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HIV TREATMENT OPTIMISM AND UNSAFE ANAL INTERCOURSE AMONG HIV-POSITIVE MEN WHO HAVE SEX WITH MEN: FINDINGS FROM THE POSITIVE CONNECTIONS STUDY

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Abstract

This study was designed to examine the impact of HIV treatment optimism on sexual risk among a racially diverse sample of HIV-positive MSM. Survey data were collected from 346 racially diverse HIV-positive MSM. Inclusion criteria: 18 years of age, male, at least one incident of unprotected anal intercourse (UAI) in the last year, currently on treatment. Other variables included demographics, sexual risk, depression, internalized homonegativity, HIV treatment history, alcohol/drug use and beliefs about HIV treatments (Susceptibility to transmit HIV, Severity of HIV infection and Condom Motivation). Those with lower income were more likely to report that HIV was less transmissible. A self-reported decrease in condom motivation was associated with being White, well-educated and increased alcohol/drug use. A decrease in Severity of HIV was associated with better mental health, being non-White and undetectable viral load. Sexual risk appears related to beliefs about how treatment affects the transmissibility of HIV. Race, socioeconomic status, alcohol/drug use, mental health and viral load were also associated with treatment beliefs.

As of 2006, the Centers for Disease Control and Prevention (CDC) reported that gay and bisexual men and other men who have sex with men (MSM) accounted for the highest proportion (53%) of new HIV infections in the United States (Hall et al., 2008). These high rates of HIV incidence among MSM may be explained by corroborative evidence that MSM continue to report high rates of risky sexual behavior. (CDC, 2005). HIV researchers and policymakers have struggled with what has been the cause of this continued risk among MSM. (Elford & Hart, 2003; Jaffe, Valdiserri, & De Cock, 2007; Wolitski, Valdiserri, Denning, & Levine, 2001). Factors reported include changes in social norms regarding consistent condom use (Morin et al., 2003), “burnout” from years of prevention messages (Ostrow et al., 2002), lack of social supports (Reilly & Woo, 2004), anxiety, depression (Bancroft et al., 2003), and drug and alcohol use (Buchaz et al., 2005; Ross et al., 2001).

Since the successful introduction of protease inhibitors as primary HIV treatment was reported in 1996 (Cameron, Heath-Chiozzi, & Kravcik, 1996; Deeks, Smith, Holodniy, & Kahn, 1997; Hammer, 1996), researchers have speculated that being diagnosed with HIV might be perceived as less serious because we have treatment to mitigate the impact of the virus. This HIV treatment optimism has been identified as one factor that has potential to negatively impact safer sex practices but has been inconsistently shown to be associated with unsafe anal intercourse.

Evidence from cross-sectional as well as longitudinal studies regarding the possible link between optimistic beliefs about treatment and sexual risk has been contradictory. Over the last decade, several studies have reported that optimistic beliefs about HIV treatments were associated with increased sexual risk among MSM (Dukers et al., 2001; Huebner, Rebchook, & Kegeles, 2004; Kalichman, Nachimson, Cherry, & Williams, 1998; Ostrow et al., 2002; Stolte, Dukers, Gekus, Countinho, & de Wit, John B, F, 2004; Van de Yen, Kippax, Knox, Prestage, & Crawford, 1999; Vanable, Ostrow, McKirnan, Taywaditep, & Hope, 2000), and others have demonstrated lack of associations of heightened treatment optimism with unsafe sex (Cox, Beauchemin, & Allard, 2004; Remien, Halkitis, O'Leary, Wolitski, & Gomez, 2005; Vanable, Ostrow, & McKirnan, 2003).

Some of this variability of study results may arise because of heterogeneity of study populations. Optimistic beliefs about HIV treatment may differ as a result of HIV status, treatment status, or race/ethnicity. Evidence suggests that were HIV-positive MSM were more likely to report increased treatment optimism than HIV-negative MSM (Elford, Bolding, Maguire, & Sherr, 2000; Huebner & Gerend, 2001; Kelly, Hoffmann, Rompa, & Gray, 1998; Knox et al., 2001; Misovich, Fisher, & Fisher, 1999; Vanable et al., 2000), and this has been shown to be associated with sexual risk (Dukers et al., 2001; Kalichman et al., 2007; Ostrow et al., 2002; Vanable et al., 2000). However, very little research has examined whether those on HIV treatment have this increased level of treatment optimism and, specifically, whether they feel that treatment impacts their sense of the severity of living with HIV disease. It is likely that those on HAART will experience different patterns of beliefs with respect to the severity of disease, the risk for transmission, and their motivation to use condoms than either HIV-positive men not on treatment or HIV-negative MSM. Another significant limitation of the literature is that the majority of previous research either did not identify the racial/ethnic makeup of their samples (International Collaboration on HIV Optimism, 2003; Ostrow et al., 2002; Van de Yen et al., 1999) or enrolled mostly Caucasian men (Elford, Bolding, & Sherr, 2002; Huebner & Gerend, 2001; Kalichman et al., 1998; Vanable et al., 2000). Men of color are at the highest risk for HIV infection, particularly African American MSM (CDC, 2008). In addition, the treatment beliefs of racial minorities reside within the context of previous abuses of racial minorities (particularly African Americans) by medical researchers (Poussaint & Alexander, 2000) and current conspiratorial theories held by Latinos and African Americans that HIV was engineered to target certain populations (Hutchinson et al., 2007; Ross, Essien, & Torres, 2006). Thus, it is likely that they would have differing levels of treatment optimism than White MSM would and that the association between optimism and sexual behavior may be different.

Accordingly, the present study was designed to assess the impact of treatment optimism on sexual risk among a racially diverse sample of HIV-positive MSM who are currently on treatment.

METHODS

SAMPLE

Participants were 346 HIV-positive MSM who reported any unprotected anal intercourse with other men in the previous 12 months. Men were recruited from Boston ($n = 49$), New York ($n = 123$), Los Angeles ($n = 103$), and Houston ($n = 71$) via flyers, Internet postings, gay identified venues and print media to attend a 2-day sexual health seminar called Positive Connections (Rosser et al., 2008). Eligibility requirements included being at least 18 years of age, biologically male, and having had at least one incident of unprotected anal intercourse (UAI) in the last year. Because the survey questions were partially focused on the severity of HIV while on treatment, only those receiving treatment were included in this analysis. As a multisite trial, this study was conducted under the oversight of the University of Minnesota Institutional Review Board (IRB) Study # 0302S43321 and five other community-based IRBs.

MEASURES

Only baseline data were used for this analysis. Demographics included age, race (White, African American, Latino, and other, including mixed race, Asian and/or Pacific Islander, Native American), education (high school graduate or less, at least some college), income, and city. Psychosocial variables included internalized homonegativity (very uncomfortable, intermediate, very comfortable ([Bell & Weinberg, 1978]); depression/anxiety (Furlanetto, Mendlowicz, & Romildo Bueno, 2005), and alcohol and drug use (Paul, Barrett, Crosby, & Stall, 1996). Frequency of alcohol use was categorized as “never drinking, moderate drinking (< once a week) and regular drinking (> once a week).” Drug use (marijuana, crack/cocaine, LSD, crystal methamphetamine, tranquilizers, club drugs such as Ecstasy or Special K, heroin, or other opioids) was measured as both a quartile of the frequency of use and as a binary (never, at least once) in the last 3 months. HIV disease indicators and antiretroviral treatment parameters included the length of time since HIV diagnosis (years), self-reported viral load suppression based on most recent test (> 50 ml—detectable, < 50 ml—undetectable), length of time on treatment (months) and perceptions of how much HIV interferes with life activities (ordinal scale ranging from 1 [not at all] to 5 [extremely]). Unsafe anal intercourse was defined as having unprotected anal intercourse with a partner of serodiscordant or unknown HIV infection status (SDUAI). HIV treatment optimism was measured using three subscales developed for use with HIV-positive gay and bisexual men (Brennan et al., 2009).

Treatment Optimism Scales

Susceptibility—This 10-item scale reflected beliefs that since we now have effective treatment, HIV is less transmissible to others (i.e., “Because we now have effective treatment for HIV, using condoms every time I have receptive anal sex [being fucked] is less important to me.”) A higher score indicates a stronger belief in decreased transmissibility now that we have treatment ($\alpha = .86$ in this sample).

Condom Motivation—This five-item scale reflected variation in motivation to use condoms now that we have effective treatment, for example, “Since we have effective treatment for HIV, I feel more motivated to use condoms with secondary partners each time I have insertive anal sex (fucking).” A higher scale score indicated an increased motivation to use condoms now that we have treatment ($\alpha = .84$ in this sample).

Severity—This four-item scale reflected beliefs about the level of severity of living with HIV and being on treatment, for example, “My life is much better now that I am on

combination drug therapy (HAART).” (This item was reverse-scored.) A higher score indicates a higher sense of severity now that we have treatment ($\alpha = .71$ in this sample).

STATISTICAL ANALYSIS

Distributions of summary scale scores were nonnormally distributed (Susceptibility and Severity were positively skewed, Condom Motivation was negatively skewed). Thus, appropriate nonparametric techniques were utilized, including Spearman rank correlations, Kruskal-Wallis tests (for more than two sample comparisons) and Mann-Whitney U (for two sample comparisons and post hoc analyses). Finally, logistic regression analyses were used to check for confounding factors and to adjust final regression models as needed.

RESULTS

The sample (Table 1) was a racially diverse sample with only 23 % Caucasian/White. Participants were mature (median age = 43), well educated (63% had some college education), gay/same-gender-loving identified (81 %) with low incomes (median = \$10,000). The median time since being diagnosed HIV-positive is 12 years (interquartile range [IQR] = 7.0–16.0 years) and the median number of months on HAART was 70 (I.Q.R. = 35.0–117.0). In bivariate analyses, alcohol and drug usage were associated with sexual risk.

BIVARIATE ANALYSES OF FACTORS ASSOCIATED WITH SCALE SCORES

Susceptibility—In terms of demographics, income was significantly associated with Susceptibility scores, Kruskal-Wallis $\chi^2(2) = 6.09$, $P = .05$: Those with the lowest level of income were more likely to report that HIV is less transmissible now that we have treatment when compared with the other income level quartiles ($U = 3274.5$, $P = .02$). No significant differences were reported for the psychosocial or treatment history factors.

Condom Motivation—Condom Motivation scores varied significantly by racial/ethnic group, Kruskal-Wallis $\chi^2(2) = 8.02$, $P < .02$. White men were more likely to report a decreased motivation to use condoms compared with Black ($U = 5178.0$, $P < .01$) and Latino men ($U = 2692.5$, $P = .02$). Annual income was similarly associated with Condom Motivation scores, $\chi^2(2) = 8.08$, $P < .02$, with the middle income group (\$8,000 – \$14,000) reporting higher levels of condom motivation than the lowest ($< \$8,000$, $U = 3353.5$, $P = .04$) and the highest ($> \$14,000$, $U = 3333.5$, $P < .01$) income group. When compared with those with no college education, those with at least some college education were more likely to report a decrease in condom motivation ($U = 11420.5$, $P < .01$).

When analyzed for association with the psychosocial factors, self-reported condom motivation was significantly associated with alcohol and drug usage. Compared with those who never drank, moderate drinkers ($U = 5967.0$, $P = .04$), and regular drinkers ($U = 4765.5$, $P = .04$) were more likely to report lower Condom Motivation ($\chi^2(2) = 10.85$, $P = .004$). Illicit drug usage was significantly, though weakly negatively associated with Condom Motivation, (Spearman $r = -.18$, $P < .01$; Table 2). Analysis revealed significant differences between drug use quartiles based on Condom Motivation scores ($\chi^2(3) = 12.13$, $P < .01$). The lowest quartile of drug usage reported significantly lower Condom Motivation than those in the third ($U = 4070.0$, $P = .002$) and fourth quartile ($U = 4674.0$, $P = .01$). Those who used drugs more were less motivated to use condoms now that we have treatment. Condom Motivation scores were not significantly associated with treatment history.

Severity—In terms of demographic factors, only race was associated with significant differences on Severity scores, $\chi^2(2) = 6.11$, $P < .05$: White men reported higher levels of Severity than Black men (median scores: White men = 13; Black men = 1; $U = 5527.5$, $P = .$

03) and Latino men (median score = 11; $U = 2675.5$, $P = .02$). Severity scores were significantly associated with mental health symptoms, $\chi^2(3) = 16.94$, $P < .01$. The lowest quartile group had significantly lower scores than second ($U = 2892.5$, $P = .03$), third ($U = 2215.5$, $P < .001$), and fourth quartile ($U = 2475.5$, $P = .001$) groups. Those with more depression and anxiety symptoms were less likely to report HIV as a less severe illness.

In terms of treatment history, individuals with undetectable viral loads (UVL) had significantly lower Severity scores than those with detectable viral loads ($U = 7385.0$, $P = .01$). Therefore, those who reported UVL also reported that having HIV is less severe now that we have treatment than those who have a viral load that is detectable. Those who reported that HIV interferes with their life “extremely” reported living with HIV as being more severe than those who reported HIV interferes with their life “somewhat,” “a little,” or “not at all,” $\chi^2(4) = 20.63$, $P < .001$.

In summary, those who had lower income were more likely to report that HIV was less transmissible. A decrease in Condom Motivation score was associated with being White, well educated, and an increase in alcohol and drug use. And, finally, a decrease in the sense of severity was associated with being non-White, having fewer mental health symptoms, having an undetectable viral load, and feeling HIV causes less interference.

SEXUAL RISK

Multiple logistic regression analyses revealed that demographics and HIV treatment factors were not significantly associated with sexual risk. However, alcohol frequency was a predictor of SDUAI in multiple regression analyses of psychosocial factors (Table 3). HIV-positive MSM in this sample who are drinking regularly reported nearly 2.5 times the risk of SDUAI.

Logistic regression analysis was conducted to determine which Treatment Optimism Scale scores were significantly associated with SDUAI (Table 4). Analysis revealed that in a model that included all three scale scores, Susceptibility was the only significant predictor of SDUAI ($\beta = .025$; Wald₍₁₎ = 7.60, $P < .01$). For each 1-level increase in Susceptibility score (range 10-70), there is a 2% increase in risk; a 5-level increase in score represents a 10% increase in sexual risk.

Condom Motivation and Severity scores were not significantly associated with sexual risk. No factor was found to be a confounder for the optimism scales or for SDUAI. Only alcohol was significantly associated with SDUAI. However, using multiple regression including alcohol in the model did not change the magnitude of the association between susceptibility and SDUAI.

DISCUSSION

Within our evaluation of three HIV treatment optimism scales, optimistic beliefs about reduced HIV transmissibility (Susceptibility) were significantly associated with sexual risk. Specifically, those who felt that a lower or undetectable viral load or that being on treatment reduces HIV transmission were significantly more likely to report sexual risk. This association of HIV transmissibility beliefs and sexual risk have been reported in most other studies looking at HIV-positive MSM (Crepaz, Hart, & Marks, 2004; Hart, James, Myers, & Roberts, 2006; Huebner & Gerend, 2001; Ostrow et al., 2002).

Previous evidence suggests that HIV transmission can be mitigated when one is on treatment and has a reduced viral load (Quinn et al., 2000; Vernazza et al., 1997). Even if the possibility of risk is lessened on an individual level, there is continued concern for HIV

transmission on a population-based level because increased incidence of SDUAI is likely to result in increased HIV transmission and sexually transmitted infections. Recent modeling of the HIV epidemic among MSM in the Netherlands has provided evidence that the benefits of highly active antiretroviral treatment (HAART) may be offset by the increased sexual risk among MSM (Bezemer et al., 2008)

A second important finding from our analyses is that Condom Motivation scores varied by race/ethnicity and other demographics. White men, those with at least some college education, and those who drank and used drugs frequently reported a decreased level of motivation to use condoms now that we have treatment. However, only those who drank frequently were more likely to report sexual risk, regardless of race or other factors. Recent evidence indicates that even though African American MSM have higher incidence and prevalence of HIV than do White MSM, they are not actually reporting more risk (Millett, Flores, Peterson, & Bakeman, 2007). This may mean that even though there is increased risk for HIV infection among men of color or those with less education, White, educated HIV-positive MSM who are using drugs/alcohol may be experiencing what has been referred to as “condom fatigue” (Adam, Husbands, Murray, & Maxwell, 2005) or they may simply feel impervious to the impact of possible HIV transmission based on a privileged racial and socioeconomic status, an increase in alcohol use or a combination of the two. It is important to note that race itself is not the risk factor but as a social construct it is important to examine the environmental influences or context in which MSM put themselves at risk. This finding could also reflect that motivation to use condoms has simply not changed among this population. Additionally, motivation is likely to be associated with other unexamined factors, such as intention, location, and individual personality traits.

The scale scores were fairly skewed. Participants tended to score low on the *Susceptibility* and *Condom Motivation* scales, reporting that HIV is still perceived as transmissible while on treatment and that condom motivation remains high. Participants tended to score high on the Severity scale indicating a belief that HIV is still a severe condition. However, when compared with White men, men of color reported that their disease symptoms were less severe while on treatment. Given that all of the participants were on treatment and connected to medical care, the meaning of this finding is unclear. Further research is required to understand what is likely a complex association between race and the level of Severity among HIV-positive MSM.

This study was a significant step in understanding the relationship between Treatment Optimism and SDUAI among HIV-positive MSM. That is, sexual risk appears related to beliefs about how HAART affects the transmissibility of HIV, rather than being related to the perceived severity of being HIV positive. This study also provides information about assumed or potential contextual factors associated with Treatment Optimism and sexual risk among this population. Limitations of this study include that this was a high-risk nonrandom cross-sectional sample recruited to take part in an intensive sexual-health-focused intervention and may not be representative of all sexually active HIV-positive MSM and the findings cannot be assumed to be causal. The use of a multicity cohort and quota sampling to increase diversity could have helped mitigate this limitation allowing for ample power to assess for racial differences. Prior research was severely lacking in this area. Another limitation of this study is that we were not able to adjust our analyses for multiple comparisons with a possibility of Type I errors. Given our relatively small sample size, we did not want to eliminate the detection of possible true factors associated with increased risk based on such adjustments. Future research with larger samples is needed to confirm these associations.

Interpretations of these findings must be made with caution based on these limitations. However, it is important to note that the goal of the overall study was to specifically recruit those who were at highest risk to ascertain what factors are impacting their sexual risk and what are possible ways to reduce this risk. A belief in HIV transmissibility being lowered while on treatment is a risk factor for some men and it will be useful to assess for this risk in providing prevention services to MSM.

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TABLE 1

Demographic Characteristics of Participants (N = 346)

Characteristic	No SDUAI reported (n = 207; 60%), No. (%)	SDUAI reported (n=139;40%) No. (%)	Total (n = 346; %)
Age (years; Mdn = 43.0, IQR = 38.0-48.0)			
21-29	10(4.9)	3 (2.2)	13 (3.8)
30-39	53 (25.7)	48 (34.5)	101 (29.3)
40-49	97 (47.1)	62 (44.6)	159 (46.10)
50-69	46 (22.3)	26 (18.7)	72 (20.9)
Race/Ethnicity			
White	47 (27.7)	33 (23.9)	80 (23.2)
African American	99 (3.9)	68 (5.8)	164(4.6)
Latino/Hispanic	53 (47.8)	32 (47.1)	85 (47.5)
Other (Asian Pacific Islander, Native American, multiple)	8 (25.6)	8 (23.2)	16 (24.6)
Education			
High school graduate or less	79 (38.2)	50 (36.0)	129 (37.3)
At least some college	128 (61.8)	89 (64.0)	217 (62.7)
Employment Status			
Employed at least part time	53 (25.6)	31 (22.3)	84 (24.3)
On disability	110 (53.1)	73 (52.5)	183 (52.9)
Other (retirees, students)	44 (21.3)	35 (25.2)	79 (22.8)
Income (Mdn = \$10,000; IQR = \$5,000-\$20,000)			
\$0-\$5000	39 (23.8)	33 (28.9)	72(25.9)
\$5001-\$10,000	45 (27.4)	32(28.1)	77 (27.7)
\$10,001-\$20,000	42 (25.6)	28 (24.6)	70 (25.2)
\$20,001-\$150,000	38 (23.2)	21 (18.4)	59 (21.2)
Sexual Orientation			
Gay/same gender loving	161 (82.6)	104 (79.4)	265 (81.3)
Other (straight, bisexual)	34(17.4)	27 (20.6)	61 (18.7)
Comfort with sexual orientation			
Very uncomfortable	47 (22.8)	28 (20.6)	75 (21.9)
Intermediate	53 (25.7)	44 (32.4)	97 (28.4)
Very-comfortable	106(51.5)	64(47.1)	170 (49.7)
Alcohol frequency over last three months *			
Never	81 (39.5)	28 (20.4)	109 (31.9)
Moderate (< 2-3 times a month)	73 (35.6)	56 (40.9)	129 (37.7)
Regular (1-2 times a week to every day)	51 (24.9)	53 (38.7)	104 (30.4)
Drug use frequency over last 3 months *			
Never	99 (47.8)	44(31.7)	143 (41.3)
At least once	108 (52.2)	95 (68.3)	203 (58.7)
Viral load			
<50: undetectable	122 (71.3)	83 (68.0) '	205 (70.0)

Characteristic	No SDUAI reported (n = 207; 60%), No. (%)	SDUAI reported (n=139;40%) No. (%)	Total (n = 346; %)
>50: detectable	49 (28.7)	39 (32.0)	88 (30.0)
Depression/Anxiety (Mdn = 19.5; IQR 14.0-28.0)			
1st quartile (12-14)	59 (29.5)	29 (23.4)	88 (27.2)
2nd quartile (15-20)	52 (26.0)	29 (23.4)	81 (25.0)
3rd quartile (21-28)	46 (23.0)	30 (24.2)	76 (23.5)
4th quartile (29-72)	43 (21.5)	36 (29.0)	79 (24.4)

Note. SDUAI = Serodiscordant unprotected anal intercourse. Mdn = median, IQR = interquartile range.

*
 $\chi^2 p < .01$.

TABLE 2

Spearman's Correlations Between Treatment Optimism Scales and Depression and HIV Treatment History

	Susceptibility	Condom Motivation	Severity	Age	Income	Depression	Drug Use	Years Since Diagnosis	Months on HAART	Interference
Susceptibility	1.00	-.11*	-.04	.01	-.06	.04	.10	-.10	-.02	.10.
Condom Motivation	-.11*	1.00	-.27**	.07	-.05	.06	-.18**	-.02	.02	<.01
Severity	-.04	-.27**	1.00	-.08	-.02	.10**	.05	.04	-.07	.22**

* p < .05.

** p < .001.

TABLE 3**Multiple Logistic Regression of Psychosocial Factors on SDUAI**

Variables	B	SE	OR (95% CI)
Depression/anxiety	.12	.11	1.13 (0.91,1.39)
Alcohol frequency			
Never	—	—	1.0 (referent)
Moderate ^a	.61	.31	1.84 (1.00, 3.40)
Regular [*]	.90	.33	2.45 (1.30, 4.63)
Drug usage	.36	.27	1.43 (0.85, 2.42)
Comfort with sexual orientation	.06	.15	1.06 (0.79,1.41)

Note. SDUAI = serodiscordant unprotected anal intercourse; OR = odds ratio; CI = confidence interval.

^a Approached significance (p - .051).

^{*} p < .05.

TABLE 4

Summary of Logistic Regression of Scale Scores Predicting SDUAI

Variables	<i>B</i>	<i>SE</i>	OR (95% CI)
Susceptibility [*]	.025	.008	1.02 (1.01, 1.04)
Condom motivation	-.030	.014	0.97 (0.94, 1.00)
Severity	.011	.023	1.01 (0.97, 1.06)

Note. SDUAI = Serodiscordant unprotected anal intercourse; OR = Odds Ratio; CI - confidence interval. Odds ratios expressed as increases of risk per 1 scale unit higher value.

^{*}
p < .01.