Seroadaptation Among Black Men Who Have Sex with Men Associated with Social Network and Modified by Age and Stigma

Summary and Rationale

This study the association between social support and seroadaptation—behavioral practices and modifications intended to protect themselves from HIV infection and/or transmission.[i,ii,iii]—among a cohort of Black men who have sex with men (BMSM) who participated in the HIV Prevention Trials Network Study 061 (HPTN 061). Previous studies have illustrated the relationship between strong social support networks and improved physical and mental health outcomes, among people living with HIV.[iv,v,vi,vii] Compared to PLWH without social support, PLWH linked to medical, familial, and social networks had greater access to resources (e.g. financial, medical, and educational) and protections that helped them overcome a range of barriers to engage in HIV prevention, treatment, and care services—from transportation and finances, to homophobia and racism.[viii,ix,x] Conversely, social networks that expose individuals to negative health behaviors, such as unprotected sex, and/or stigma, often are associated with deferred prevention, treatment, and care, and less optimal health outcomes overall.[xi,xii,xiii] Research based on HPTN 061 study data revealed similar social networks trends. HPTN study participants who had larger social networks (more than three people), compared to those with smaller social networks (fewer than three people), reported fewer missed medical appointments and symptoms of depression.[xiv] Yet having a larger social network also was associated with participation in higher risk sex (condomless receptive anal sex, condomless insertive anal sex) and substance use (poppers), as well as experiences of internalized stigma, perceived racism, and perceived homophobia. In these instances, having a smaller social network would seem more protective.

Discerning the association between social network size and seroadaptation may help explain these trends, informing the creation of better informed interventions targeting BMSM's social network(s), rather than individual BMSM. Indeed, social support, measured in the HPTN 061 Study via a social network inventory in which participants listed up to five persons who could provide functional support across four domains (emotional, medical, financial, and social), often provides increased access to resources, including information, around HIV prevention. Larger networks may ensure that individual BMSM have more information about, and support to engage in, seroadaptive decisions related to sexual activity, based on knowledge of partner serostatus; partner type; frequency of condom use; and HIV status disclosure to partner. The association between social network size may be modified by HIV status, age, and overall stigma experience, encompassing racism, internalized homophobia, and depression

(due to its high correlation with HIV stigma established in other studies). BMSM who are HIV positive generally want to mitigate partner exposure to HIV, while younger BMSM are more likely to report more sexual activity, with different partners. Higher rates of stigma may create barriers to engagement in HIV prevention activities, including seroadaptation.

2. Work Will Be Completed by (*Anticipated month and year in which the work will be completed.*)

03 2019

Month Year

For longitudinal data requests only:

1. Background (*Provide a brief description of the rationale for the study, including key references.*)

Background

BMSM represent a nexus of communities disparately impacted by HIV in the U.S., including underserved youth, racial/ethnic minorities, and sexual and gender minorities (SGMs)—a group recognized in 2016 by the National Institutes of Minority Health and Health Disparities Research as a health disparity population.[xv] Black communities in the U.S., disparately impacted by HIV since the start of the epidemic,[1] have a lifetime risk of HIV infection far higher than any other ethnic group.[xvi,xvii] While BMSM account for less than 1% of the U.S. population, they represented approximately 28% of the nearly 40,000 HIV diagnoses nationwide in 2014.[xviii] In 2015, the Centers for Disease Control and Prevention estimated that BMSM have a 1 in 2 lifetime risk of HIV infection.[xix] Young BMSM under age 30 (BYMSM) have been particularly hard hit. While rates of HIV decreased among all groups by 19% nationwide from 2005-2014, they increased by 87% among BYMSM during this same time period.[xx] Approximately 1 in 4 BYMSM are HIV positive by age 25, and over 60% of BMSM are HIV positive by age 40.[xxi] Compared to other MSM, HIV+ BMSM are diagnosed later in their infections,[xxii] rendering them

[1] For the purposes of this essay, the terms African-Americans and Blacks are used interchangeably when referring to the entire population. The term Black YMSM is used to refer to all Black men who identify as gay, bisexual, heterosexual, and trans and have sex with men and transwomen.

less likely to be responsive or adherent to HIV treatment[xxiii] and more likely to experience frequent hospitalization, transmission of the virus to others, and early death.[9] HIV positive BMSM often defer HIV testing, treatment, and care due to a number of factors, including poverty, under/unemployment, food insecurity, unstable housing, and limited educational attainment, as well as stigma, racism, and internalized homophobia. [22,xxiv,xxv,xxvi]

Social Networks and Seroadaptation

Several studies have noted that linkage to social networks can protect BMSM from the negative impacts of stigma, racism, and homophobia, while offering access to diverse resources—medical, familial, and social—that can encourage healthier choices and engagement in medical services.[xxvii,xxviii,xxix] Yet social networks can increase exposure behaviors such drug use or unprotected sex, as well as racism and stigma, encouraging avoidance of prevention, treatment, and care, and undermining health outcomes.[xxx,xxxi,xxxii] Research based on HPTN 061 study data revealed similar trends related to social networks. HPTN study participants who had larger social networks (more than three people), compared to those with smaller social networks (comprised of fewer than three people), reported fewer missed medical appointments and symptoms of depression.[xxxiii] Yet, having a larger social network also was associated with participation in higher risk sex (condomless receptive anal sex, condomless insertive anal sex) and substance use (poppers), as well as reporting more internalized stigma, perceived racism, and perceived homophobia. In these instances, having a smaller social network would seem more protective.

Discerning the association between social network size and seroadaptation may help explain these trends. Additional social support, measured in the HPTN 061 Study via a social network inventory in which participants listed up to five persons who could provide functional support across four domains (emotional, medical, financial, and social), would provide greater access to resources, including information, around HIV prevention. Larger networks may provide more information about, and support to engage in, seroadaptive decisions related to sexual activity, based on knowledge of partner serostatus; partner type; frequency of condom use; and HIV status disclosure to partner.

Modifying Variables

The association between social network size is modified by **age** and **overall stigma experience** (encompassing *racism*, *internalized homophobia*, and *depression*). Compared to older BMSM, BMSM under age 30 are expected to have larger social networks and greater numbers of sexual

partners; as such, age will strengthen the between relationship social network size and seroadaptation among younger BMSM compared to older BMSM. In turn, stigma creates barriers to engagement in HIV prevention activities, attenuating the relationship between seroadaptation and social network size.

2. Specific Aims and Hypotheses

This project hypothesizes the following:

- BMSM engagement in seroadaptation is associated the social network size; HPTN 061 participants with larger social networks (three or more people) will report engaging in two or more seroadaptive behaviors compared to HTPN 061 participants with smaller social networks (less than three people).

- BMSM ages 30 and under will have larger social networks and, as such, more likely to engage in two or more seroadaptive behaviors compared to BMSM ages 30 and older.

- Overall stigma (captured in the independent variables racism, internalized homophobia, and depression, which has been shown to be heavily associated with depression) will attenuate the association between social network size and seroadaptation, and will have a greater impact on BMSM under age 30 than BMSM ages 30 and older.

3. Relevance to HPTN 061 and/or BMSM HIV prevention research or community engagement

Previous descriptions of BMSM risk behaviors have focused on individuals, out of context of their social networks. Discerning the association between social network size and seroadaptation may help explain these trends, informing the creation of better informed interventions targeting BMSM's social network, rather than individual BMSM.

4. Study Design and Analysis (include data analysis plan and/or table shells as appropriate)

We will be assessing the association between social network size and BMSM leveraging multivariate GEE analysis. The variables will be as follows:

- **Outcome**: ***Seroadaptation*** will be a continuous composite variable of the following: knowledge of partner serostatus (HIV+, HIV- , unknown); partner type (primary, secondary, commercial), frequency of condom use, and HIV status disclosure to partner.

- **Predictors**: ***Social Network Size*** will be the size of the social network captured in the social network inventory at baseline. This will be contrast coded into low (less than three persons) and high (three or more persons).

- **Covariates**: I will be controlling for *standard covariates*, including age (18-29 vs. 30 and older); SES (educational attainment, employment status, marital status); Hispanic/Latino ethnicity; gender; serostatus; racism; internalized homophobia; depression; and HPTN study location.

- **Modifiers**: Two theorized modifiers will be introduced in this model: age (dichotomized as 18-29, 30 and older) and stigma captured in three variables: racism, internalized homophobia, and depression.

Descriptive analysis will be conducted to determine characteristics of HPTN 061 participants at baseline. Multivariate GEE analysis will be used to assess the relationship between the outcome, seroadaptation, and the predictor and covariates in order to account for the correlation of observations between repeated measurements taken over time of the HPTN 061 participants. Bivariate associations will be calculated between social network size, other covariates, age, and stigma. We will then conduct a GEE regression of the relationship between seroadaptation and social network size. A second, multivariate GEE regression model will be calculated to assess the association between seroadaptation and social network size, controlling for the covariates outlined above. Two multivariate regression analyses then will be calculated to assess whether the theorized modifiers attenuate or increase the association between the predictor and the outcome: age (social network size*age) and stigma [social network size * race, social network size * depression, social network size * internalized homophobia]. A final multivariate GEE regression model, including both age and stigma [social network size * race, social network size * depression, social network size * internalized homophobia], will be calculated.

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