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Race-Based Medical Mistrust, HIV-Related Stigma, and ART Adherence in a Diverse Sample of Men Who Have Sex with Men with HIV

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Abstract

Disparities in antiretroviral treatment (ART) access by race for men who have sex with men (MSM) with HIV persist. We assessed whether race-based medical mistrust and HIV stigma impacts ART adherence among MSM with HIV. Longitudinal data were drawn from a RCT of a messaging intervention to promote sexual health among MSM. Regression models tested associations between baseline race-based medical mistrust, HIV stigma, and ART adherence at follow-up. In multivariable models with the overall sample of MSM with HIV (n = 383), baseline medical mistrust was negatively associated with ART adherence 3-months post-baseline. Among participants of color (i.e., Black/African American, Hispanic/Latino, or another race; n = 301), HIV stigma was negatively associated with optimal ART adherence 6-months post-baseline.

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Conflicts of Interest:
The authors declare that they have no conflicts of interest.

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Study protocols and intervention materials were approved by the Emory University Institutional Review Board.

Consent to Participate:
All study participants provided informed consent prior to enrollment.

Availability of Data, Material, and Code:
The datasets generated and analyzed during the current study are not publicly available but are available from the corresponding author on reasonable request.

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Medical mistrust was longitudinally associated with reduced ART adherence among racially and ethnically diverse MSM with HIV. HIV-related services might prioritize patients reporting medical mistrust for additional supports.

Keywords

Race-Based Medical Mistrust; Sexual Minority Men; HIV; Antiretroviral Treatment; Treatment Adherence

1. Background

1.1 HIV among MSM in the United States

Gay, bisexual, and other men who have sex with men, collectively referred to as MSM, remain disproportionately impacted by the HIV epidemic, comprising nearly 70% of new HIV diagnoses for the U.S. in 2018 (1). To combat this epidemic, the Joint United Nations Programme on HIV/AIDS (UNAIDS) has set three goals [i.e., 95-95-95 goals] to be achieved by 2030 (1); that 95% of all persons with HIV (PWH) know their status, (2) that 95% of those diagnosed are on antiretroviral treatment (ART), and (3) that 95% of those on ART are virally suppressed (e.g., a viral load <200 copies of HIV RNA/mL) (2). Significant gaps in ART treatment access and viral suppression for MSM with HIV in the U.S, however, remain (3). For 2018, 80.8% of a broad sample of MSM with HIV were linked to care within one month of receiving their diagnosis, though only 70.1% of Black/African American MSM were linked to care in that timeframe (3). Further, 68.3% of all MSM were virally suppressed within 6 months of receiving a diagnosis, with only 61.6% of Black/African American MSM achieving viral suppression (3). Understanding factors that longitudinally impact ART adherence among racially diverse MSM, and thereby impact subsequent viral suppression, are critical to meet 95-95-95 goals.

1.2 Medical Mistrust & HIV Stigma

One psychosocial factor that has been negatively associated with HIV-related outcomes (e.g., ART adherence and viral suppression) for racially diverse PWH populations is medical mistrust (4-7). Medical mistrust, though lacking a standardized definition, has been described as a lack of trust in health care providers, medical institutions, the health care system, and treatments (4, 8, 9). Importantly, medical mistrust has been found to be associated with reduced engagement in HIV care, a suspicion of HIV medication necessity and effectiveness, and decreased ART adherence (4-7). Further, medical mistrust is more prevalent among racial minority groups, particularly among those who are Black or African American, and is grounded in both historical and systemic injustices (i.e., racism) within healthcare systems (5, 8). Race-based medical mistrust (i.e., medical mistrust experienced by racial/ethnic groups), therefore, has been conceptualized as a survival coping mechanism in response to systems-level discrimination, which, in turn, serves to impact HIV-related outcomes through a reluctance to engage in healthcare (10). This is supported by limited research that has found that race-based medical mistrust significantly predicts suboptimal ART adherence 1-month later and is mediated by skepticism regarding medication necessity among a broad sample of PWH in the Southern U.S. (5). These pathways serve to increase

health disparities among racial and ethnic minority PWH (5, 8). Evaluating the prospective associations between medical mistrust and ART adherence among MSM with HIV, and in other regions with endemic HIV, is critical for the development of effective HIV services for this population.

In addition to race-based medical mistrust, social stigma has been found to be independently associated with poorer HIV-related outcomes among MSM with HIV (6, 13). Social stigma, broadly, has been conceptualized as the devaluing of a specific characteristic or attribute (14, 15). Current theoretical frameworks conceptualize stigma as manifesting in three distinct ways: anticipated, internalized, and enacted stigmas (16). Anticipated stigma refers to individuals' expectation of mistreatment as a result of their stigmatized identity or group membership (16). Internalized stigma consists of individuals' self-devaluation related to their stigmatized identity (16). Lastly, enacted stigma, the focus of the current paper, consists of experiences of discrimination and rejection related to one's group membership (16, 17). Importantly, social stigma, including HIV-related stigma, has been associated with longer gaps between HIV care appointments and decreased ART adherence among MSM with HIV (6, 13). Additionally, research has demonstrated that medical mistrust mediates the relationship between certain social stigmas (e.g., healthcare-related stigma) and engagement in healthcare services among Black MSM in Atlanta, GA (6), indicating that investigating both stigma and medical mistrust in tandem could be critical for understanding HIV-related outcomes among racially diverse MSM with HIV. The association between HIV-related stigma and ART adherence for MSM with HIV, however, has primarily been investigated retrospectively or cross-sectionally. In addition, these associations have primarily been investigated within the Southern United States, a region with unique structural and social barriers to ending the HIV epidemic (e.g., disproportionately high levels of poverty, HIV stigma, race-based stigma, and poor healthcare infrastructure) (11, 12), and as such, it is unclear how the association between HIV stigma and ART adherence may translate to other regions with differing socio-cultural contexts. Further understanding the prospective associations between HIV stigma and ART adherence among MSM with HIV across varying time points, and in other socio-geographic regions with endemic HIV, is crucial for the development of effective, tailored HIV-related supports.

1.3 The Current Analysis

Past research has identified two potential psychosocial factors, race-based medical mistrust and HIV stigma, as critical barriers to ART adherence among some populations of PWH in the U.S. More research is needed, however, to test these associations over longer study timeframes, and to test these associations specifically among MSM with HIV residing in regions with endemic HIV outside of the Southern United States. As such, the current study sought to assess whether race-based medical mistrust and enacted HIV stigma was prospectively associated with future ART adherence 3- and 6-months later among racially and ethnically diverse MSM with HIV from regions with endemic HIV.

2. Methods

2.1 Participants and Procedures

Data were drawn from the Mobile Messaging for Men (M^3), a randomized controlled trial (RCT) of a social cognitive theory-based mobile messaging intervention that promotes health-seeking behavior and the adoption of sexual health services among MSM (18). The M^3 study rationale and methodology have previously been described in full (18). Briefly, a total of 1,229 MSM from three U.S. cities with endemic HIV (Detroit, MI, New York City, NY, and Atlanta, GA) were recruited and enrolled into the M^3 RCT between January 2018 and November 2018. Of the 1,229 MSM recruited, 383 were living with HIV and are the focus of the current analysis. All study participants completed survey measures at baseline, 3-month, 6-month, and 9-month follow-up time points. Study protocols and intervention materials were approved by the Emory University Institutional Review Board and M^3 was registered at ClinicalTrials.gov (18).

2.2 Measures

2.2.1 Sociodemographic Characteristics—At baseline, participants self-reported sociodemographic factors including age (in years), ethnicity (Hispanic/Latino *vs.* Not Hispanic/Latino), race (White, Black, or Other), highest level of education obtained (less than a college degree, four-year college degree, or any post-graduate studies), employment status (full-time/part-time/active military, unemployed, or retired/unable to work), annual income ($0-19,999, $20,000-59,999, or $50,000 or more), and past 12-month housing status (homeless *vs.* not homeless).

2.2.2 Baseline Medical Mistrust—Medical mistrust was assessed with the 12-item Group-Based Medical Mistrust Scale (GBMMS) (19). Items were scored on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) and summed to create a composite total score (range = 12-60), with higher scores representing greater mistrust. The GBMMS comprises three subscales: Suspicion, Group disparities in health care, and Lack of support from health care providers (19). The 6-item Suspicion subscale (range = 6-30) addresses a general lack of trust towards health care systems and practices (e.g., "*People of my ethnic group cannot trust doctors and healthcare workers.*"). The 3-item Group disparities in health care subscale (range = 3-15) measures inequality in the treatment of racial/ethnic groups ("*In most hospitals, people of different ethnic groups receive the same kind of care.*"). Lastly, the 3-item Lack of support subscale (range = 3-15) measures beliefs that health care providers' intentions and practices can be insensitive and potentially harmful ("*Doctors have the best interests of people of my ethnic group in mind.*") (19). The overall GBMMS and corresponding subscales demonstrated acceptable-to-good reliability in the current sample (Overall: $\alpha = 0.72$; Suspicion: $\alpha = 0.90$; Group disparities in health care: $\alpha = 0.86$; Lack of support: $\alpha = 0.70$).

2.2.3 Baseline HIV Stigma—HIV stigma was assessed with 9-items from the HIV Stigma Scale (20). These 9 items measure personalized (i.e., enacted) HIV stigma (e.g., "*I have lost friends by telling them I have HIV.*"). Items were scored on a 5-point Likert-type scale ranging from 1 (strongly disagree) to 5 (strongly agree) and summed to create a

composite score (range = 9-45), with higher scores representing greater enacted HIV stigma (20). This subset of HIV Stigma Scale items demonstrated acceptable reliability ($\alpha = 0.73$) within the current study.

2.2.4 ART Adherence at 3- and 6-Month Follow-Up—ART adherence was assessed with participants' self-reported responses to, "*On how many days did you take all of your doses of your HIV medicines?*" for both the past 7-day and past 30-day timeframes. These two questions align with research that has demonstrated accuracy for participants' self-reported ART adherence during 1-month recall protocols (21). The item assessing past 30-day ART adherence was dichotomized to represent: (0) suboptimal ART adherence (< 24 days of ART adherence, or <80% of doses) or (1) optimal ART adherence (≥ 24 days of ART adherence, or ≥ 80% of doses). Both items were assessed at the 3- and 6-month follow-up time points.

2.3 Statistical Analyses

Descriptive statistics were calculated for participant sociodemographic characteristics, race-based medical mistrust, HIV stigma, and ART adherence, both for the overall sample and stratified by race. Bivariate linear and logistic regression analyses were conducted to assess the associations between sociodemographic characteristics, race-based medical mistrust, HIV stigma scores at baseline, and ART adherence 3- and 6-months post-baseline. Multivariable linear and logistic regression analyses were then conducted to test the associations between race-based medical mistrust, HIV stigma, and future ART adherence while controlling for covariates significant in the bivariate analyses. Given that the M^3 intervention content was not designed to address race-based medical mistrust or HIV stigma (18), intervention condition was not controlled for in these analyses. To reduce the potential for multicollinearity, GBMMS subscales that were significantly associated with ART adherence at the bivariate level were retained in lieu of the overall GBMMS score in the multivariable model. Lastly, bivariate and multivariable linear and logistic regression analyses testing the associations between race-based medical mistrust, HIV stigma, and future ART adherence were conducted among a subset of participants that identified as Black/African American, Hispanic/Latino, or another race (i.e., MSM of color with HIV).

3. Results

3.1 Sociodemographic Characteristics

Overall, a total of 383 MSM with HIV completed the M^3 baseline survey, with an average age of 42.0 years (Standard Deviation [SD] = 11.2) (See Table 1). Most identified as Black/African American (54.6%), with fewer identifying as white (21.4%), Hispanic/Latino (15.4%), or another race (8.6%). Over half had less than a four-year college degree (65.8%), had full-time, part-time, or active military employment (54.3%), and had optimal past 30-day ART adherence (88.5%) at baseline. When stratifying the sample by race/ethnicity, there were greater proportions of participants of color reporting past year homelessness (19.9% *vs.* 9.8%, $\chi^2(1) = 4.6$, $p = .033$), an annual income of < $20,000 (48.2% *vs.* 24.7%, $\chi^2(2) = 31.1$, $p < .001$), having less than a college degree (72.3% *vs.* 42.7%, $\chi^2(2) = 27.2$, $p < .001$), and being unemployed (36.7% *vs.* 20.7%, $\chi^2(2) = 7.5$, $p = .023$) compared to

their white counterparts. Additionally, participants of color had significantly higher scores on the GBMMS ($t(365) = -4.8$, $p < .001$), the GBMMS Suspicion subscale ($t(369) = -5.0$, $p < .001$), and the GBMMS Lack of Support subscale ($t(375) = -2.6$, $p = .010$) compared to white participants.

3.2 Multivariable Results in the Overall Sample

In the bivariate models (See Table 2), GBMMS Suspicion scores (retained in lieu of overall GBMMS scores), educational level, employment, income, homelessness, and HIV stigma were significantly associated with 7-day ART adherence at 3-month follow-up and therefore were adjusted for in the multivariable model. In multivariable analyses, baseline GBMMS Suspicion scores were significantly negatively associated with 7-day ART adherence at 3-month follow-up when controlling for covariates (Adjusted β [$a\beta$] = −0.12, 95% CI = −0.24 – −0.002, $p = .046$). Similarly, being unable to work at baseline was negatively associated with 7-day ART adherence 3-months post-baseline compared to being employed ($a\beta = -0.16$, 95% CI = −0.28 – −0.04, $p = .011$). No other factors, including HIV stigma ($a\beta = -0.07$, 95% CI = −0.19-0.04, $p = .220$), were significantly associated with 7-day ART adherence at 3-month follow-up.

In bivariate analyses, GBMMS Suspicion scores and income were significantly associated with 7-day ART adherence at 6-month follow-up and therefore were selected for inclusion in the multivariable model. Similar to the 3-month findings, baseline GBMMS Suspicion scores were significantly negatively associated with 7-day ART adherence at 6-month follow-up when controlling for income ($a\beta = -0.22$, 95% CI = −0.34 – −0.11, $p < .001$) in the multivariable model. Additionally, having an annual income of $50,000 or more was significantly positively associated with past 7-day ART adherence at 6-month follow-up ($a\beta = 0.13$, 95% CI = 0.01 – 0.25, $p = .037$).

In the bivariate models, GBMMS Suspicion scores, race, education, employment, income, and homelessness were significantly associated with 30-day ART adherence at 3-month follow-up and, as such, were adjusted for in the multivariable model. In contrast to what was found in the 7-day ART adherence models, baseline GBMMS Suspicion scores were not associated with 30-day ART adherence 3-months post-baseline when controlling for covariates ($aOR = 0.96$, 95% CI = 0.90-1.01, $p = .100$). Being unable to work, however, was associated with reduced odds of optimal 30-day ART adherence compared to being employed ($aOR = 0.42$, 95% CI = 0.20-0.89, $p = .024$). Additionally, those who reported being homeless at baseline were significantly less likely to report optimal 30-day ART adherence 3-months post-baseline compared to those who were housed ($aOR = 0.43$, 95% CI = 0.23-0.80, $p = .008$).

In the bivariate models, GBMMS Suspicion scores, race, education, employment, income, homelessness, and HIV stigma were significantly associated with 30-day ART adherence at 6-month follow-up and were therefore included in the multivariable model. In this model, higher baseline Suspicion scores were associated with reduced odds of optimal 30-day ART adherence when controlling for covariates ($aOR = 0.94$, 95% CI = 0.88-0.99, $p = .039$). Additionally, those who reported having a four-year college degree at baseline were significantly more likely to report optimal 30-day ART adherence 6-months post-baseline

compared to those who had less than four-years of college (*aOR* = 2.61, 95% CI = 1.19-5.70, *p* = .016).

3.3 Multivariable Results in a Subset of Participants of Color

In bivariate regression analyses among a subset of participants of color (*n* = 301), baseline GBMMS Suspicion scores, educational level, employment, and HIV stigma were significantly associated with 7-day ART adherence at 3-month follow-up and were selected for inclusion in the multivariable model. In this model, however, baseline GBMMS Suspicion scores were not significantly associated with 7-day ART adherence at 3-month follow-up when controlling for covariates (*aβ* = −0.10, 95% CI = −0.24-0.04, *p* = .154). Being unable to work at baseline, however, was negatively associated with 7-day ART adherence 3-months post-baseline compared to being employed (*aβ* = −0.19, 95% CI = −0.33 – −0.05, *p* = .010). No other factors, including HIV stigma (*aβ* = −0.12, 95% CI = −0.26-0.01, p = .074), were significantly associated with 7-day ART adherence at 3-month follow-up in the multivariable model.

In bivariate analyses, only baseline GBMMS Suspicion scores were significantly associated with 7-day ART adherence at 6-month follow-up and, as such, we selected the covariates that were significantly associated with 7-day ART adherence at the 3-month time point for inclusion in the multivariable model; education level, employment, and HIV stigma. In this model, baseline GBMMS Suspicion scores were significantly negatively associated with 7-day ART adherence at 6-month follow-up (*aβ* = −0.31, 95% CI = −0.44 – −0.17, *p* < .001). No other variables, including HIV stigma (*aβ* = 0.02, 95% CI = −0.12 – 0.16, *p* = .784), were associated with past 7-day ART adherence at 6-month follow-up.

Baseline GBMMS Suspicion scores, education level, employment, income, homelessness, and HIV stigma were all associated with 30-day ART adherence 3-months post-baseline in the bivariate models and were therefore adjusted for in the multivariable model. In contrast, baseline GBMMS Suspicion scores were not associated with 30-day ART adherence 3-months post-baseline when controlling for covariates (*aOR* = 0.97, 95% CI = 0.91-1.03, *p* = .266). Those who reported being homeless at baseline, however, were significantly less likely to report optimal 30-day ART adherence 3-months post-baseline compared to those who were housed (*aOR* = 0.48, 95% CI = 0.25-0.93, *p* = .030).

Baseline GBMMS Suspicion scores, education level, income, homelessness, and HIV stigma were significantly associated with 30-day ART adherence at 6-months post-baseline in the bivariate analyses and, as such, were included within the multivariable model. In multivariable analyses, higher baseline GBMMS Suspicion scores were associated with reduced odds of optimal 30-day ART adherence when controlling for covariates (*aOR* = 0.94, 95% CI = 0.88-0.99, *p* = .032). Similarly, higher HIV stigma scores at baseline were associated with a reduced odds of optimal ART adherence 6-months post-baseline when controlling for covariates (*aOR* = 0.97, 95% CI = 0.94-0.99, *p* = .026). Additionally, those who reported being homeless at baseline were significantly less likely to report optimal 30-day ART adherence 6-months post-baseline compared to those who were housed (*aOR* = 0.48, 95% CI = 0.25-0.94, *p* = .033). Conversely, having a four-year college degree, was

associated with increased odds of optimal 30-day ART adherence compared to having less than a four-year college degree (*aOR* = 2.73, 95% CI = 1.13-6.62, *p* = .026).

4. Discussion

The current study longitudinally tested the associations between race-based medical mistrust, enacted HIV stigma, and future ART adherence among a racially and ethnically diverse sample of MSM with HIV from Detroit, MI, New York, NY and Atlanta, GA. The findings illustrate that, among the overall sample of MSM with HIV, the suspicion component of race-based medical mistrust was statistically associated with decreased 7-day ART adherence 3- and 6-months later, and a reduced odds of optimal 30-day ART adherence 6-months later, when controlling for covariates. These findings were further echoed within a subset of participants of color, in which medical mistrust-related suspicion was associated with decreased 7- and 30-day ART adherence at 6-month follow-up.

The study results align with past research finding that medical mistrust is negatively associated with HIV-related outcomes among both PWH and MSM with HIV (4-7), and that race-based medical mistrust, specifically, was associated with suboptimal ART adherence among racial and ethnic minority PWH over a 1-month timeframe (5, 8). The results of the current study expand this work to demonstrate that the suspicion component of race-based medical mistrust may play a critical role in HIV-related outcomes, and that this association holds for MSM with HIV, specifically, and can be sustained for both 3- and 6-month timeframes. Given the context of historical injustice, structural racism, and white supremacy that racially and ethnically diverse MSM with HIV experience (10, 22), medical mistrust may be a survival coping mechanism in response to these injustices (10). This work, then, suggests that it could be important for HIV intervention and treatment efforts to not only prioritize MSM patients with HIV reporting race-based medical mistrust for receiving additional ART adherence supports, but to also investigate ways in which HIV-related healthcare services can be more trustworthy for racially diverse MSM with HIV. Strategies that have been suggested to address mistrust among racially and ethnically diverse PWH, and could be further adapted for SMM with HIV, include eHealth intervention strategies, partnering with community workers, and employing healthcare staff that better reflect the population of interest (23).

It is important to note, however, that the proportion of variance in 7-day ART adherence explained by medical mistrust-related suspicion was relatively small for the overall sample (1.4% at 3-month follow-up and 4.8% at 6-month follow-up). The small proportion of variance explained could be due, in part, to the relatively low levels of medical mistrust-related suspicion reported by the overall sample (*M* = 10.6 out of a maximum score of 30), and also likely suggests that a multitude of factors (e.g., education, employment, income, housing, and other structural-level factors that coincide with, and exacerbate, medical mistrust (23)) will likely need to be addressed to improve ART adherence for this population and to meet the 95-95-95 goals set by UNAIDS (2). Given that the subset of participants of color had significantly higher medical mistrust scores, and that medical mistrust-related suspicion explained nearly 10% of the variance in 7-day ART adherence at

6-month follow-up (9.61%), it is possible that medical mistrust is a particularly salient factor in long-term HIV-related health for MSM of color with HIV.

Contrary to existing literature that has demonstrated that HIV stigma is associated with longer gaps between HIV care appointments, decreased ART adherence, and a greater likelihood of having a detectable viral load among MSM with HIV, and that medical mistrust mediates the relationship between certain social stigmas and health service engagement (6, 13, 24), baseline enacted HIV stigma was not significantly associated with past 7-day or 30-day ART adherence at 3- or 6-months post-baseline in the overall sample when controlling for covariates. Interestingly, higher enacted HIV stigma scores were significantly associated with reduced odds of optimal 30-day ART adherence at 6-months, but not at 3-months, post-baseline for a subset of participants of color. This potentially indicates structural-level factors (e.g., education, employment, and housing), rather than HIV stigma, as particularly important factors in the immediate-term for ART adherence among racially and ethnically diverse MSM with HIV (23, 25), and that multi-level approaches to HIV intervention development could be needed for this population. It also indicates, however, that enacted HIV stigma is of potential concern for MSM of color with HIV, specifically, and that the associations between this form of stigma and ART adherence can be sustained over time (i.e., for at least 6 months). Though limited past research has found PWH of color reported lower levels of enacted HIV stigma compared to their white counterparts (26), the current findings potentially provide further support for the importance of investigating and understanding intersectional stigma (e.g., HIV-, sexual orientation-, race-related stigma, and/or other overlapping forms of marginalization) for MSM of color with HIV (26-30). Future research with additional, validated measures of stigma (e.g., internalized and anticipated HIV stigma, sexual orientation stigma, and race-based stigma) and ART adherence, and across varying study timeframes, is critically needed to fully explore these associations.

4.1 Limitations

The sample consisted of MSM with HIV from Detroit, MI, New York, NY, and Atlanta, GA, who were predominately people of color (79%), and had low socioeconomic status (43% had an annual income ≤ $20,000). Consequently, the generalizability of the findings may be limited to MSM more likely to engage in mHealth research in these areas. The reliance on self-report for potentially sensitive information (e.g., ART adherence) may have resulted in the underreporting of the outcomes of interest due to social desirability bias. Despite the potential for underreporting, effect sizes were sufficiently large to detect statistical significance, and the results presented herein likely represent conservative measures of association. Lastly, due to the longitudinal nature of the study design, attrition is a potential limitation for these analyses. Though the retention rate was within acceptable limits (85%) at the 3- and 6-month follow-up time points, it is possible that selection bias was introduced from participant loss to follow-up (31).

5. Conclusion

We found baseline race-based medical mistrust-related suspicion was associated with reduced ART adherence, both 3- and 6-months later among a racially diverse sample of MSM with HIV. Additionally, we found that enacted HIV stigma was associated with reduced odds of optimal 30-day ART adherence 6-months later among a subset of participants of color. These findings reinforce and expand existing literature by delineating how both race-based medical mistrust and HIV stigma can serve as one of many important factors that longitudinally impact HIV-related treatment for a variety of MSM populations. These results have implications for the prioritization of ART adherence supports and for future RCTs examining whether tailored interventions to reduce medical mistrust and HIV stigma can mitigate disease progression among racially and ethnically diverse MSM with HIV. Further research is needed to fully understand both the relationship between different facets of HIV stigma and ART adherence as well as between race-based medical mistrust and varying indicators of ART adherence among MSM with HIV.

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Table 1.

Sociodemographic characteristics, race-based medical mistrust, and HIV stigma at baseline among a sample of MSM with HIV (n = 383) in Atlanta, Detroit, and New York, 2018.

Variable	Overall Sample n(%)	White Participants n(%)	Participants of Color n(%)	Test Statistic p-value
Age (Mean, SD)	42.0 (11.2)	43.6 (11.3)	41.6 (11.2)	t = 1.45 .1466
Race				
White	82 (21.4)	82 (100.0)	--	--
Black/African American	209 (54.6)	--	209 (69.4)	--
Hispanic/Latino	59 (15.4)	--	59 (19.6)	--
Other[a]	33 (8.6)	--	33 (11.0)	--
Education				
Less than 4 years of college	252 (66.0)	35 (42.7)	217 (72.3)	χ^2 = 27.17 **<.0001**
Four-year college degree	78 (20.4)	25 (30.5)	53 (17.7)	
Any post-graduate studies	52 (13.6)	22 (26.8)	30 (10.0)	
Employment Status				
Full Time/Part Time/Active Military	208 (54.5)	52 (63.4)	156 (52.0)	χ^2 = 7.53 **.0232**
Unemployed	127 (33.2)	17 (20.7)	110 (36.7)	
Retired/Unable to Work	47 (12.3)	13 (15.9)	34 (11.3)	
Annual Income				
$0-19,999	164 (43.1)	20 (24.7)	144 (48.2)	χ^2 = 31.14 **<.0001**
$20,000-49,999	147 (38.7)	30 (37.0)	117 (39.1)	
$50,000 or more	69 (18.2)	31 (38.3)	38 (12.7)	
Past 12 Month Homelessness				
Yes	68 (17.7)	8 (9.8)	60 (19.9)	χ^2 = 4.57 **.0325**
No	315 (82.3)	74 (90.2)	241 (80.1)	
Past 30-Day ART Adherence at Baseline				
Optimal Adherence (≥ 24 days)	339 (88.5)	73 (89.0)	266 (88.4)	χ^2 = 0.03 .8696
Suboptimal Adherence (< 24 days)	44 (11.5)	9 (11.0)	35 (11.6)	
Past 7-Day ART Adherence at Baseline (Mean, SD)	6.4 (1.4)	6.6 (1.3)	6.4 (1.5)	t = 1.29 .1972
Medical Mistrust (Mean, SD)	27.3 (5.8)	24.6 (5.5)	28.1 (5.7)	t = −4.84 **<.0001**
Suspicion Subscale (Mean, SD)	10.6 (4.5)	8.5 (3.6)	11.2 (4.5)	t = −4.95 **<.0001**
Group Disparities Subscale (Mean, SD)	9.7 (3.6)	9.5 (4.0)	9.7 (3.5)	t = −0.55 .5804
Lack of Support Subscale (Mean, SD)	7.1 (2.0)	6.6 (1.7)	7.2 (2.0)	t = −2.59 **.0099**
HIV Stigma (Mean, SD)	18.4 (8.9)	18.6 (8.5)	18.4 (9.0)	t = 0.16 .8703

Abbreviations: SD = Standard Deviation.

[a]Other = Participants who self-identified as either Asian American/Pacific Islander, Native American/American Indian/Alaskan Native, Mixed Race, or as an “Other” racial group.

Table 2.

Bivariate and multivariable associations between sociodemographic characteristics, medical mistrust, and HIV stigma at baseline and ART adherence at follow-up among the overall sample of MSM with HIV (n = 383) in Atlanta, Detroit, and New York, 2018-2019.

	7 Day ART Adherence (3 Month Follow-Up)		*30 Day ART Adherence (3 Month Follow-Up)*		*7 Day ART Adherence (6 Month Follow-Up)*		*30 Day ART Adherence (6 Month Follow-Up)*	
	β (95% CI)	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**	**β (95% CI)**	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**
Characteristics at Baseline								
Age	−0.02 (−0.13-0.10)	--	1.00 (0.98-1.02)	--	0.06 (−0.05-0.18)	--	1.01 (0.99-1.03)	--
Race								
White	0.09 (−0.03-0.20)	--	**2.58** ** **(1.31-5.08)**	1.70 (0.80-3.63)	0.03 (−0.09-0.14)	--	**1.96** * **(1.02-3.74)**	1.10 (0.53-2.31)
Black (Ref)	--	--	--	--	--	--	--	--
Hispanic/Latino	−0.01 (−0.13-0.10)	--	1.30 (0.67-2.49)	0.97 (0.48-1.96)	0.01 (−0.10-0.13)	--	1.18 (0.61-2.28)	0.89 (0.43-1.81)
Other[a]	0.01 (−0.11-0.14)	--	0.68 (0.32-1.45)	0.80 (0.34-1.86)	−0.06 (−0.18-0.06)	--	0.62 (0.29-1.32)	0.62 (2.64-1.43)
Education								
Less than 4 years of college (Ref)	--	--	--	--	--	--	--	--
Four-year college degree	**0.15** ** **(0.04-0.26)**	0.10 (−0.02-0.21)	**2.94** ** **(1.47-5.86)**	1.81 (0.87-3.77)	0.07 (−0.04-0.18)	--	**3.70** *** **(1.76-7.77)**	**2.61** * **(1.19-5.70)**
Any post-graduate studies	0.08 (−0.03-0.20)	0.04 (−0.08-0.16)	1.80 (0.88-3.68)	1.01 (0.44-2.29)	0.04 (−0.07-0.15)	--	2.03 (0.97-4.34)	1.26 (0.54-2.94)
Employment Status								
Full time/Part time/Military (Ref)	--	--	--	--	--	--	--	--
Unemployed	**−0.18** ** **(−0.30- −0.06)**	−0.12 (−0.25-0.02)	**0.38** *** **(0.23-0.63)**	0.55 (0.30-1.02)	−0.03 (−0.15-0.08)	--	**0.49** ** **(0.30-0.91)**	0.84 (0.45-1.56)
Unable to Work	**−0.16** ** **(−0.29- −0.05)**	**−0.16** * **(−0.28- −0.04)**	**0.33** ** **(0.17-0.65)**	**0.42** * **(0.20-0.89)**	−0.01 (−0.13-0.12)	--	0.56 (0.28-1.12)	0.67 (0.30-1.50)

	7 Day ART Adherence (3 Month Follow-Up)		*30 Day ART Adherence (3 Month Follow-Up)*		*7 Day ART Adherence (6 Month Follow-Up)*		*30 Day ART Adherence (6 Month Follow-Up)*	
	β (95% CI)	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**	**β (95% CI)**	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**
Annual Income								
$0-19,999 (Ref)	--	--	--	--	--	--	--	--
$20,000-49,999	0.10 (−0.02-0.22)	0.01 (−0.13-0.15)	**1.84 * (1.11-3.04)**	0.95 (0.52-1.75)	**0.15 * (0.02-0.27)**	0.11 (−0.01-0.23)	**2.29 ** (1.36-3.83)**	1.57 (0.84-2.91)
$50,000 or more	**0.12 * (0.001-0.23)**	0.01 (−0.13-0.15)	**2.30 * (1.16-4.55)**	0.94 (0.38-2.29)	**0.17 ** (0.05-0.29)**	**0.13 * (0.01-0.25)**	**2.21 * (1.13-4.30)**	1.19 (0.50-2.80)
Past 12 Month Homelessness								
Yes	**−0.14 * (−0.26- −0.02)**	−0.05 (−0.17-0.08)	**0.29 *** (0.17-0.49)**	**0.43 ** (0.23-0.80)**	−0.11 (−0.23-0.02)	--	**0.35 *** (0.20-0.60)**	0.54 (0.29-1.03)
No (Ref)	--	--	--	--	--	--	--	--
Overall Medical Mistrust Score	**−0.13 * (−0.25- −0.02)**	--	**0.96 * (0.92-0.99)**	--	**−0.17 ** (−0.28- −0.05)**	--	0.97 (0.93-1.01)	--
Suspicion Subscale	**−0.19 ** (−0.30- −0.07)**	**−0.12 * (−0.24- −0.002)**	**0.93 ** (0.88-0.98)**	0.96 (0.90-1.01)	**−0.29 *** (−0.36- −0.13)**	**−0.22 *** (−0.34- −0.11)**	**0.91 *** (0.86-0.96)**	**0.94 * (0.88-0.99)**
Group Disparities Subscale	0.01 (−0.10-0.12)	--	1.00 (0.94-1.06)	--	0.07 (−0.05-0.18)	--	**1.09 * (1.02-1.16)**	--
Lack of Support Subscale	0.01 (−0.11-0.13)	--	1.01 (0.89-1.13)	--	−0.08 (−0.19-0.04)	--	0.92 (0.82-1.04)	--
HIV Stigma Score	**−0.15 * (−0.26- −0.03)**	−0.07 (−0.19-0.04)	0.98 (0.96-1.01)	--	0.02 (−0.10-0.14)	--	**0.97 ** (0.94-0.99)**	0.97 (0.95-1.00)

Abbreviations: β = Standardized Beta; aβ = Adjusted Standardized Beta; OR = Odds Ratio; aOR = Adjusted Odds Ratio.

[a]Other = Participants who self-identified as either Asian American/Pacific Islander, Native American/American Indian/Alaskan Native, Mixed Race, or as an "Other" racial group.

*$p < .05$

**$p < .01$

***$p < .001$.

Table 3.

Bivariate and multivariable associations between sociodemographic characteristics, medical mistrust, and HIV stigma at baseline and ART adherence at follow-up among a sample MSM of color with HIV (n = 301) in Atlanta, Detroit, and New York, 2018-2019.

	7 Day ART Adherence (3 Month Follow-Up)		*30 Day ART Adherence (3 Month Follow-Up)*		*7 Day ART Adherence (6 Month Follow-Up)*		*30 Day ART Adherence (6 Month Follow-Up)*	
	β (95% CI)	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**	**β (95% CI)**	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**
Characteristics at Baseline								
Age	−0.04 (−0.18-0.09)	--	1.00 (0.98-1.03)	--	0.10 (−0.03-0.23)	--	1.01 (0.99-1.03)	--
Race								
Black (Ref)	--	--	--	--	--	--	--	--
Hispanic/Latino	−0.01 (−0.14-0.12)	--	1.30 (0.67-2.49)	--	0.01 (−0.11-0.14)	--	1.18 (0.61-2.28)	--
Other[a]	0.01 (−0.12-0.15)	--	0.68 (0.32-1.45)	--	−0.07 (−0.20-0.07)	--	0.62 (0.29-1.32)	--
Education								
Less than 4 years of college (Ref)	--	--	--	--	--	--	--	--
Four-year college degree	**0.15** * **(0.03-0.28)**	0.12 (−0.001-0.25)	**2.64** * **(1.22-5.69)**	1.75 (0.78-3.92)	−0.06 (−0.06-0.19)	0.06 (−0.06-0.18)	**3.33** ** **(1.43-7.74)**	**2.73** * **(1.13-6.62)**
Any post-graduate studies	0.03 (−0.10-0.16)	0.01 (−0.12-0.14)	1.77 (0.73-4.32)	1.06 (0.40-2.79)	−0.03 (−0.16-0.10)	−0.01 (−0.14-0.11)	1.67 (0.68-4.06)	1.20 (0.45-3.23)
Employment Status								
Full time/Part time/Military (Ref)	--	--	--	--	--	--	--	--
Unemployed	**−0.16** * **(−0.30- −0.03)**	−0.11 (−0.25- −0.03)	**0.43** ** **(0.25-0.75)**	0.68 (0.34-1.33)	0.001 (−0.13-0.14)	0.05 (−0.09-0.19)	0.59 (0.34-1.01)	--
Unable to Work	**−0.20** ** **(−0.34- −0.07)**	**−0.19** ** **(−0.33- −0.05)**	**0.35** ** **(0.16-0.77)**	0.52 (0.22-1.23)	−0.03 (−0.18-0.11)	0.01 (−0.13-0.16)	0.50 (0.23-1.10)	--
Annual Income								
$0–19,999 (Ref)	--	--	--	--	--	--	--	--

	7 Day ART Adherence (3 Month Follow-Up)		*30 Day ART Adherence (3 Month Follow-Up)*		*7 Day ART Adherence (6 Month Follow-Up)*		*30 Day ART Adherence (6 Month Follow-Up)*	
	β (95% CI)	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**	**β (95% CI)**	**aβ (95% CI)**	**OR (95% CI)**	**aOR (95% CI)**
$20,000-49,999	0.09 (−0.04-0.23)	--	**1.91 *** **(1.11-3.28)**	1.08 (0.56-2.08)	0.09 (−0.04-0.22)	--	**2.08 *** **(1.19-3.63)**	1.48 (0.79-2.76)
$50,000 or more	0.06 (−0.06-0.19)	--	1.93 (0.85-4.39)	1.07 (0.39-2.95)	0.11 (−0.03-0.25)	--	1.39 (0.64-3.02)	0.94 (0.38-2.33)
Past 12 Month Homelessness								
Yes	−0.12 (−0.26- −0.02)	--	**0.32 *** **(0.18-0.57)**	**0.48 *** **(0.25-0.93)**	−0.13 (−0.28-0.01)	--	**0.35 *** **(0.19-0.62)**	**0.48 *** **(0.25-0.94)**
No (Ref)	--	--	--		--	--	--	--
Overall Medical Mistrust Score	−0.09 (−0.23- −0.04)	--	0.98 (0.94-1.02)	--	**−0.22 ** ** **(−0.35- −0.09)**	--	0.97 (0.93-1.02)	--
Suspicion Subscale	**−0.15 *** **(−0.28- −0.02)**	−0.10 (−0.24- 0.04)	**0.94 *** **(0.89-0.99)**	0.97 (0.91-1.03)	**−0.30 *** ** **(−0.43- −0.17)**	**−0.31 *** ** **(−0.44- −0.17)**	**0.91 ** ** **(0.86-0.97)**	**0.94 *** **(0.88-0.99)**
Group Disparities Subscale	0.03 (−0.11-0.16)	--	1.04 (0.97-1.12)	--	0.07 (−0.07-0.20)	--	**1.09 *** **(1.02-1.18)**	--
Lack of Support Subscale	0.03 (−0.11-0.17)	--	1.02 (0.90-1.15)	--	−0.09 (−0.22-0.05)	--	0.90 (0.79-1.02)	--
HIV Stigma Score	**−0.15 *** **(−0.28- −0.02)**	−0.12 (−0.26-0.01)	**0.97 *** **(0.95-0.99)**	0.98 (0.95-1.01)	−0.02 (−0.16-0.12)	0.02 (−.12-0.16)	**0.96 ** ** **(0.94-0.99)**	**0.97 *** **(0.94-0.99)**

Abbreviations: β = Standardized Beta; aβ = Adjusted Standardized Beta; OR = Odds Ratio; aOR = Adjusted Odds Ratio.

[a]Other = Participants who self-identified as either Asian American/Pacific Islander, Native American/American Indian/Alaskan Native, Mixed Race, or as an "Other" racial group.

*$p < .05$

**$p < .01$

***$p < .001$.