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A longitudinal study of persistent smoking among HIV-positive gay and bisexual men in primary relationships

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HIGHLIGHTS

- At baseline, over one-quarter of men in relationships reported smoking.
- The majority of men remained smokers during the two years of the study.
- Partners who smoke and low income were the strongest predictors of persistent smoking.

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ABSTRACT

Introduction: We examined the stability of smoking behaviors, and factors associated with persistent smoking in a longitudinal study of HIV-positive gay and bisexual men in primary relationships.
Methods: A sample of 377 HIV-positive men on antiretroviral therapy and their same-sex partners completed five assessments over two years. Participants completed semi-structured interviews which assessed smoking status, sociodemographic factors, relationship dynamics, and HIV-related disease characteristics. Latent transition analysis estimated the amount of transition in smoking over time. Latent class analysis examined factors associated with smoking status across the study period.
Results: At baseline, 28.1% ($n = 106$) of participants reported current smoking. Over 90% of the HIV-positive men remained in the same smoking category over time (68.4% persistent non-smokers; 24.1% persistent smokers). Men whose partners smoked and men with lower income had higher odds of being persistent smokers, whereas older men and men who identified as Latino race/ethnicity had lower odds of being persistent smokers compared to non-smokers.
Conclusions: Despite efforts to reduce smoking among people living with HIV (PLWH), a substantial subset of men continued to smoke during their two years in the study. Findings suggest that primary partners who also smoke and low income were the strongest predictors of sustained smoking behaviors among HIV-positive men. Additional research is needed to better understand how to increase motivation and support for smoking cessation among PLWH and their primary partners, while attending to how socioeconomic status may inhibit access to and the sustained impact of existing smoking cessation programs.

1. Introduction

Tobacco use continues to be one of the leading causes of preventable morbidity and premature mortality in the United States and is a well-recognized risk factor for chronic diseases including cardiovascular disease, pulmonary disease, and cancer (Centers for Disease Control and Prevention, 2015). Among people living with HIV (PLWH) and in particular, HIV-positive gay, bisexual and other men who have sex with men (MSM), smoking is a highly prevalent behavior (Friis-Moller et al., 2003; Gritz, Vidrine, Lazev, Amick, & Arduino, 2004; Lifson et al., 2010; Mamary, Bahrs, & Martinez, 2002; Mdodo et al., 2015; O'Cleirigh, Dale, et al., 2015; O'Cleirigh, Valentine, et al., 2015; Vittecoq et al., 2003). Among HIV-positive individuals, smoking has been linked to an increased likelihood of HIV-related medical complications (Humfleet,

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Hall, Delucchi, & Dilley, 2013), and has been shown to negatively impact immune and virologic response (O'Cleirigh et al., 2014).

Despite advances in smoking cessation interventions, available data on smoking cessation interventions among PLWH indicate that cessation rates are low (Humfleet et al., 2013). In fact, fewer than 8% of HIV-positive smokers are actively engaged in any type of smoking-cessation program (Cioe, Crawford, & Stein, 2014), and engagement is even lower among HIV-positive gay and bisexual men (Webb, Vanable, Carey, & Blair, 2007). Thus, PLWH and in particular HIV-positive gay and bisexual men have been cited as a high-priority group for smoking cessation interventions; however, additional research is needed to better understand the relative stability of smoking over time among HIV-positive gay and bisexual men outside of the context of a controlled, intervention study, as well as which risk factors are associated with persistent smoking in order to develop better smoking prevention and cessation interventions.

Prior research has shown a range of factors associated with smoking behaviors among PLWH. With few exceptions (Pacek, Latkin, Crum, Stuart, & Knowlton, 2014), studies have largely focused on individual-level characteristics such as younger age, as well as comorbid depression and alcohol use which decreases the probability of successful smoking cessation (Gritz et al., 2004). Additionally, HIV-positive gay and bisexual men may also cope with unique minority stressors such as internalization of negative messages about one's sexual identity or expression, which can lead to maladaptive coping responses such as substance use (Meyer, 2003); these unique minority stressors have been associated with tobacco use among gay and bisexual men (Gamarel, Neilands, Dilworth, Taylor, & Johnson, 2015; Pachankis, Hatzenbuehler, & Starks, 2014). Moreover, recent evidence suggests that living with another smoker is an increased risk factor for sexual minority men specifically (Gamarel et al., 2016).

Close relationships are consistently linked to better health outcomes across a number of conditions (Lewis et al., 2006) and within couples affected by HIV, primary partners play a positive role in HIV-related health outcomes (Johnson et al., 2012). The mutual influence of partners on each other's health—or dyadic interdependence—can have positive and negative effects on health behaviors, such as smoking (Lewis et al., 2006). For example, individuals who are partnered with smokers are more likely to smoke themselves (Sutton, 1993), and less likely to quit if their partner also smokes (Chandola, Head, & Bartley, 2004; Cobb et al., 2004; Holahan et al., 2012; Homish & Leonard, 2005; McBride et al., 1998). Conversely, positive influences related to relationship commitment and provision of partner encouragement to engage in healthy behaviors may contribute to health-enhancing behaviors such as quitting smoking to protect the longevity of one's relationship (Weiselquist, Rusbult, Foster, & Agnew, 1999). Thus, it is likely that relationship factors – such as commitment level and partner encouragement– may strongly influence smoking behaviors over time among HIV-positive men in same-sex relationships, given the previously observed associations with smoking behaviors among the general population.

Despite effective public health campaigns, public policy initiatives, and improvements in smoking cessation treatment programs, PLWH continue to be a group which warrants future study. To date, few studies have conducted longitudinal analyses to understand factors associated with smoking behaviors over time among HIV-positive men in same-sex relationships. Using data from a longitudinal study of HIV-positive gay and bisexual men and their same-sex primary partners, we explored the following questions: a) what is the stability of smoking status over a two-year period?, and b) to what extent is partner smoking status and relationship factors associated with smoking compared to non-smoking across a two-year period over and above existing individual and social factors? Based on existing literature showing low smoking cessation rates among PLWH in the context of intervention studies and unique minority stressors experienced by gay and bisexual men, we hypothesized that smoking status would be relatively stable across participants' two years in the study. Secondly, we hypothesized that partner smoking status and perceptions of partner encouragement would be robust predictors of smoking status over time, such that partners who also smoked and those who perceived their partners were a negative influence on their health would have greater odds of persistent smoking over time. Additionally, we hypothesized that relationship commitment would be protective such that higher levels of commitment would be predictive of non-smoking behaviors over time.

2. Methods

The data derive from the Duo Project, a longitudinal study of 266 same-sex male couples in which at least one partner was HIV-positive. While the primary purpose of the Duo Project was to examine relationship dynamics and ART adherence over time, we also collected one item on tobacco use. Details of the study procedures have been described elsewhere (Conroy et al., 2016; Johnson et al., 2012). In total, 532 men participated in the baseline assessment, of which 377 were HIV-positive men on ART. Couples were enrolled for a two-year period and data collection began in January 2009 and ended in September 2014. Participants were recruited from the San Francisco Bay Area in the United States (U.S.) using passive recruitment strategies, and participant and provider referrals. Flyers were posted in clinics, community bulletin boards, AIDS service organizations, and at other community-based organizations. Media ads were placed online and in print publications targeting HIV-positive and gay/bisexual men. Interested individuals contacted study staff for more information on the study. Men were eligible for the study if they met the following criteria: (1) in a primary relationship, which was defined as "currently (for at least 3 months) in a relationship with someone you feel committed to above anyone else and with whom you have had a sexual relationship," which is the definition used in many couples-based HIV prevention studies (Beougher et al., 2015; Mitchell & Sullivan, 2015); (2) at least one partner in the relationship is HIV-positive and on an acknowledged ART regimen for at least 30 days; (3) at least 18 years old; (4) born male and currently identify as male; (5) English-speaking; and (6) able and willing to provide informed consent.

Partners were screened separately over the phone to assess eligibility and if both partners were eligible, couples were scheduled for an in-person interview at the study research center. Both partners were required to attend the assessment appointments together, but were separated during data collection. Data were collected using a combination of Computer Assisted Personal Interviewing (CAPI) and Audio Computer Assisted Self Interviewing (ACASI) methods, which optimize data integrity through the reduction of data entry errors while minimizing the effects of social desirability bias (Turner et al., 1998). Couples were assessed at baseline and every six months thereafter for a total of five assessment waves. All HIV-positive participants had blood drawn for viral load tests at their baseline, 12-month, and 24-month visits.

Of the 377 HIV-positive participants on ART, 21% were lost during the course of the study to relationship breakup, 4% to relocation or travel, 2% to the death of a partner, and 6% withdrew or were withdrawn from the study due to inability to follow study protocols.

Ethical approval was obtained from the Committee on Human Research at the University of California, San Francisco. Written informed consent was obtained from all participants. Each partner of the couple was paid US $50 for each survey completed and HIV-positive participants were paid an additional $10 for each blood sample.

2.1. Measures

2.1.1. Smoking status

At each assessment, participants were asked "Do you currently smoke cigarettes?" Answers to this question were used to classify participants as nonsmokers (reported not smoking at that time point) or current smokers (reported smoking at that time point). Smoking status at each time point was coded as smoking (1) versus non-smoking (0).