

**TREATMENT AS PREVENTION (TASP) AMONG BLACK
TRANSGENDER WOMEN (BTW) IN THE UNITED STATES:
CHARACTERIZING THE HIV CARE CONTINUUM AND
IDENTIFYING CORRELATES OF HIV DIAGNOSIS AND CARE**

by

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ABSTRACT

Public Health Significance: Treatment as prevention (TasP) could be an effective way to address the HIV epidemic among Black transgender women (BTW) in the United States. For TasP to be effective in this population, more information regarding the manifestation of HIV care continuum outcomes among BTW is needed.

Methods: Data came from *Promoting Our Worth, Equality, and Resilience* (POWER). In 2014 and 2015, POWER recruited Black men who have sex with men (BMSM) and BTW who attended Black Pride events in Philadelphia, PA, Houston, TX, Washington, D.C., Detroit, MI, Memphis, TN, and Atlanta, GA. A total of 245 BTW provided complete data for our analysis.

Results: We detected an HIV prevalence rate of 37.8%. Of the 92 HIV-positive BTW, 50% had prior knowledge of their HIV-positive status. 100% of those with prior knowledge of their HIV-positive status reported that they were linked to HIV medical care. 93% of HIV-positive BTW linked to HIV medical care reported that they were retained in HIV medical care, and 95% of those retained in HIV medical care reported that they had been prescribed antiretrovirals (ARVs). 68% of the 41 HIV-positive BTW prescribed ARVs reported that they had an undetectable viral load. Health outcomes associated with HIV care in other populations were not associated with HIV diagnosis or viral suppression in our sample.

Conclusion: Developing and implementing interventions that address testing uptake may assist in informing the HIV disparity among BTW in the United States. More research is needed to identify and understand the structural, community, and individual-level barriers and facilitators that shape BTW's engagement in HIV medical care.

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1.0 BACKGROUND

Transgender women experience high rates of HIV infection. A 2008 meta-analysis reported an HIV prevalence of 28% in this population, with markedly higher prevalence (56%) among Black transgender women (BTW) [1]. Given the high prevalence of HIV infection in this population, treatment as prevention (TasP) could be an effective way to prevent additional HIV infection among BTW as it is widely supported as a means to lower HIV incidence [2-4]. However, before we can develop and implement TasP interventions among BTW, we need to characterize the HIV care continuum and identify correlates of HIV care in this population. While several characterizations of the HIV care continuum include transgender women alongside samples of men who have sex with men (MSM), few examine these outcomes among transgender women exclusively [5, 6]. To our knowledge, no characterizations of the HIV care continuum among BTW exist, a major gap if TasP is to be effectively implemented among BTW. Interventions require knowledge of which stage of HIV care continuum patients experience barriers in order to address them.

In order to address barriers that keep patients from progressing along the HIV care continuum, we need to know what differentiates BTW who get stuck at one stage from those who progress. Little information is available regarding such barriers among BTW [7, 8]. BTW have limited access to education, housing, and health care opportunities [1]. Compared to the general population, BTW have achieved fewer years of education, experience higher rates of homelessness, and have been less likely to access medical care [1]. Additionally, BTW experience high rates of incarceration, engagement in sex work, experiences of physical assault, intimate partner violence, depression and substance use [1]. As these factors are associated with HIV care continuum outcomes in other populations [9-13], and because formative research among transgender women identified these outcomes as potential barriers to HIV testing and care [7], they warrant examination. In addition to these outcomes, social support should also be

explored. Formative research among transgender women identified the support of friends and family as potential facilitator to HIV care [7].

This exploratory study seeks to fill aforementioned gaps in the literature by: (1) determining the prevalence of HIV care continuum outcomes, and (2) exploring correlates of HIV care continuum outcomes among a sample of HIV-positive BTW

2.0 METHODS

2.1 STUDY DESIGN AND POPULATION

Data came from the Promoting, Our Worth, Equality, and Resilience (POWER) study. In 2014 and 2015, POWER employed time-location sampling to recruit men who have sex with men and transgender women at Black Pride events in six cities: Atlanta, GA; Detroit, MI; Houston, TX; Memphis, TN; Philadelphia, PA; and Washington, DC. Individuals were eligible to participate if they: (1) were assigned male sex at birth; (2) reported having a male sexual partner in their lifetime; and (3) were 18 years or older. This study only includes those who: (1) identified as “Black” or “African American”; and (2) identified as female, transgender, or reported having transitioned from male to female gender.

Participants completed an anonymous self-administered, computer-assisted, behavioral health questionnaire on electronic tablets designed to take approximately 20 minutes to complete. To prevent duplication of participants in our sample, we asked participants a series of questions to create a unique identifier code [14]. Anyone with duplicate questionnaire data had only their first response included in the current investigation.

Upon completion of the behavioral health questionnaire, POWER offered every participant confidential HIV testing. Confidential HIV testing was performed onsite by local community based organizations (CBOs). CBOs utilized their own rapid HIV-testing protocol, and used either the Oraquick (OraSure Technologies, Inc., Bethlehem, PA) Clearview STAT-PAK (Alere Inc., Waltham, MA), or INSTI (bioLythical Laboratories, Richmond, BC) test. Confirmatory testing of preliminary positive results using Western Blot was performed offsite at a later date. Participants electing confidential HIV testing received their test result and \$20. If a participant declined confidential HIV testing, POWER staff offered anonymous HIV testing.

POWER staff used OraQuick for oral fluid to provide anonymous HIV testing. Those electing for anonymous testing did not receive their HIV test result but did receive \$20. Participants declining either form of HIV testing were paid \$10 for completion of the survey. HIV test results were anonymously linked to survey files via a unique subject ID. All study procedures were approved by the Institutional Review Board at the University of Pittsburgh.

2.2 MEASURES

HIV status

HIV status was assessed with a combination of biological and self-report data. HIV-positive status was determined if participants had a preliminary HIV-positive test result, or responded “HIV-positive” to the following question: “What was the result of your most recent HIV test?” Unlike HIV-positive status, HIV-negative status had to be confirmed via HIV test result. Serostatus was coded as missing for all participants who assayed biologically indeterminate, with the exception of those who self-identified as HIV-positive.

Knowledge of HIV-Positive Status

Self-report and biological data were used to assess previously undiagnosed HIV-positive status. Previously diagnosed HIV-positive status was determined if participants identified themselves as HIV-positive in the questionnaire. Previously undiagnosed HIV-positive was determined if participants received a HIV-positive test result and responded “HIV-negative,” “Indeterminate,” or “I don’t know,” when asked about the result of their most recent HIV test.

Remaining HIV Care Continuum Outcomes: Linkage, Retention, ART prescription, and Viral Suppression

Assessment of *linkage to HIV medical care* used the following yes/no item: “Have you ever been seen by a doctor, nurse, or other health care provider for a medical evaluation or care related to your HIV infection?” *Retention in HIV medical care* was measured with the following item: “Are you currently being seen by a doctor, nurse, or other health care provider for a medical evaluation or care related to your HIV infection?” Assessment of *prescription of anti-retroviral medications* (ARVs) was assessed with the question: “Are you currently taking

antiretroviral medicines to treat your HIV infection? To determine *viral load* one item was used: “What were the results of your most recent HIV lab tests? (Viral load)” with four responses (1) undetectable; (2) detectable, but under 10,000; (3) 10,000 - 100,000; and (4) Higher than 100,000.” This variable was recoded as a dichotomous outcome: undetectable (response 1) or detectable (response 2, 3, or 4).

Depression

The Center for Epidemiologic Studies Depression 10 (CES-D 10; Cronbach’s alpha=0.74) measured past-week depressive symptomatology [15]. The scale was dichotomized so that individuals with scores of 10 or greater were considered to have sufficient depressive symptomatology consistent with major or clinical depression [15].

Poly-Substance Use

Past-year poly-substance use was operationalized as the use of two or more of the following substances in the last 12-months: poppers, crack cocaine, cocaine, methamphetamines, heroin, non-prescribed prescription opiates (e.g., Vicodin, OxyContin), or party drugs other than methamphetamine (e.g., MDMA, ecstasy, GHB).

Physical Assault

Measurement of physical assault used the following yes/no item: “In the past year have you been physically assaulted (hit, kicked, beat up or in any other way physically harmed)?”

Intimate Partner Violence

Intimate partner violence was assessed with the following yes/no item: “In the past year, have you been in a relationship with a partner who has ever hit, kicked, slapped, beaten or in any other way physically assaulted you?”

Social Support

Family and friend support were measured with the following question: “To what degree do you feel you receive support from your family/friends? none, a little, somewhat, a lot.”

Incarceration

Assessment of incarceration used was measured with the following yes/no item: “In the past 2 years, have you been incarcerated (spent a night or more in jail or prison)?”

Homelessness

Homelessness was assessed with the following yes/no item: “In the past 12 months have you been homeless at any time? By homeless, I mean you were living on the street, in a shelter, in a Single Room Occupancy hotel (SRO), or in a car.”

Sex work

Two questions measured engagement in sex work. “In the past 12 months, did you ever give or take money, drugs or other goods for sex with a female partner? (Check all that apply);” the question was repeated for male partners. Response options included: “No;” “Yes, I received money, drugs or other goods for sex;” and “Yes, I gave money, drugs or other goods for sex.” Participants were considered to have engaged in sex work if they received money, drugs, or goods for sex with either a female or male partner.

Health Insurance Coverage and Access to Medical Care

The presence of health insurance coverage was measured with the following yes/no item: “Do you currently have health insurance or health care coverage?” Access to medical care was assessed with the yes/no item: “During the past 12 months, was there any time when you needed medical care but didn’t get it because you couldn’t afford it?”

Demographics

Age, education, and city of data collection were also assessed. Age was measured in years, and four levels were used to measure education: less than high school, high school diploma, some college, and college diploma or more.

2.3 ANALYSIS

Of the 290 BTW who completed the survey, 15.5% were missing data on at least one variable in our analysis. Bivariate analyses compared demographics of those with no missing data to those missing data on at least one variable; there was no significant difference between the two groups so we removed those with missing data using listwise deletion, creating an analytic sample of 245 participants.

Bivariate analysis compared diagnosed HIV-positive BTW to undiagnosed HIV-positive BTW as well as diagnosed HIV-positive BTW with an undetectable viral load to diagnosed HIV-positive BTW with a detectable viral load. We used chi-square tests for categorical variables and t-tests for continuous variables. We conducted analyses in SAS version 9.4 , (SAS Institute, Inc., Cary, NC) and all significance was set at $\alpha = 0.05$.

3.0 RESULTS

Table 3.1 shows sociodemographic characteristics of the 245 BTW in the sample. The mean age was 29.9 (range: 18-84); 26.9% of the sample had not completed high school, and 79.6% of the sample had some form of health insurance and/or coverage. In the past two years, 34.7% of BTW had been incarcerated, and in the past-year 42.0% of BTW had been homeless, 18.9% had engaged in sex work with male and/or female partners, and 46.3% had experienced physical assault. HIV prevalence in the sample was 37.6% (n=92).

Figure 3.1 depicts the HIV care continuum among the HIV-positive BTW in our sample. Of the 92 HIV-positive BTW, 50% (n=46) had prior knowledge of their HIV-positive status. 100% (n=46) of those with prior knowledge of their HIV-positive status were linked to HIV medical care. 93% (n=43) of HIV-positive BTW linked to HIV medical care were retained in HIV medical care, and 95% (n=41) of those retained in HIV medical care had been prescribed antiretrovirals (ARVs). 68% (n=28) of the 41 HIV-positive BTW prescribed ARVs had an undetectable viral load.

Table 3.2 shows a comparison of diagnosed HIV-positive BTW to undiagnosed HIV-positive BTW. Undiagnosed HIV-positive BTW reported completing marginally fewer years of education, (p=0.07) and had marginally higher levels of incarceration (p=0.06) and friend support (p=0.06). Undiagnosed HIV-positive BTW also reported significantly lower levels of depression. For example, 45.7% of undiagnosed HIV-positive BTW reported being depressed compared to 67.4% of diagnosed HIV-positive BTW.

Table 3.2 also shows a comparison of diagnosed HIV-positive BTW with an undetectable viral load to diagnosed HIV-positive BTW with a detectable viral load. BTW with an undetectable viral load reported marginally lower levels of incarceration (p=0.06) and poly-substance use (p=0.06). BTW with a detectable viral load reported significantly higher levels of family support than BTW with an undetectable viral load; 56.3% of BTW with a detectable viral

load indicated they somewhat felt they received support from their family compared to 14.3% of BTW with an undetectable viral load (p=0.02).

Table 3.1: Characteristics of Black transgender women: United States, 2014-2015

	n=245
	% (n)
Demographics	
Education	
Less than high school	26.9 (66)
High School diploma	32.2 (79)
Some college	22.9 (56)
College diploma or more	18.0 (44)
City	
Philadelphia, PA	11.4 (28)
Houston, TX	24.9 (61)
Washington, D.C.	17.6 (43)
Detroit, MI	24.1 (59)
Atlanta, GA	20.4 (50)
Memphis, TN	1.6 (4)
Age mean (standard deviation)	29.9 (10.2)
Health care	
Presence of health coverage	79.6 (195)
Able to access care	56.3 (138)
Hypothesized correlates of HIV care continuum outcomes	
Incarceration	34.7 (85)
Homelessness	42.0 (103)
Sex work	18.9 (46)
Poly-substance use	23.7 (58)
Depression	50 (123)
Physical Assault	46.3 (113)
Intimate Partner Violence	49.4 (121)
Family Support	
None	64 (26.1)
A little	73 (29.8)
Somewhat	43 (17.6)
A lot	65 (26.5)
Friend Support	
None	60 (24.5)
A little	63 (25.7)
Somewhat	43 (17.6)
A lot	79 (32.2)
HIV Positivity	37.6 (92)

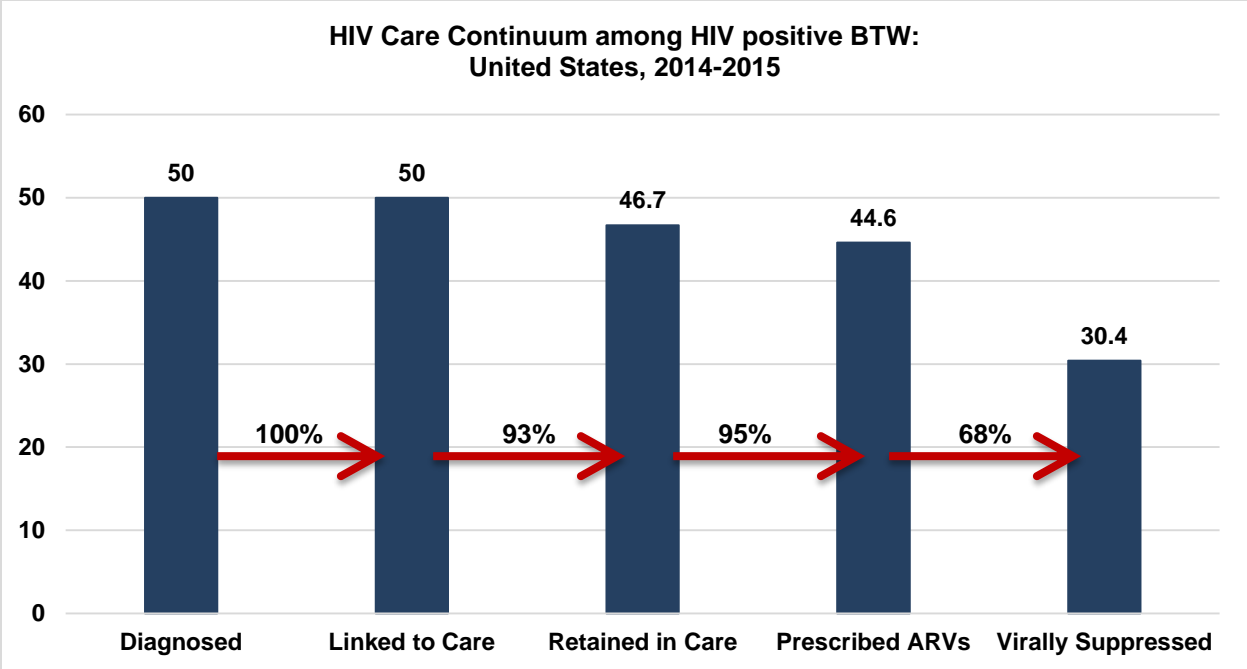


Figure 3.1: HIV care continuum among HIV positive BTW: United States, 2014-2015

Table 3.2: Comparison of diagnosed HIV-positive black transgender women (BTW) to undiagnosed HIV-positive BTW, and comparison of virally suppressed HIV-positive BTW to virally unsuppressed HIV-positive BTW: United States, 2014-2015

	Diagnosed HIV-positive n=46 % (n)	Undiagnosed HIV-positive n=46 % (n)	<i>p</i>	Virally Suppressed n=30 % (n)	Virally Unsuppressed n=16 % (n)	<i>p</i>
Demographics						
Education						
Less than high school	17.4 (8)	26.1 (12)	0.0743	17.9 (5)	18.6 (3)	0.1733
High School diploma	28.3 (13)	39.1 (18)		39.3 (11)	12.5 (2)	
Some college	28.3 (13)	19.6 (9)		25.0 (7)	25.0 (4)	
College diploma or more	26.1 (12)	15.2 (7)		17.9 (5)	43.8 (7)	
Age mean (standard deviation)	32.7 (9.76)	29.0 (11.3)	0.0976	33.8 (9.83)	30.4 (10.1)	0.285
Health care						
Presence of health coverage	80.4 (37)	78.3 (36)	0.7968	85.7 (24)	81.3 (13)	0.6969
Able to access care	47.8 (22)	54.4 (25)	0.5315	53.6 (15)	50.0 (8)	0.8196
Hypothesized correlates of HIV care continuum outcomes						
Incarceration	30.4 (14)	50.0 (23)	0.0557	17.9 (5)	43.8 (7)	0.0636
Homelessness	54.4 (25)	45.7 (21)	0.4042	50.0 (14)	62.5 (10)	0.4231
Sex work	19.6 (9)	19.6 (9)	1	10.7 (3)	25.0 (4)	0.2357
Poly-substance use	26.1 (12)	23.9 (11)	0.8097	17.9 (5)	43.8 (7)	0.0636
Depression	67.4 (31)	45.7 (21)	0.0355*	60.7 (17)	75.0 (12)	0.3362
Physical Assault	54.4 (25)	58.7 (27)	0.674	53.6 (15)	62.5 (10)	0.5652
Intimate Partner Violence	58.7 (27)	60.9 (28)	0.8316	60.7 (17)	62.5 (10)	0.9068
Family Support						
None	19.6 (9)	28.3 (13)	0.1794	21.4 (6)	18.8 (3)	0.0183*
A little	23.9 (11)	32.6 (15)		35.7 (10)	6.3 (1)	
Somewhat	28.3 (13)	10.9 (5)		14.3 (4)	56.3 (9)	
A lot	28.3 (13)	28.3 (13)		28.6 (8)	18.8 (3)	
Friend Support						
None	13.0 (6)	34.8 (16)	0.0667	17.9 (5)	6.3 (1)	0.7177
A little	19.6 (9)	19.6 (9)		17.9 (5)	25.0 (4)	
Somewhat	30.4 (14)	15.2 (7)		32.1 (9)	31.3 (5)	
A lot	37.0 (17)	30.4 (14)		32.1 (9)	37.5 (6)	

*p<0.05

4.0 DISCUSSION

4.1 DISCUSSION AND RECOMMENDATIONS

The results of our study show HIV is endemic among BTW. Thirty-seven percent of BTW in our sample are living with HIV. However, our results also suggest that once diagnosis occurs for HIV-positive BTW, the majority of these BTW report being linked to care, retained in care, and prescribed ARVs. Though only 50% of HIV-positive BTW had prior knowledge of their HIV-positive status, 100% of diagnosed HIV-positive BTW reported linkage to HIV care, 93.5% retention in HIV care, 89.1% prescribed ARVs, and 60.9% reported achieving an undetectable viral load. Though these estimates may reflect higher uptake of medical care than those seen in the larger population of HIV-positive people in the U.S. [16], they suggest interventions should target unknown HIV-positivity among BTW.

BTW need to be a priority population for interventions that address HIV diagnosis in the United States. According to the Medical Monitoring Project, 18.1% of persons living with HIV in the United States are undiagnosed [16], which makes the 50% prevalence of undiagnosed HIV-positivity in our sample much higher than those reported for other high risk populations. Fatalism and avoidance could explain this disparity. BTW experience significant difficulties when attempting to access HIV testing and care services. Barriers are often related to instances of transphobia and discrimination and include a lack of transgender inclusive/affirming providers and organization [17, 18]. Formative research among BTW found that though BTW felt their HIV infection was inevitable, they were hesitant to obtain an HIV test fearing they might receive a stigmatized diagnosis that would require they access additional, possibly stigmatizing health care [7]. Considering this view within the framework of the Transtheoretical Model [19] could possibly explain our HIV care continuum findings. Perhaps the pre-contemplation

contemplation, and planning stages for accessing HIV-testing and accessing HIV-medical care are the same for BTW. Once BTW take action to access testing and learn of their HIV-positive status, they are ready to take action to access HIV medical care. In order to advance TasP among HIV-positive BTW, future research should explore this hypothesis.

We compared diagnosed HIV-positive BTW to undiagnosed HIV-positive BTW to identify correlates of an undiagnosed HIV-positive status in this population. Diagnosed HIV-positive BTW had significantly higher levels of depression. However, because the frequency of major depressive disorders is higher among HIV-positive individuals compared to HIV-negative individuals, having been diagnosed HIV-positive most likely explains this difference [20]. Diagnosed HIV-positive BTW in our sample had marginally higher levels of education and friend support and a marginally lower frequency of incarceration than undiagnosed HIV-positive BTW. Though these findings were not statistically significant, given low and medium education level, recent incarceration, and lower levels of social support have been associated with delayed HIV-diagnosis in other populations [21-23], they most likely would be with a larger sample of HIV-positive BTW. In view of these findings, social network strategy could be an effective way to identify HIV-positive BTW. Social network strategy has successfully identified undiagnosed HIV-positivity among African-American women and Black MSM (BMSM) populations [24, 25], and BTW cite social support as an important facilitator to HIV testing and care [7].

While there were marginal differences in some factors we normally associated with HIV care continuum outcomes in other populations, there was no difference in rates of homelessness, engagement in sex work, poly-substance use, physical assault, and intimate partner violence [26]. How do we explain these null findings in a way that conveys their importance and advances the field of TasP research among BTW? One way is to consider the very high prevalence rates of these health outcomes in the overall sample. This could lead to a ceiling effect, and therefore eliminate differences between undiagnosed and diagnosed HIV-positive BTW. The prevalence of these health outcomes in our sample as a whole is concerning. While they were not found to be associated with HIV care continuum outcomes, considering how they manifest in other HIV-positive populations [12, 27], these health outcomes are most likely problematic to the advancement of TasP among BTW.

In order to address the HIV disparity and advance TasP in this population, we must utilize a holistic approach to HIV care. BTW face a multiplicity of challenges to health and well-

being [1], and according to formative research, such challenges threaten the effectiveness of TasP in this population [7, 12, 27]. The frequency of homelessness, sex work, and experiences of physical assault in our sample most likely result from societal stigma, limited employment, education, and housing opportunities available to BTW [28]. Therefore, interventions addressing structural inequity are necessary to alleviate experiences of these outcomes. Federal laws that prohibit discrimination based on gender identity in the areas of employment, housing, public accommodation, social services and access to credit are necessary, as are interventions designed to address racism and transphobia within the communities BTW live [29].

4.2 LIMITATIONS

While there were notable strengths to our methods, our analysis is not without limitations. The most notable being the utilization of self-report data to characterize the HIV care continuum among BTW. Studies have shown a discrepancy between self-report and clinical evaluation of unknown HIV-positivity among men who have sex with men (MSM) [30, 31] as there may be social desirability bias related to self-report HIV status, linkage to and retention in care, ARV adherence, and viral suppression. Therefore, our data may overestimate the number of HIV-positive BTW at each point of the HIV care continuum. Additionally, our retention in HIV medical care measure may overestimate the number of BTW retained in care. Though there is no gold standard for measuring retention in HIV care [32], our measure of retention in care is not clearly defined. Asking participants if they are currently being seen for HIV medical care does not measure concrete aspects of retention in care (e.g. missed visits, appointment adherence, visit consistency or gaps in care) as the literature suggests [33].

Our findings are not necessarily generalizable to all BTW. BTW who attend Black Pride events may be different than those who do not attend Black Pride events. Factors regarding travel such as money and the ability to take time off of work or school could influence attendance of Black Pride events. Additionally, our findings may not accurately capture the manifestation of health outcomes among BTW. Though BTW were eligible to participate in POWER, POWER's primary study population was BMSM. Therefore, POWER utilized a questionnaire designed to

capture the lived experiences of BMSM rather than those of BTW. It is possible measures used in this study need to be reframed for BTW. For example, the prevalence of homelessness and physical assault in our sample suggests a need to measure these outcomes with shorter time intervals; in addition to past-year measures, past-three month measures could be employed. It is also possible that measures need to be added in order to better explore correlates HIV care continuum outcomes in this population. BTW have different health needs than their non-transgender peers. Many BTW may choose to reconcile their gender identity with anatomy and physiology through transgender affirming medical care. Utilization of such care could prove to be a barrier or facilitator to HIV testing and treatment [7, 34-36], and therefore could have implications for the effectiveness of TasP in this population. Because questions pertaining to transgender affirming medical care were not asked until 2015, the sample of HIV-positive BTW who answered these questions (n=35) was small. Therefore, we could not adequately explore their associations with HIV care continuum outcomes in this subsample of HIV-positive BTW.

Finally, small sample size limited our analysis. Though characterizing the HIV care continuum among HIV-positive BTW is a good way to identify targets for interventions, simple characterization does not explicate means by which such disparities can be attenuated. Without such knowledge, intervention development cannot move forward. In order to explore associations with progression along the HIV care continuum, larger samples of HIV-positive BTW are needed.

5.0 CONCLUSION

The disparity of undiagnosed HIV-positivity within this population has negative health effects for BTW and members of their sexual networks. In order for TasP to be effective, BTW need to be a priority population for interventions that address HIV diagnosis in the U.S. However, we cannot begin to develop and implement such interventions until we understand how the overall health of BTW affects HIV care continuum outcomes. BTW face many challenges to health and well-being, and frequencies of negative health outcomes in our sample supports this claim. Because of these amplified disparities, BTW need to be more fully represented in research. Despite being disproportionately burdened by HIV, BTW continue to be underrepresented in existing HIV/AIDS research, and when BTW are represented, they are most often grouped with BMSM [37]. Fuller representation could produce larger samples of HIV-positive BTW and better explore how amplified health disparities among BTW affect HIV care continuum outcomes. Though BTW make up only a small portion of HIV-positive individuals in the United States. Given the high HIV prevalence in this population, advancing TasP among BTW should be a priority. Viral suppression, the ultimate goal of TasP, is important to the health of individual BTW; but it has another important effect: preventing new HIV infection in others.

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