (2.06)	0.889	0.600 (2.339)	0.843	-0.158 (0.733)	0.357
Employment status								
Employed	–	–	–	–	–	–	–	–
Unemployed	-0.869 (1.371)	0.801	-1.548 (1.532)	0.405	-1.859 (1.739)	0.148	-0.320 (0.545)	0.228
Retired	2.613 (2.674)	0.463	3.686 (2.987)	0.265	3.854 (3.391)	0.164	1.232 (1.063)	0.113
Disabled	0.972 (1.381)	0.473	2.036 (1.542)	0.189	-0.660 (1.750)	0.697	0.033 (0.549)	0.950
Decline to answer	0.611 (3.398)	0.756	1.520 (3.797)	0.652	1.796 (4.310)	0.776	0.504 (1.352)	0.862
Income level								
<\$12,000	–	–	–	–	–	–	–	–
>=\$12,000	-1.216 (1.160)	0.270	0.251 (1.296)	0.862	0.781 (1.471)	0.556	0.140 (0.461)	0.693
Decline to answer	-0.807 (2.353)	0.742	-0.183 (2.629)	0.951	-3.967 (2.984)	0.175	0.471 (0.936)	0.621
Education								
College and above	–	–	–	–	–	–	–	–
Some college	3.058 (1.542)	0.069	1.000 (1.722)	0.862	-3.602 (1.955)	0.054	-0.532 (0.613)	0.305
High school and below	2.284 (1.651)	0.768	-0.511 (1.845)	0.951	0.061 (2.094)	0.957	-0.265 (0.656)	0.582
Had been attacked or harassed*	2.276 (1.188)	0.068	1.054 (1.346)	0.435	<b>-3.028 (1.503)</b>	0.046	<b>-1.438 (0.459)</b>	0.002
Had been attacked with violence*	0.222 (1.526)	0.768	-0.596 (1.704)	0.605	-0.346 (1.935)	0.777	-0.975 (0.606)	0.363
Had been a victim of any other crime*	2.156 (1.583)	0.310	2.882 (1.769)	0.147	-2.098 (2.008)	0.492	-0.745 (0.630)	0.508
Had been incarcerated**	0.801 (1.202)	0.339	0.566 (1.343)	-593	1.643 (1.525)	0.442	-0.073 (0.478)	0.525
Receiving ART	-2.819 (2.287)	0.263	<b>-5.251 (2.555)</b>	0.048	<b>4.960 (2.901)</b>	0.001	<b>1.965 (0.910)</b>	0.042

	PHQ-9		GAD-7		SWLS		Ladder scale	
	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>	<i>b</i> (SE)	<i>p</i>
Virtually suppressed	-0.239 (1.156)	<i>0.818</i>	-0.696 (1.291)	<i>0.586</i>	0.590 (1.466)	<i>0.666</i>	-0.450 (0.459)	<i>0.327</i>
Good adherence	0.214 (1.215)	<i>0.718</i>	1.237 (1.358)	<i>0.329</i>	0.918 (1.541)	<i>0.684</i>	0.552 (0.483)	<i>0.379</i>

Bold values are statistically significant p values of less than or equal to 0.05 b: beta coefficient SE: standard error PHQ9: Patient Health Questionnaire-9 GAD7: General Anxiety Disorder-7 SWLS: Satisfaction with Life Scale

\* in the past year

\*\* in the past 5 years