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HEAVY MARIJUANA USE AMONG GAY AND BISEXUAL MALE EMERGING ADULTS LIVING WITH HIV/AIDS

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Introduction

For young persons living with HIV/AIDS, the period of emerging adulthood may present unique challenges and stressors. Emerging adulthood, the developmental period between the ages of 18 to 25, is characterized by identity exploration, instability in terms of residence and work, and the possibility of change (Arnett, 2000, 2004). Such explorations of possible life directions often coincide with a peak in drug and alcohol use (Arnett, 2005) as youth work to develop their integrated adult identities. In addition to the processes of exploring various social identities that are characteristic of the period, adjusting to living with HIV/AIDS may involve risk and resistance factors that interact to impact an adolescent's adaptation to his/her chronic illness (Wallander & Varni, 1992, 1998). Several studies report marijuana to be used by adults living with HIV/AIDS to alleviate stress, symptoms, and side effects associated with antiretroviral therapy (Abrams, Jay, Shade, Visozo, Reda, Press, et al., 2007; Furler, Einarson, Millson, Walmsley, & Bendayan, 2004; Ware, Rueda, Singer, & Kilby, 2003). Very little is known as to how and the extent to which emerging adults may use marijuana to adjust to living with HIV/AIDS.

Longitudinal panel data have shown that daily marijuana use is higher among emerging adults than the rest of the population, with 4–6% of emerging and young adults (years 18–30) reporting daily use and 21–22 year olds reporting the highest rates of daily use (6.3%). Heavy alcohol use also spikes with this age group, with 41% of 21–22 year olds consuming five drinks in a row at a single drinking occasion during the past two weeks (Johnson, O'Malley, Bachman, & Schulenberg, 2010). It has been suggested that the developmentally distinctive features of emerging adulthood (identity exploration, instability, focus on the self, feeling “in between” adolescence and adulthood, and possibilities) can be used to explain the high rates of drug and alcohol use among these young adults (Arnett, 2005). Addiction research has identified enhancement of experiences, coping, expansion of awareness, conformity and social anxiety as motivations for increased frequency of marijuana use among emerging adults, although findings have varied among different samples and study designs (Bonn-Miller & Zvolensky, 2009; Buckner, Bonn-Miller, Zvolensky, & Schmidt, 2007; Simons, Correia, & Carey, 2000).

For young gay and bisexual men, emerging adulthood can be particularly challenging. Risks associated with same-sex identity development may also include experiences of

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discrimination within schools and communities, and being kicked out of parents' homes, which increase risk for substance use and adverse health outcomes (Bruce & Harper, 2011; Ryan, Huebner, Diaz, & Sanchez, 2009). The instability that characterizes emerging adulthood may occur earlier for this population, as gay and lesbian adolescents have been documented to be at much greater risk for being runaways than heterosexual adolescents (Kruks, 1991; Tenner, Trevithick, Wagner, & Burch, 1998). In dealing with the developmental tasks of emerging adulthood, many of these young men may turn to drugs or alcohol to help them cope with these challenges or escape from problems (Rosario, Hunter, & Gwadz, 1997). Across studies, lesbian/gay/bisexual youth have been more likely to report past month marijuana use than heterosexual youth (Marshall, Friedman, Stall, King, Miles, Gold, et al., 2009), and weekly marijuana use among young urban men who have sex with men has been reported as high as 23% (Thiede, Valleroy, MacKellar, Celentano, Ford, Hagan, et al., 2003).

Adaptation or adjustment to an HIV/AIDS diagnosis brings additional stressors for gay and bisexual male emerging adults who test positive for the virus. In addition to developing sexual identities within a mainstream culture that stigmatizes same-sex thoughts, feelings and behaviors, they also must adjust to living with a chronic illness that is also stigmatized and marginalized (Courtenay-Quirk, Wolitski, Parsons, & Gómez, 2006; Swendemen, Rotheram-Borus, Comulada, Weiss, & Ramos, M. E., 2006). Research on HIV-related stigma and psychological distress in HIV-positive young men who have sex with men described dimensions of HIV-related stigma including negative-self image, disclosure concerns, personalized stigma, and public attitudes, and elevated stigma was found to be positively correlated with depressive symptoms and low self-esteem (Dowshen, Binns, & Garofalo, 2009). This is consistent with high levels of stress and co-morbid mental health or substance use disorders associated with disease management found among adults living with HIV/AIDS (Brown & Vanable, 2008).

On a theoretical and conceptual level, because research on emerging adults' adjustment to HIV/AIDS is limited, consideration of adjustment among this population may draw on literature regarding adolescent and adult adjustment to chronic disease, as well as HIV/AIDS. In their Disability-Stress-Coping model, Wallander and Varni (1992, 1998) propose that adolescent adjustment to living with a chronic illness involves an interaction of risk and resistance factors. Specifically, psychosocial stress experienced by adolescents with a chronic disease exceeds the stress typically experienced by their peers, and that psychosocial stress is the proximal cause of adjustment problems in this population. Cognitive appraisal of the disease's threat to one's well-being may negatively affect adjustment if the stress that such appraisal generates exceeds the individual's coping resources (Lazarus and Folkman, 1984). A meta-analysis has shown that children with chronic diseases report twice the number of adjustment problems compared to other children (Lavigne & Faier-Routman, 1992).

For persons living with HIV (PLWH), motivations for marijuana use may also be associated with expectancies of the drug's effects including alleviation of medication side effects and disease symptoms, as well as stress. Studies of adults living with HIV have shown that marijuana can be successfully used to help manage symptoms and side effects from HIV treatment. A recent study reported marijuana use for HIV symptom management ranged from 19% (fatigue) to 27% (nausea) (Corless, Lindgren, Holzemer, Robinson, Moezzi, Kirksey, et al., 2009). In a randomized clinical trial of medicinal marijuana use in the U.S., smoked cannabis was shown to reduce daily pain by 34% among adults experiencing HIV-related sensory neuropathy (Abrams et al., 2007). Canadian studies have found stress, appetite stimulation, and nausea to be symptoms most commonly addressed through medicinal marijuana use (Furler et al., 2004; Ware et al., 2003), although one study found

there to be a significant overlap between recreational use and medicinal use during the past year (Furler et al., 2004). Finally, the data are equivocal with the role of marijuana in facilitating adherence to HIV treatment through symptom management; some have reported a positive association of marijuana use and adherence to treatment among a subset of nausea sufferers (DeJong, Prentiss, McFarland, Machekano, & Israelski, 2005) and others reported a negative association with reduced adherence correlated with marijuana use (Corless et al., 2009).

In order to address the gap in the literature, the present study aimed to examine marijuana use among gay and bisexual male emerging adults living with HIV/AIDS. In Phase I of the study, we utilized qualitative data from a Disability-Stress-Coping-derived framework to inform the empirical testing in Phase II of substance use motivations with marijuana use among gay and bisexual male emerging adults living with HIV/AIDS. Of particular interest was investigating how living with HIV/AIDS influences marijuana use among this population, and how its prevalence compares to other groups of emerging adults, including lesbian, gay, or bisexual (LGB) emerging adults. Results from the qualitative interviews in Phase I guided our hypotheses in Phase II that elevated marijuana use among this sample would be significantly associated with a range of substance use motivations (including alleviating stress, side effects, and negative affect), as well as using substances while alone, and a recent HIV diagnosis.

Methods

Study Design

The data discussed in this paper are derived from a two-phase mixed methods study of young gay and bisexual men living with HIV/AIDS and the associations among their racial/ethnic identity, sexual orientation identity, and identity as young men living with HIV/AIDS, with stressors, coping mechanisms, and health behaviors (XXX). Phase I consisted of semi-structured qualitative interviews with 54 young gay/bisexual men living with HIV/AIDS conducted at four geographically and demographically diverse sites within the Adolescent Medicine Trials Network for HIV/AIDS Interventions (ATN). Phase II consisted of a computer-assisted quantitative survey administered to 200 participants across 14 clinical sites within the ATN.

Multiple benefits arise in the use of mixed methods including using one method to refine and provide insight into different levels of analysis for the other method (Tashakkori, & Teddlie 1998), and converging or confirming findings from various data sources (Creswell et al., 2003). In this study we utilized a sequential exploratory approach (Creswell, et al., 2003), as the findings from the Phase I qualitative data guided the selection of variables to examine in the Phase II survey data.

Sampling Strategies

During Phase I, attempts were made to recruit a purposive sample that was proportionately divided across three ethnic categories: African American, Latino, and Other. A convenience sampling strategy was utilized during Phase II, and allowed each site to enroll up to a maximum of 16 participants per site, in order to achieve geographic balance across the sites and provide a snapshot of young gay/bisexual men in HIV care across the U.S. Participants from Phase I were eligible to also participate in Phase II; however, confidentiality of participant data precluded the investigators from knowing whether any young men participated in both phases of data collection.

Recruitment

During each phase of the study, young HIV-positive men ages 16–24 who were receiving care within clinic settings at the participating sites were approached by study coordinators to assess study eligibility. Inclusion criteria for the study was (1) biologically male at birth and identifies as male at time of study participation; (2) HIV-infected as documented by medical record review or verbal verification with referring professional; (3) HIV infection occurred through sexual or substance use behavior of the participant; (4) between the ages of 16 and 24 years at the time of informed consent/assent; ability to understand both written and spoken English; and (5) history of at least one sexual encounter involving either anal or oral penetration (either receptive or insertive) with a male partner during the 12 months prior to study enrollment. Study coordinators conducted a brief screening interview in a private room in order to determine eligibility; upon verification of eligibility, study coordinators then obtained signed consent/assent from participants.

Study Procedures

Since the population of interest for this study was young gay and bisexual men the institutional review boards of each study site were requested to grant a waiver of parental permission to participate in the study for participants under the age of 18. This was done to avoid the selection biases present in recruiting only youth whose parents are both aware of and comfortable with their sexual orientation. The research protocol was approved by the institutional review boards at the home institution and the participating clinical sites. Incentives were paid to participants, and these varied by site according to guidelines established by each site's IRB and site-specific cost of living considerations.

Once consent/assent was received, participants were enrolled in the study utilizing a confidential code that contained no identifying person information. Qualitative interviews during Phase I were scheduled by study coordinators at each site and conducted by interviewers trained by the study's principal investigator and project director. All interviews were digitally recorded and transcribed. Original recordings and transcribed interviews were stored on a secure server with access restricted to key research staff at the home institution. Quantitative surveys during Phase II were completed using an audio computer-assisted survey (ACASI) in a private room. Data was encrypted and transferred to the ATN Data Operations Center at Westat, then unencrypted at Westat and processed further for study reporting and data analysis.

Phase I: Semi-Structured Interview Guide

The Disability-Stress-Coping Model (Wallander and Varni, 1992) was used as a framework to develop questions that would investigate stressors and coping mechanisms related to the development of participants' identities, as well as substance use, sexual behavior, and adherence to healthcare. A semi-structured interview format was developed that explored risk factors, resiliency factors, and health behaviors using parallel lines of questioning within each identity domain (racial/ethnic, sexual orientation, HIV-positive). Data regarding the perceived relationship between marijuana use and living with HIV was elicited chiefly from two questions in the semi-structured interview: “People use drugs and/or alcohol for a lot of different reasons. How do you think being a young man living with HIV influences your use of drugs and/or alcohol?” and “What are some ways that you deal with stress you think is associated with being a young man living with HIV?”

Phase II: Quantitative Measures

Demographics—Various demographic variables of interest were collected including age, race/ethnicity, sexual orientation, education, and employment. In addition, HIV-specific data were collected, including time since diagnosis and being on antiretroviral therapy.

Substance Use Motivations—Based on the results of the Phase I interviews, and evidence from the literature regarding the use of marijuana to alleviate side effects, we assessed various motivations for drug and alcohol use in Phase II utilizing items we adapted from the CRAFFT ("Car-Relax-Alone-Forget-Friends-Trouble"), a tool used to screen substance use problems, disorder, and dependence among adolescents that has demonstrated an acceptable range of internal consistency (=.68) (Knight, Sherritt, Shrier, Harris, & Chang, 2002). Five items were adapted for our assessment included ever using alcohol or drugs to (a) reduce the stress of living with HIV; (b) relax or fit in; (c) help forget about being HIV-positive; and (d) reduce side effects of HIV medication; additionally, (e) participants were asked if they every used alcohol or drugs while alone. All substance use motivation variables were dichotomized (ever/never). Because the items had dichotomous response categories, they were not appropriate for scaling due to the reduced variance within such items.

Substance Use—Marijuana use, alcohol use, and hard drug use during the past 3 months were assessed in terms of frequency. We included heavy alcohol use (more than 5 drinks per occasion) and hard drug use as a variable of interest in analysis because the substance use motivation variables assessed drug and/or alcohol use in general. Hard drug use was defined by any cocaine, ecstasy, or methamphetamine use during the past 3 months. Response categories for marijuana use during the past 3 months were: "I did not smoke marijuana in the past 3 months," "Once a month or less," "More than once a month but less than once a week," "One or more times a week, but not every day," "Every day." Response categories for heavy alcohol use during the past 3 months were: never, less than monthly, monthly, weekly, daily or almost daily. Response categories for hard drug use in the past 3 months were dichotomous (any use/no use). We created dichotomous variables for marijuana and heavy alcohol use during the past 3 months by combining weekly and daily use into "at least weekly use" category and remaining responses into a "less than weekly use or none" category.

Data Analysis

Phase I: Qualitative Analysis—A diverse team of analysts (in terms of gender, ethnicity, and sexual orientation) consisting of the principal investigator, project director, and four graduate students met weekly to discuss findings during Phase I. An iterative process of data reduction and consolidation allowed for cross-case analyses and a summary of emergent themes. First, content analysis was performed to identify all concepts related to the individual research questions. Next, thematic analysis was conducted in which codes were assigned to delineate precise descriptions of themes that emerged from the content analysis. A refinement of codes was then performed until all themes and sub-themes were identified. Finally, we performed cross-case analyses by constructing matrices to compare the aggregate themes across cases. The identification of themes relating to marijuana use led to the identification of variables to analyze in the quantitative data collected in Phase II.

Phase II: Quantitative Analysis—Participants younger than 18 were excluded from the sample of emerging adults (N=195) in the Phase II analysis. Data were examined for non-normality. None of the variables showed evidence of skewness and/or kurtosis (value above 2.0). Since the substance use motivation items asked about "ever using drugs or alcohol," we included three dependent variables assessing drug or alcohol use for analysis: "weekly

marijuana use," and "weekly heavy alcohol use" and "any hard drug use." The dependent variables were dichotomized. Because of the characteristics of the data, logistic regression models were developed using SPSS v.17 statistical software (SPSS, 2008). Demographic and substance use motivation variables that approached statistical significance in the correlation analyses were entered as independent variables into three separate regression models that predicted participants' (a) weekly marijuana use, (b) weekly alcohol use, and (c) any hard drug use.

Results

Phase I

Participants were African American or Black (n=31, 57%), Latino/Hispanic (n=12, 22%), White (n=7, 13%), and mixed race/ethnicity (n=4, 7%) male adolescents or emerging adults living with HIV who identified as gay or homosexual (n=45) or bisexual (n=9). Ages of participants ranged from 17 to 24 years (M=21.0 years, SD = 2.2). None of the participants younger than 18 (n=4) discussed marijuana use in their interviews.

Marijuana use was discussed by 12 participants. Of those who did cite marijuana use in response to our questioning of HIV-related substance use and HIV-related coping responses, participants described marijuana use chiefly within the contexts of responses to initial HIV diagnosis, stress relief, and relaxation. One participant cited his marijuana use as an appetite stimulant. Several described marijuana in terms of what may be labeled as avoidant coping techniques. Included within each subsection below are particularly salient quotes from participants themselves that illustrate in their own words how and why they use marijuana.

Response to Initial Diagnosis—Several participants reported smoking marijuana regularly in the months following their HIV diagnosis. Descriptions of elevated marijuana use as a response to initial diagnosis were in all instances responses to the HIV-related coping question during the interview. This usage pattern was described as a method to alter one's mood and to "shut out the outside world." One participant retrospectively described his elevated marijuana use at the time as a temporary solution to his post-diagnosis depression, and one from which he eventually progressed:

> After I went home on the first day, you know, I was like - I felt that okay, I can deal with this and moping and whatever, and kind of just smoked a bunch of weed, because I - weed's not a drug to me…So I just smoked a bunch of weed and I kind of moped around and stuff. I was just like, well, this is my vacation, you know, this is like time for me to mope and be depressed, because depression is a completely natural feeling, whether or not doctors agree or whatever, depression is natural… You know, everybody gets depressed, and I just needed that. And after that two weeks and - I just didn't feel like being depressed anymore, I felt like being happy. And I just realized, you know, I can do anything I want. (18-year old Mixed-Race Gay male)

The following participant had tested positive less than three months prior to the interview, and he reported his elevated marijuana use while alone as a way to "retreat" from life and to avoid thinking of his new diagnosis:

> Well, since April [two months prior to interview], since coming up positive, I have really, really retreated from life and the best and most enjoyable ways to do that is by smoking lots and lots of weed. Makes time fly, helps sleep, helps eat, makes things that are boring bearable… I don't want to have to be reminded of it and I am all of the time and at least if I stay inside and I'm stoned, being reminded of it won't

> be embarrassing, like it would be being out in public, vulnerable, not sober and I won't be potentially putting anyone else at risk. (21-year old White Gay male)

Stress Relief—Marijuana use was also reported by participants to provide relief from stress; in most cases, participant responses describing marijuana use as a stress relief technique were derived from the question, "How do you think being a young HIV-positive man influences your use of drugs and/or alcohol?" One young man described such marijuana use in general terms:

> Thank God for pot. I mean, that's just my stress reliever. (19-year old White Gay male)

Another participant reported using marijuana and art together to relieve stress associated with living with HIV.

> I also like besides artwork, I guess I just kinda lay back and smoke pot sometimes when I'm stressed. That's another thing I do so. I don't always have pot but when I do I'll just smoke and kind of draw too, because I know that really helps. (18-year old Mixed-Race Gay male)

Social Relaxation—In contrast to the participants who reported smoking marijuana alone as a response to their HIV diagnosis, one young man stated that he only smoked marijuana on social occasions and didn't smoke by himself:

> It's social relaxation. I only do it [smoke marijuana] when I'm like with my friend. I don't smoke by myself, I don't feel it's a purpose to smoke pot by yourself, you just gonna be sitting there, probably just doped up, you know? I'd rather be with my friends and sit there and laugh at each other. (19-year old Mixed-Race Bisexual male)

Avoidant Coping: Forgetting about HIV—Several participants mentioned marijuana use in ways that may be labeled as avoidant coping. In addition to describing marijuana as a way to relieve HIV-related stress, these participants such as the young man quoted below, maintained that it was a coping strategy that needed changing:

> I've been smoking weed the whole time I've been having HIV and so that's kind of like what I do to make the problem go down or just make me forget about what I was thinking. That's kind of like usually how I handle it. Now I've got to try to find a new solution to comfort it when I get stressed out about having HIV… But by me smoking marijuana, it just takes away my problems. It makes it seem not so bad. (24-year old African American Bisexual male)

Another participant distinguished between the coping effects of alcohol and marijuana, assigning different cognitive processes to periods when he was drunk compared to when he was high:

> Alcohol actually kind of made me more depressed and focus on more of my problems with dealing with HIV along with other issues I had going on, but the marijuana use actually didn't. It kind of got my mind off dealing with the HIV problems I was going through at that particular time `cause at that particular time I kind of dropped out of care for a year. (22-year old Biracial Gay male)

Summary—Participants described a number of motivations for using marijuana within the context of living with HIV/AIDS, including stress alleviation, relaxation, and forgetting about their diagnosis. Additionally, elevated marijuana use was described as a response to initially receiving their diagnosis, particularly when used alone. These findings led us to

conduct analysis of data from the survey in Phase II to empirically test associations among these motivations and conditions with elevated marijuana use. We hypothesized that at least weekly marijuana use would be positively and significantly associated with these motivations, and with having been diagnosed with HIV for less than one year.

Phase II

Sample Characteristics—Participant characteristics are presented in Table 1. Two-thirds of the sample identified as Black or African American and over three-quarters identified as gay. Over half of the participants were not employed, 37% reported graduating from high school, 31% had some college or were currently in college, and 26.5% had not completed high school. Approximately one in five participants reported currently being in a long-term relationship for one year or more. Slightly less than half of the sample was currently on antiretroviral therapy, almost one-quarter had been diagnosed with HIV for less than one year, and the mean time since HIV diagnosis was 28.5 months.

Substance Use—Substance use data are presented in Table 2. Almost one-quarter of the sample reported smoking marijuana every day, and another 16% said they smoked at least weekly but not daily, during the past 3 months. Nine percent of participants reported heavy drinking at least once a week during the past 3 months. A quarter of the sample reported any hard drug use during the same time period. Among the substance use motivation variables, a majority of participants reported at some time using alcohol or drugs to relax or fit in, with slightly less reporting using to relieve the stress of living with HIV and using alcohol or drugs while alone.

Correlation Analysis—Among the dependent variables, any hard drug use in the past 90 days was significantly correlated with both weekly marijuana use and weekly heavy alcohol use. There was no significant correlation between weekly marijuana use and weekly heavy alcohol use. Independent variables that were correlated with weekly marijuana, heavy alcohol use, or hard drug use at $p < .20$ were retained for regression analyses. Although several independent variables were significantly correlated, none met the multicollinearity threshold of $r > .70$ that would have merited their removal from regression models (Judge, Hill, Griffiths, Lutkepohl, & Lee, 1988; Aiken & West, 1991). A summary of correlations among the proposed dependent and independent variables are presented in Table 3.

Regression Analyses—We entered the independent variables to predict the three dependent substance use variables using separate logistic regression models. Demographic variables that met the significance criteria in the above correlation analyses were entered as categorical variables (race/ethnicity, education level, employment status) or as a continuous variable (age), and the substance use motivations were entered as dichotomous variables. The final regression models are presented in Table 4. Model 1 significantly predicted weekly marijuana use ($\chi^2 = 66.1$, $df = 3$, $p < .001$). Ever using drugs and/or alcohol to relieve the stress of living with HIV, ever using drugs and/or alcohol while alone, and ever using drugs and/or alcohol to reduce side effects were significantly associated with risk for weekly marijuana use. Model 2 significantly predicted weekly alcohol use ($\chi^2 = 14.6$, df =1, p<.01), and ever using drugs and/or alcohol while alone was significantly associated with risk for weekly alcohol use. Model 3 significantly predicted past 90 day hard drug use ($\chi^2 = 15.8$, df =1, p<.001), and being older was significantly associated with risk for past 90 day hard drug use.

Discussion

This study documents the motivations for and prevalence of heavy marijuana use among HIV-positive gay and bisexual male emerging adults. The mixed methods utilized allowed us to first explore motivations for marijuana use within a Disability-Stress-Coping framework and then to empirically test associations among such motivations with elevated marijuana use. Our findings suggest that using marijuana to alleviate stress associated with living with HIV is a widespread phenomenon among this population, and that this phenomenon may not extend to other forms of substance use.

In Phase I, participants described a number of motivations for using marijuana within the context of living with HIV/AIDS, including stress alleviation, relaxation, and forgetting about their diagnosis. Additionally, marijuana use was described as a coping response to initially receiving an HIV diagnosis, and was often used alone as an avoidant coping method. These findings lend support for psychological adjustment to disease-related stressors as a central component of the Disease-Disability-Coping model as applied to the context of living with HIV/AIDS. In turn, the lack of data from this phase of the study regarding marijuana use and the alleviation of side effects due to HIV medications merits examination. Wallander and Varni have classified specific aspects of an illness that may affect a young person's adjustment as a “disease parameter” (Wallander & Varni, 1992, 1998). When investigating young persons' adjustment to HIV/AIDS, operationalization of the Disease-Disability-Coping Model may need to be specified to include medication side effects as a HIV-related disease parameter.

The marijuana use reported in Phase II of this study greatly exceeds that of national samples of emerging adults and previous studies on LGB emerging adults. Almost one-quarter of the sample reported smoking marijuana every day, almost four times higher than percentages reported in national samples of emerging adults (Johnson et al., 2010), and another 16% of our sample reported smoking marijuana at least weekly. On the other hand, heavy alcohol use reported in this study was substantially lower than in national samples of emerging adults (Johnson et al., 2010), and past 90-day hard drug use was lower than in previous studies of gay male emerging adults (Kipke et al., 2007; Thiede et al., 2003). The prevalence of marijuana use and the results of our regression analyses suggest that marijuana may consign unique effects on its HIV-positive users that are distinct from other substances.

Based on the results of the qualitative phase of the study, we tested several hypotheses with our quantitative sample. Contrary to what we heard from several of the participants in the qualitative phase about adjustment to a recent HIV diagnosis, an HIV diagnosis within the past year was found not to be significantly correlated with weekly marijuana use or the other substance use variables in the quantitative analysis; therefore, this variable was not included in the regression models.

HIV-related stress and medication side effects were both significantly associated with weekly marijuana use in the final regression model. From a statistical standpoint, relief from side effects was the strongest predictor of weekly marijuana use, yet only 6% of the sample cited side effects relief as a motivation for substance use. This low prevalence may be affected by the relatively low proportion (48%) of participants on antiretroviral at the time of the survey. The relatively large standard error and wide confidence interval exhibited by side effects as a predictor in the logistic regression model also implies uncertainty in the estimation of its overall effect.

Unlike the relatively low prevalence of using substances to relieve side effects, using to relieve HIV-related stress and using while alone were both reported by almost half of the Phase II sample, although their direct effects on weekly marijuana use in the regression

analysis were comparatively smaller than that of side effects. Nonetheless, using drugs and/or alcohol to relieve HIV-related stress was significantly associated with weekly marijuana use and not with weekly heavy drinking, suggesting that marijuana may serve as distinct coping mechanism compared to alcohol within the context of adjusting to living with HIV/AIDS.

From a stress and coping perspective, using substances while alone may be conceptualized as an avoidant coping method, and using substances while alone was significantly associated with both weekly marijuana use and weekly heavy alcohol use. It should also be noted that using drugs/alcohol while alone demonstrated some multicollinearity with using drugs/alcohol to relieve stress. We noted the multicollinearity among a number of the substance use motivation variables during the correlation analysis, but due to the exploratory nature of the study decided to enter them all into the regression models in order to compare effects of particular motivations on heavy marijuana use. Due to their multicollinearity, the estimated effects of using alone and using to relieve stress may in fact be underestimated due to their overlap in measuring the same underlying factor (Rubin, 2010).

Medicinal use of marijuana to manage symptoms and side effects from HIV treatment has gained credibility in the past decades, and is now legal in certain U.S. jurisdictions and Canada. As the use of medicinal marijuana increases, it will be important for health researchers and practitioners to distinguish between medicinal and recreational use. Much of the previous research on marijuana use among adults living with HIV/AIDS has centered on prescribed doses of marijuana or other cannibid derivatives (Abrams et al., 2007; Ware et al., 2003), but some research has found a significant overlap between recreational and medicinal use of marijuana (Furler et al., 2004). Future studies of marijuana use among persons living with HIV need to take into account both prescribed and non-prescribed use of marijuana, especially as it relates to stress management. Further research is needed to delineate how prescribed and recreational use of marijuana to alleviate stress may differ in terms of context, setting, and social networks.

It is important to develop more robust measures of marijuana expectancies and motivations regarding HIV/AIDS for assessment and intervention purposes with this population. Our analysis utilized items derived from the CRAFFT (Knight, et al., 2002), but the dichotomous CRAFFT items comprise essentially an index for assessment purposes and are not necessarily scaled to measure variance among groups of HIV-positive emerging adults. Previous research has developed measures to assess marijuana use motivations among college students (Lee, Neighbors, Hendershot, & Grossbard, 2009; Simons, Correia, Carey, & Borsari, 1998), and such measures could be adapted to address HIV-specific stressors in order to provide more precise data on how young persons living with HIV/AIDS use marijuana, and their motivations and expectations associated with its use.

While gay and bisexual men may experience acute stress upon receiving a diagnosis of HIV/AIDS (Kelly, Raphael, Judd, Kernutt, Burnett, & Burrow, 1998; Purcell, Ibanez, Schwartz, 2005), our findings suggest elevated marijuana use may not be significantly associated with such acute post-diagnosis stress. Instead, the dimension of HIV-related stress that may be characterized as chronic or ongoing appears to be more amenable to elevated marijuana use in our study. There is a need to develop and implement stress reduction interventions that present alternative stress reduction strategies and adaptive coping methods for this population. Effective stress management interventions have been shown to improve self-care, disease management, and health outcomes among HIV-positive adults (Brown & Vanable, 2008), but few such interventions have been designed to be developmentally appropriate to the needs of gay and bisexual male emerging adults and their adjustment to living with HIV/AIDS.

Given the high prevalence of elevated marijuana use in this population, and the use of marijuana among other groups of persons living with HIV/AIDS, it will become increasingly important to study the long-term effects of marijuana use among persons living with HIV/AIDS. While marijuana use has been shown to not have an adverse effect on viral load or CD4 (Abrams, et al., 2003), long-term effects of chronic marijuana use have been shown to include increased risk for depression and anxiety (Patton, et al., 2002), pulmonary diseases (Wu, et al., 1988), and cognitive dysfunction including decreased memory and attention (Solowij, et al., 2002). Long-term effects of chronic marijuana use among persons living with HIV are not well documented.

Our mixed methods study utilized convenience samples drawn from adolescent medicine settings, and the samples from both phases of the study roughly mirror the HIV epidemic among young men who have sex with men proportionally in terms of racial/ethnic groups represented. While not a population-based sample, our two samples do provide a fairly representative cross-section of young gay and bisexual male emerging adults currently in HIV/AIDS care. The data collected in both phases of our study were derived from interviews and surveys of young gay and bisexual male emerging adults living with HIV/AIDS who were currently receiving HIV primary medical care; therefore, the generalizability of the data to all young gay and bisexual male emerging adults living with HIV/AIDS is limited. Also, all data was collected in English, so we did not access the population of young gay and bisexual male emerging adults living with HIV/AIDS for whom English may not be their primary language.

The findings of this study are limited by its cross-sectional design, and we are unable to draw causal inferences among the variables in the regression analyses. Both qualitative and quantitative studies of this population could benefit from following participants over time in order to explore potential temporal fluctuations in HIV-related stress, patterns in adjustment, and marijuana use. We also relied on self-reported data, and given that much of the data examined related to illicit drug use, levels of substance use may have been underreported; however, collecting data through an ACASI format may have lessened any propensity for participants to underreport substance use behavior due to social desirability.

The temporal frames in which we asked participants to characterize their substance use and substance use motivations in Phase II were not concurrent, in that substance use was reported for the past 90 days in terms of frequency, and motivations were assessed as to whether participants had *ever* used substances for particular reasons. As such, the relationships between substance use and substance use motivations should be viewed with the understanding that the motivations are framed within general expectations relating to substances, while the rates of substance use are time-specific. Our findings are also limited by the lack of data regarding participant marijuana use patterns prior to their HIV diagnosis.

Despite these limitations, the mixed methods approach helped us to identify themes relating to marijuana use from the lived experiences of gay and bisexual male emerging adults living with HIV/AIDS and to test these themes empirically in a sample of the population. This triangulation of data strengthens our findings in that we are able to view the phenomena both from the narratives of participants as well as with the breadth of the statistical data. The convergence of our qualitative and quantitative findings point to the significant role of marijuana in the lives of many gay and bisexual male emerging adults living with HIV/AIDS.

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TABLE 1

Phase II Participant Demographics (N=195)

	M	SD
Age (in Years)	21.3	1.8
	n	%
Ethnic Identity		
Black (African American, Caribbean)	128	65.6
Hispanic/Latino	36	18.5
Non-Hispanic White	14	7.2
Native American, American Indian	2	1.0
Asian American	1	0.5
Mixed Race/Other	14	7.2
Sexual Orientation		
Gay/Queer	154	78.9
Bisexual	23	11.8
Straight/Down Low/Trade	9	4.6
Questioning	2	1.0
Other	7	3.5
Education		
Did not complete high school	51	26.2
High school graduate, GED	71	36.4
Some college/technical school	66	33.8
College graduate, or above	7	3.6
Employment		
Full-time	44	22.6
Part-time	46	23.6
Not employed	105	53.8
On Antiretroviral Therapy		
Yes	93	47.7
Time Since Diagnosis		
Less than 1 year	47	24.1

TABLE 2

Substance Use (N=195)

	n	%
Marijuana use, past 90 days		
Weekly, but not daily	32	16.4
Daily	46	23.6
Heavy alcohol use, past 90 days		
Weekly, but not daily	16	8.2
Daily	2	1.0
Hard drug use, past 90 days		
Any cocaine use	27	13.8
Any methamphetamine use	21	10.8
Any ecstasy use	34	17.4
Any cocaine, meth, or ecstasy use	48	24.6
Ever use drugs or alcohol to relax or fit in	105	53.8
Ever use drugs or alcohol when alone	97	49.7
Ever use drugs or alcohol to reduce the stress of living with HIV	82	42.1
Ever use drugs or alcohol to help you to forget about living with HIV	62	31.8
Ever use drugs or alcohol to reduce the side effects of HIV medications	12	6.2

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TABLE 3

Correlations

	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Weekly Marijuana Use, past 90 days	--												
2. Weekly Heavy Alcohol Use, past 90 days	.05	--											
3. Any Hard Drug Use, past 90 days	.29**	.22**	--										
4. Age	−.05	.24**	.26**	--									
5. HIV Diagnosis, past 12 months	.01	−.04	−.08	−.34**	--								
6. Currently on ART	−.02	−.08	−.04	.02	−.15	--							
7. Employment	−.23**	.09	−.11	.18**	−.14*	−.04	--						
8. Education Level	−.18*	.12	−.09	.25*	−.11	.13	.33**	--					
9. Race/Ethnicity	.07	.21**	.12	.08	−.03	−.10	.04	.12	--				
10. Ever use to reduce HIV-related stress	.36**	.17*	.25**	.03	.02	−.08	−.19**	−.05	−.06	--			
11. Ever use to help forget about HIV	.31**	.14	.29**	.07	−.01	−.07	−.21**	−.02	.01	.65**	--		
12. Ever use to reduce side effects	.19**	−.01	.19**	.08	−.11	.14	−.13	−.04	.05	.13	.10	--	
13. Ever use to feel better about self	.37**	.20**	.24**	.21**	−.06	−.02	−.14	−.01	.05	.47**	.43**	.02	--
14. Ever use while alone	.49**	.25**	.19**	.18*	−.01	−.05	−.18*	−.04	.19**	.33**	.27**	.02	.57**

TABLE 4

Logistic Regression Models

	df	Est.	S.E.	X^2	*p*	O.R.	95% lower	C.I. upper
Model 1: Weekly Marijuana Use								
Parameter								
Use to Reduce Side Effects	1	2.44	.905	7.26	<.01	11.47	1.95	67.60
Use while Alone	1	2.05	.376	29.83	<.01	7.78	3.73	16.25
Use to Reduce Stress	1	1.04	.355	8.65	<.01	2.83	1.41	5.67
Model 2: Weekly Heavy Alcohol Use								
Parameter								
Use while Alone	1	1.20	.350	11.64	<.01	3.31	1.66	6.57
Model 3: Past 90 day Hard Drug Use								
Parameter								
Age	1	0.53	.142	14.06	<.01	1.65	1.29	2.25

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