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Anxiety Specific Pathways to HIV Sexual Transmission Risk Behavior among Young Gay and Bisexual Men

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Abstract

This study evaluated whether specific anxiety disorders increased the likelihood of sexual transmission risk behavior (TRB) in younger (ages 20–29) versus older (ages 30+) HIV positive gay and bisexual men. Participants completed screening measures for Posttraumatic Stress Disorder (PTSD), Social Phobia, and Panic Disorder, and an assessment of recent TRB Moderated regression analyses indicated that PTSD was associated with greater risk of TRB in younger but not older men, independent of HIV disease stage or treatment status. Efficacy of secondary HIV prevention efforts for younger men may be augmented by addressing the context of trauma history and consequent mental health issues.

Keywords

HIV; age; post-traumatic stress disorder; sexual transmission risk behavior

Introduction

Gay and bisexual men and other men who have sex with men account for almost half (49%) of new HIV diagnoses in the U.S. and 48% of existing diagnoses, constituting the largest risk group (Centers for Disease Control & Prevention, 2008; 2010). Due to this steady incidence of HIV in this group, coupled with the success of highly active antiretroviral therapy (HAART) in reduced HIV/AIDS-related deaths (Sterne et al., 2005), the population of gay and bisexual men living with HIV has continued to grow, with representation across the spectrum of ages (CDC, 2010), facing unique psychosocial stressors (Stall et al., 2003).

Most research on psychological risk factors for HIV transmission among gay and bisexual men with HIV focuses on depression and substance abuse (e.g., Johnson, Cunningham-Williams, & Cottler, 2003; Stall et al., 2003). However, clinically diagnosable anxiety such as post-traumatic stress (Kalichman, Sikkema, DiFonzo, Luke, & Austin, 2002; O'Leary, Purcell, Remien, & Gomez, 2003; Rosario Schrimshaw, & Hunter, 2006) or social anxiety (Hart & Heimberg, 2005; Hart, James, Purcell, & Farber, 2008) may present unique challenges to both HIV prevention (reducing unsafe sexual practices) and treatment (O'Cleirigh, Skeer, Mayer, & Safren, 2009). Anxiety disorders are often preceded by longstanding patterns of fear, withdrawal and physiological arousal in new or unfamiliar

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situations (Kagan, Reznick, & Gibbons, 1989; Kagan, Reznick, & Snidman, 1987; Rosenbaum et al., 1983; Van Ameringen, Mancini, & Oakman, 1998). Anxiety may thus impede self-efficacy regarding negotiation of safer sex (Hart et al., 2008). Additionally, risky sexual behavior may also reflect a strategy for avoiding negative (e.g., anxious) affect (O'Cleirigh & Safren, 2007), such that engaging in the act of risky behaviour may provide an escape from an anxious state (i.e., resulting from difficulties related to condom negotiation; Martin & Knox, 1997). Further, the relationship between anxiety and TRB also may vary with respect to certain anxiety disorders based on the core fear; for instance, the core component of social anxiety disorder is evaluation by others, whereas the core component in PTSD relates to the traumatic experience, and this distinction may be important in predicting the relationship between anxiety symptoms and TRB (O'Cleirigh, Hart, & James, 2008).

Associations between anxiety and risk of sexual transmission risk behavior (TRB) may be amplified further in younger HIV positive gay and bisexual men. For instance, one may consider older gay and bisexual men to be more likely to have habituated to cognitive, affective, and physiologic indicators of threat in sexual risk situations and are thus less likely to activate situation-specific conditioned responses (e.g., preoccupation with partner perceptions); this is supported by previous work demonstrating that overall there are distinct age differences in emotional control and coping responses, such that older individuals tend to experience less negative affectivity and report greater emotional control (Gross, Carstensen, Pasupathi, Tsai, Götestam, & Hsu, 1997). Further, previous research has suggested that younger (i.e., under 30) vs. older (30 and over) show distinct patterns of response in sexual-risk taking situations, and that young gay men may be more susceptible to sexual risk taking in response to perceptions of risk and threat (Stall et al., 1992). However, the specific notion that younger gay and bisexual men are particularly susceptible to anxiety-related vulnerabilities for TRB to date has not been empirically tested.

As such, the current study aimed to address these gaps in our understanding of how anxiety disorders (PTSD, Social Phobia, Panic Disorder) may relate to TRB among HIV positive gay and bisexual men, and whether these relationships may differ based on age. Specifically, we hypothesized that anxiety would be more strongly related to TRB among young HIV positive gay and bisexual men in comparison with those who are older, in line with the aforementioned theoretical framework that older gay and bisexual men may have been more likely to habituate to cognitive, affective, and physiologic indicators of threat and less likely to be influenced by situation-specific factors that may affect anxiety responses.

Method

Participants

Analyses were based on a behavioral data from 503 HIV positive gay and bisexual men receiving primary care at Fenway Health in Boston, Massachusetts at the time of initial screening. Fenway is the largest ambulatory HIV care centre in New England, and has traditionally served sexual minority populations. Participants were required to be 18 years or older; self-identify as gay, bisexual, or as men who have sex with men; to be HIV positive for at least three months; and get their primary HIV care at Fenway.

Procedure

The current study includes cross-sectional data from baseline assessments of two secondary HIV prevention intervention trials which provide full details on study specific procedures (Safren et al. 2011; Safren, O'Cleirigh, Skeer, Elsesser, & Mayer, 2012). The Fenway Institutional Review Board approved all study procedures. Potential participants, who had

previously indicated an interest in participating in ongoing research, were referred by their medical care provider to study personnel. Participants who had not documented an interested were not referred or contacted by study personnel. Initial eligibility was determined via face-to-face screening. During the screening visit, trained research assistants explained study parameters and obtained informed consent. Individuals who enrolled in the study completed an audio-computer assisted self-interviewing (ACASI) assessment that addressed demographic data, HIV history, psychopathology, and sexual behavior. HIV-related physiologic data were extracted from participant medical records. Patients received monetary compensation ($25 for the screening visit and $25 for assessment session) for their time and effort.

Measures

Demographic and HIV-related factors—A basic questionnaire assessed age, ethnicity, education level, personal income, and relationship status. Participants also indicated whether and for how many months they had taken anti-retroviral therapy (ART) for HIV. Plasma HIV RNA concentration (i.e. viral load; copies per millilitre) and peripheral blood CD4+ T cell count (cells/mm^3) were collected from electronic medical record data that were closest in time to the date of study screening and assessment.

Sexual transmission risk behavior (TRB)—Sexual TRB was assessed as the frequency of unprotected insertive or receptive anal sex with a partner of HIV-negative or -unknown status within the past three months. Sexual behavior items were adapted from prior HIV TRB research with gay and bisexual men (Koblin, Chesney, Husnik, Bozeman, Celum, Buchbinder, et al., 2003) and HIV positive individuals (Fisher et al., 2006).

Anxiety disorder symptoms—Brief screening tools were used to assess for symptoms of PTSD, Social Phobia, and Panic Disorder. PTSD symptoms were screened using the SPAN (Meltzer-Brody, Churchill, & Davidson, 1999), a brief four-item instrument assessing startle, physiologic arousal, anger, and numbness. Participants rated the extent to which they were distressed by each symptom during the past week on a five-point scale ('Not at all' to 'Extremely'). Prior to SPAN administration, participants provided a brief description of the traumatic event, reviewed by study clinicians for meeting DSM Criteria A for PTSD (the person experienced, witnessed, or was confronted with an event or events that involved actual or threatened death or serious injury, or a threat to the physical integrity of self or others). Participant response to the traumatic event (i.e., intense fear, helplessness, or horror) was not assessed. Participants were considered to meet screen in criteria for risk for PTSD if they had a qualifying traumatic event (e.g., rape, childhood sexual abuse, being in a car accident) and a SPAN cut-off score of five (as utilized by Meltzer-Brody et al., 1999). Previous work has demonstrated acceptable efficiency (.80; Meltzer-Brody et al., 1999), accuracy (89%; Sijbrandij, Olff, Opmeer, Carlier, & Gersons, 2008) and good convergent validity with diagnostic assessments of PTSD (Davidson et al., 1997; Meltzer-Brody et al., 1999). In the current sample the internal consistency was good with Cronbach's Alpha of .83.

Social phobia symptoms were evaluated with the three-item Mini-Social Phobia Inventory (Mini-SPIN; Connor, Kobak, Churchill, Katzelnick, & Davidson, 2001), a brief version of the SPIN (Connor et al., 2000) that assesses fear of embarrassment and social avoidance. Participants indicated how much each problem was bothersome during the past week using a five-point scale ('Not at all' to 'Extremely'). In previous research (Connor et al., 2001), the Mini-SPIN demonstrated 90% accuracy in discriminating social phobia using clinical diagnoses from the Structured Clinical Interview for DSM-IV (SCID; First, Spitzer, Williams, & Gibbon, 1995). As suggested by Connor et al. (2001), the current study used a

cut-off score of six to identify positive screens for social anxiety. In the current sample the internal consistency was good with a Cronbach's Alpha of .84.

Panic disorder was assessed using the panic disorder subscale of the Patient Health Questionnaire (PHQ; Spitzer, Kroenke, & Williams, 1999). The PHQ was developed to identify common mental health disorders in primary care settings. The PHQ panic disorder scale comprises 15 'yes/no' questions based on DSM-IV criteria, including presence of recent panic attacks that are unexpected, bothersome, and characterised by specific physical and/or cognitive sensations. Data from a large outpatient sample indicated that the PHQ was an accurate, specific and practical instrument for screening panic disorder (Löwe, Gräfe, Zipfel, Spitzer, Herrmann-Lingen, Witte, & Herzog, 2003). Among those endorsing panic attacks within the part 4 weeks the internal consistency was fair with a Cronbach's Alpha of .77.

Statistical Analyses

Logistic regression was used to evaluate the main effects of age and each anxiety disorder on likelihood of engaging in sexual TRB, and specifically to test whether age group moderated the associations between each anxiety disorder and likelihood of engaging in sexual TRB. In the moderated models, HIV disease stage (viral load [log10], CD4+ count), and history of ART were covaried in Block 1 to control for the possibility that disease and treatment-related differences between the age groups may have accounted for differences in TRB. The inclusion of plasma viral load as a covariate was also intended to control for differences in sexual behavior decision making related to plasma viral load, given evidence that one's viral load may impact their engagement in sexual risk taking behaviors (Van de Ven, Mao, Fogarty, Rawstorne, Crawford, Prestage, et al., 2005). The specific anxiety disorder (0 = *screen-negative*; 1 = *screen-positive*) was entered in Block 2; age group (0 = ages 20=29; 1=ages 30+) was entered in Block 3; and an interaction term representing 'anxiety disorder by age group' was entered in Block 4. For significant interaction terms (i.e. Wald statistic at $p < .05$), the sample was stratified by age group and the simple effects of the anxiety disorder on TRB were interpreted.

Results

Sample Characteristics

Participant age was normally distributed (skewness statistic = .19 (SE .11) and ranged from 20 to 68 years, with a mean age of 41.9 (SD = 8.3) years (Table 1) and median age of 42 years. Most men (62%) were not in a committed relationship. Education and income varied, with modal levels of a high school diploma or GED (45%) and of $20,000 or less income per year (35%). Approximately 75% of the sample identified as non-hispanic white. Mean plasma viral load (M = 13671.4, SD = 44355.0; median = 75) and CD4+ count (M = 528.0, SD = 295.1) did not differ by age (Table 2). However, younger men (57%) were less likely than older men (79%) to have a current or prior history of ART use ($\chi^2 = 10.10$, $p < .01$).

Frequency of Anxiety Disorders and TRB

Almost half of the sample (47%) scored above the clinical cutoff for any one of the three anxiety disorders. More than one-third (35%) met criteria for PTSD, 23% for social anxiety disorder, and 10% for panic disorder. Fourteen percent of the men in the sample met screen in cut off for 2 or more anxiety disorders and 3.5% met screen in criteria for 3 anxiety disorders. Over one-third of men (37%) had engaged in at least one sexual TRB in the past three months (defined as unprotected insertive or receptive anal sex with a partner of HIV-negative or – unknown status within the past three months). The frequency of screening positive for any of the three anxiety disorders or for engaging in recent sexual TRB did not

differ by age. The proportion of those meeting clinical cut off for each of the anxiety disorders did not differ significantly by racial/ethnic category for panic disorder (Chi Square (3) = 4.79, p = .19), PTSD (Chi Square (3) = 1.35, p = .71), and social phobia (Chi Square (3) = 4.13, p = .25), In addition, the relationship between age coded categorically (identifying men in their 20s, 30s, 40s, and 50 or older) revealed no significant differences between the age groups for frequency of PTSD ($F(3,481) = .61$, $p = .61$), Social Anxiety Disorder ($F(3,488) = 10.5$, $p = .37$), Panic Disorder ($F(3, 490) = 0.985$, $p = .41$) or mean number of sexual transmission risk episodes ($F(3, 493) = 1.28$, $p = .28$).

Main Effects of Age and Anxiety on TRB

Results of separate logistic regression models indicated that after controlling for viral load (log10), CD4+ count, and current or past ART, there were no significant main effects of age, PTSD, social anxiety disorder, or panic disorder on the risk of engaging in sexual TRB (Table 3).

Age Moderated Effects for Anxiety on TRB

The interaction between PTSD and age group predicted likelihood of engaging in sexual TRB (OR = 5.28, 95% CI = 1.02–27.26) after adjusting for viral load (log10), CD4+ count, history of ART, and the main effects of both age group and PTSD (Table 4). Among the control variables, higher CD4+ count was marginally associated with greater likelihood of engaging in sexual TRB (OR = 1.01, 95% CI = 1.00–1.01). PTSD was associated with greater likelihood of engaging in sexual TRB among younger men (OR = 12.09, 95% CI = 1.43–102.57) but was not associated with risk of sexual TRB in the older group (OR = .91, 95% CI = .60–1.39). The interaction between social anxiety disorder or panic disorder and age group did not predict likelihood of engaging in sexual TRB, independent of control variables.

Discussion

This is the first study to suggest that the relationship between PTSD and sexual transmission risk among HIV positive gay and bisexual men may differ by age group. For HIV positive gay and bisexual men in their 20s, meeting the PHQ's screening criteria for PTSD was associated with greater likelihood of recent sexual TRB. In contrast, for those who were aged 30 years and above, PTSD was not associated with risk of recent sexual TRB. This moderated effect for age was observed in the absence of significant differences in PTSD and sexual risk behavior between the two age groups. Results suggest that elevations in PTSD symptoms may uniquely contribute to increased sexual transmission risk among younger gay and bisexual men. It is plausible that those who are younger may cope with PTSD symptoms (i.e. intrusion, avoidance, and hyperarousal) differently relative to older gay and bisexual men, and that this differential response may account for the increased risk of sexual TRB. This is supported by evidence that older and younger individuals demonstrate different coping responses and that younger individuals may be less able to adaptively cope with negative emotions (Gross et al., 1997). Additionally, particularly in the case of childhood sexual abuse, older individuals may be more distal from their trauma; this may have enabled more extensive processing of the trauma and reduced emotional salience of the event, reducing the potential impact of the trauma symptoms on sexual risk taking.

In contrast, neither panic disorder nor social anxiety was associated with sexual risk in either age group. Among HIV-uninfected gay and bisexual men, the link between social anxiety and sexual TRB has been previously reported to depend on anxiety subtype (i.e. social performance anxiety but not social interaction anxiety; Hart et al., 2008). This may explain in part the non-significant relationship found in the current study, given that we did not use a

more specified assessment of anxiety subtype. Additionally, we did not test the specificity of particular panic symptoms in relation to sexual risk taking; future work is also needed to understand the possible implications of cognitive and physiologic symptoms of panic within the context of safe sex negotiations in this population.

The results of this study should be interpreted in light of a number of study limitations. Firstly, the conclusions are limited by the cross sectional nature of the design, which limits our ability to infer causality or directionality of findings. In addition, most of the data were collected via self-report and were thus vulnerable to social desirability and recall biases, which may be a particular concern regarding accurate reporting of TRB. The assessment of PTSD was based on the presence of a qualifying traumatic event and a cut-off score on a brief self report screening instrument and not a diagnostic clinical interview which may limit its reliability. Additionally, our assessment of TRB was also limited by not including a characterization of primary or casual partner status. The study was based in one clinic, with a relatively educated, largely white population in a state with many social services available, so the generalizeability to other populations may be limited. Finally, the interpretation of the age moderated effects reported here should take into account the unequal sample sizes; more specifically, the interpretation of the relationships between anxiety disorders and sexual risk in young MSM in 20s is restricted by the small sample sizes, which allows for the possibility that some of these parameters may not be reliably estimated.

The findings presented here suggest that younger HIV positive gay and bisexual men who meet screening criteria for PTSD are more likely to engage in sexual TRB relative to those who are older. As emerging evidence indicates that gay and bisexual men with trauma histories issues may be less likely to benefit from traditional HIV prevention programs (O'Cleirigh, Safren, & Mayer, in press; Mimiaga et al., 2009), which represents a significant subset of gay and bisexual men (Paul, Catania, Pollack, & Stall, 2001). Future research may help identify whether efficacious treatment of PTSD may in turn reduce sexual risk behavior. This may be especially indicated for those with chronic PTSD symptoms who have developed longstanding patterns of avoidance and maladaptive coping strategies that may contribute to higher rates of sexual risk behavior. Overall, our findings emphasize that within both mental health and primary medical care settings, assessment of PTSD symptoms among younger men are needed to guide secondary prevention interventions that integrate mental health treatment with sexual risk reduction and more adaptive management of HIV.

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Table 1

Demographic Characteristics of Current Sample of HIV Positive Men Who Have Sex with Men (n = 503)

Variables	%
Age	41.9±8.3
20 – 29 years	37 (7.4%)
30 – 39 years	160 (31.8%)
40 – 49 years	221 (43.9%)
50 – 59 years	74 (14.7%)
60 year and greater	11 (2.2%)
Ethnic group identification	
Non-Hispanic White	75.1
Black/African American	11.3
Hispanic/Latino	8.9
Asian/Pacific Islander	1.8
American Indian/Alaskan	.8
Other	2.0
Years of formal education	
<12 years	3.0
High school diploma/GED	45.3
College degree (BA/BS)	34.6
Graduate degree	17.1
Personal income ($USD)	
20,000 or less	35.0
20,001 – 40,000	21.5
40,001 – 60,000	16.5
60,001 – 80,000	12.1
Above 80,000	13.5
Refused to answer	1.4
Relationship status	
Single/never married	52.1
Married or living with a committed partner	29.9
In a committed relationship	8.2
Separated, divorced or widowed	8.0
Other	1.8

Note: Percentages may not total 100% due to rounding.

Table 2

Age Comparisons of HIV-related Factors, Anxiety Disorders and Sexual Transmission Risk Factors in HIV Positive Gay and Bisexual Men

Variables	Mean ±SD or %			
	Total Sample	Younger (n=37)	Older (n=466)	p value
HIV-related factors				
Viral load (copies per mL)	13671.4 ±44355.0	21670.0 ±52768.9	13034.9 ±43620.0	.34
CD4+ count (cells/mm^3)	528.0 ±295.1	535.0 ±246.7	527.4 ±298.9	.86
Current or past ART*	77.7	56.8	79.4	<.01
No. of months on ART*	60.2±47.0	15.8±17.0	62.8±46.9	<.01
Anxiety disorders				
Post-traumatic stress disorder	34.8	33.3	34.9	.51
Social anxiety disorder	22.9	33.3	22.1	.12
Panic disorder	9.5	10.8	9.4	.85
Transmission risk in past 3 months				
No. of sexual transmission risk acts	3.3±10.6	5.1±10.8	3.1±10.6	.30

Note: Younger=ages 20–29; older=ages 30+.Group differences were tested for significance using t-tests and Pearson chi-square tests; mean number of months excluded treatment-naïve participants.

Table 3

Main Effects of Age and Positive Screens for Anxiety Disorders in Predicting Likelihood of Engaging in Sexual HIV Transmission Risk Behavior

Models	Wald statistic	OR	95% CI
Age	<.01	1.00	.47, 2.15
PTSD	.05	1.05	.70, 1.57
Social anxiety disorder	.87	1.24	.79, 1.95
Panic disorder	<.01	1.02	.52, 2.00

Note. Each logistic regression model controlled for viral load (log10), CD4+ count, and current or past ART. Anxiety disorders were coded as 0=screen-negative, 1=screen-positive. Age was coded as 0=ages 20–29, 1=ages 30+.

Table 4

Interactions between Age and Positive Screens for Anxiety Disorders in Predicting Likelihood of Engaging in Sexual HIV Transmission Risk Behavior

Models	Wald statistic	OR	95% CI
Moderation models			
PTSD x age	*3.95	5.28	1.02, 27.26
Social anxiety disorder x age	1.00	2.20	.47, 10.34
Panic disorder x age	.10	.67	.06, 7.99
Stratified models			
PTSD in younger men	*5.22	12.09	1.43, 102.57
PTSD in older men	.19	.91	.60, 1.39

Note.

*p<.05. Each logistic regression model controlled for viral load (log10), CD4+ count, and current or past ART. Anxiety disorders were coded as 0=screen-negative, 1=screen-positive. Age was coded as 0=ages 20–29, 1=ages 30+.