Measuring Alcohol Consumption Using Timeline Followback in Non-Treatment-Seeking Medical Clinic Patients With and Without HIV Infection: 7-, 14-, or 30-day Recall

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ABSTRACT. Objective: The measurement of alcohol consumption is an essential component of research in patients at risk for or infected with HIV. Daily estimation measures such as the Timeline Followback (TLFB) have been validated, yet the optimal time window and its performance in non-treatment-seeking medical clinic subjects and among those with HIV are not known. **Method:** In 1,519 HIV-infected and 1,612 uninfected men receiving medical care in general medical or infectious disease clinics, we compared the association between 7-, 14-, and 30-day TLFB reports, obtained via telephone, of alcohol consumption using Spearman's correlation coefficients. To evaluate agreement between 7-, 14-, and 30-day reports of heavy episodic drinking, we evaluated percent agreement, sensitivity, and kappa statistics, considering 30-day report as the gold standard. **Results:** The estimated prevalence of heavy episodic drinking was progressively higher for longer TLFB intervals (7 days: 6.3%; 14 days: 8.0%; 30 days: 9.5%). Correlation coefficients with 30-day TLFB were higher for 14 days (.94) than for 7 days (.86) overall ($p < .001$) and among HIV-infected (.94 vs. .86, $p < .001$) and uninfected (.95 vs. .87, $p < 001$). Correlations were similar by HIV status. When considered overall and by HIV status, the sensitivity, percent agreement, and kappa statistics are better for heavy episodic drinking based on 14 days compared with 7 days. **Conclusions:** A TLFB for alcohol consumption of 14 days is preferable to 7 days for non-treatment-seeking patients in medical clinics with and without HIV infection when compared with 30 days. (*J. Stud. Alcohol Drugs, 74,* 500–504, 2013)

ALCOHOL USE IS COMMON IN PATIENTS who are at risk for or infected with HIV (Braithwaite et al., 2007; Petry, 1999; Samet et al., 2004a). Alcohol use can lead to decreased antiretroviral medication adherence and worse biologic outcomes such as decreased cluster of differentiation 4 (CD4) cell count and increased HIV viral load, even in the current era of combined antiretroviral therapy (cART) (Braithwaite et al., 2007, 2008; Romeo et al., 2007; Samet et al., 2004b, 2007). Finally, alcohol use leads to a loss of inhibition and therefore is associated with behaviors that increase the risk of acquiring or transmitting HIV, such as unprotected sex and multiple sexual partners (Fiellin, 2004; Justice et al., 2010).

The measurement of alcohol consumption is an essential component of research in patients at risk for or infected with HIV. The use of patient self-report using quantity–frequency and daily estimation measures has been validated but can be burdensome and time consuming, especially in research conducted in general medical settings with non-substance-related treatment-seeking individuals. Timeline followback (TLFB) is a well-established and valid method to measure patient self-report of alcohol consumption (Maisto et al., 2008; Sobell et al., 1988, 2001). The use of TLFB has the advantage that it allows for varied time horizons ranging from 1 day to 1 year (Vakili et al., 2008). However, for many researchers, longer time horizons increase subject response burden and may not lead to more informative data (Vakili et al., 2008). The concordance between longer versus shorter time horizons has been a subject of prior research (Carey et al., 2004; Hoeppner et al., 2010; Roy et al., 2008; Sobell et al., 2001; Toll et al., 2008; Vakili et al., 2008) but rarely investigated in non-substance-related treatment-seeking individuals and not in patients with HIV infection. In addition, there are no data verifying that the TLFB performs similarly in patients with and without HIV infection. HIV-infected individuals may differ from noninfected individuals in some of the variables associated with the extent to which sampled

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time windows of drinking estimation are representative. These include stability of drinking patterns, alcohol problem severity, and motivation to change (Bertholet et al., 2010; Braithwaite et al., 2008; Kraemer et al., 2006; Vakili et al., 2008). Thus, it is important to document the performance of the TLFB in those with and without HIV infection. Finally, few studies have evaluated the performance of the TLFB in clinical populations who are not seeking or receiving treatment for alcohol problems. The purpose of the current study was to determine the concordance of 7-, 14-, and 30-day report of alcohol consumption in non-substance-related treatment-seeking medical clinic patients with and without HIV infection.

Method

Subjects

Details regarding the subject selection and study design have previously been published (Braithwaite et al., 2005). Subjects for the analysis were a subset of participants in the Veterans Aging Cohort Study (VACS) enrolled between June 2002 and July 2004. VACS is an ongoing prospective observational study, funded by the National Institute on Alcohol Abuse and Alcoholism, of HIV-infected and age- and race-matched uninfected participants. Subjects are recruited from outpatient infectious disease (HIV-infected) and general medicine (uninfected) clinics at eight Veterans Affairs (VA) Medical Centers across the United States: Atlanta, GA; Baltimore, MD; Bronx, NY; Houston, TX; Los Angeles, CA; Manhattan, NY; Pittsburgh, PA; and Washington, D.C. For the current analysis, we used data from the 1,519 HIV-infected and 1,612 HIV-uninfected participants who indicated that they had consumed at least one alcoholic beverage in their life (94% of respondents) and who had completed a baseline TLFB survey.

Data collection

Demographic and clinical information was collected using self-administered survey questionnaires and administrative data. The TLFB was administered via telephone interview by trained telephone interviewers and assessed the quantity and pattern of alcohol consumption over the prior 30-day period (Braithwaite et al., 2005). The TLFB has been evaluated in clinical and nonclinical populations and has been shown to have high test–retest reliability across multiple populations of drinkers (Roy et al., 2008; Sobell et al., 1988, 2001, 2003; Vakili et al., 2008).

Measures

For each period (7, 14, and 30 days), we summed the number of drinks reported during the time frame, creating three total-number-of-drink variables. We then divided total number of drinks by the number of days in the time frame, creating a variable of average drinks per day. We created this average so that quantity consumed during each time frame would be comparable (one would likely report more drinks over a 30-day time frame than over a 14-day time frame). Because average drinks per day was not normally distributed (most people had a mean of 0 drinks per day), we categorized mean drinks per day into the following categories: 0, greater than 0 to less than 2.5, 2.5 to less than 5, and 5 or more drinks per day. Heavy episodic ("binge") drinking was defined as consuming 5 or more drinks in one day.

Data analysis

We compared descriptive variables between HIV-infected and uninfected subjects using chi-square tests and *t* tests as appropriate. For HIV-infected subjects, we summarized CD4 count, HIV viral load, and lifetime history of receipt of cART. We compared the prevalence of average number of drinks per day and heavy episodic drinking for each group for 7-, 14-, and 30-day periods. We used Spearman's correlation coefficients to assess the association between total drinks over the 30-day period and total drinks for the 14-day period as well as total drinks over the 30-day period and total drinks for the 7-day period. The differences between correlation coefficients were assessed using the Fisher *r*-to-*z* transformation (Lowry, 2001–2013). We also created scatter plots to compare correlations between average number of drinks per day over 30 days to 14 days and to 7 days. To evaluate agreement between 30 days and 14 days and between 30 days and 7 days for heavy episodic drinking criteria, we evaluated percent kappa statistics, agreement, sensitivity, and negative predictive values considering the 30-day report as the gold standard as supported by prior research (Vakili et al., 2008). Statistical analyses were performed using Stata Version 10.0 (StataCorp LP, College Station, TX). The VACS has been approved by the Institutional Review Boards at the coordinating center at the VA Connecticut Healthcare System, at Yale University, and each of the local sites. All subjects provided written informed consent.

Results

Subjects

Ninety-four percent (n = 2,937) of the subjects were male, the mean age was 49 years, and 63% (n = 1,961) were Black. Compared with uninfected subjects, a greater percentage of HIV-infected subjects were male (97% vs. 91%, $p < .001$) and Black (66% vs. 60%, $p < .001$). The HIV-infected subjects were younger than the uninfected subjects (M = 49 vs. 50 years, $p < .001$). Education was similar between groups. Among the HIV-infected patients, 88% (n = 1,339) were

Table 1. Agreement of heavy episodic drinking between 30 days and 14 days and 30 days and 7 days, using 30-day period as the "gold standard"

Variable	κ	Agreement %	Sensitivity %	Negative predictive value %
All subjects				
30 vs. 14 day	.90	98.4	83.6	98.3
30 vs. 7 day	.78	97.7	65.8	96.5
HIV+				
30 vs. 14 day	.89	98.3	81.3	98.2
30 vs. 7 day	.78	96.8	65.5	96.6
HIV−				
30 vs. 14 day	.91	98.6	85.5	98.4
30 vs. 7 day	.78	96.7	66.0	96.4

Notes: HIV+ = HIV infected; HIV− = HIV uninfected.

receiving cART, and 49.6% had an undetectable HIV viral load (<500 copies/ml).

Drinking categories

The consumption of drinks per day and prevalence of heavy episodic drinking was similar between HIV-infected and uninfected subjects. The percentage with a mean of zero drinks per day was highest for the 7-day period (67%) and lowest for the 30-day period (57%). The percentage who reported heavy episodic drinking was highest for the 30-day period (9.5%) and lowest for the 14-day (8.0%) and 7-day periods (6.3%).

Concordance

Spearman's correlation coefficients where higher when comparing alcohol consumption over 30 days with 14 days than for 30 days compared with 7 days overall (.94 vs. .86, $p < .001$) and among HIV-infected (.94 vs. .86, $p < .001$) and uninfected (.95 vs. .87, $p < 001$) subjects. Correlation coefficients were similar for the HIV-infected and uninfected groups (.94 vs. .86 and .95 vs. .87, respectively, $p > .07$ for both).

For all groups (total, HIV-infected, and uninfected) the kappa statistics, percent agreement sensitivity, and negative predictive value were greater for heavy episodic drinking based on 14 days compared with heavy episodic drinking based on 7 days (Table 1).

Discussion

In this large study of the telephone-based TLFB in non-substance-related treatment-seeking clinical populations of those with and without HIV infection, we determined that 14-day reports of alcohol consumption correlate highly with 30-day reports and that 14-day reports of alcohol consumption are more highly correlated with 30-day reports than are 7-day reports. This was true for both HIV-infected and uninfected subjects and for reports of total alcohol consumption, average drinks per day (data not shown), and heavy episodic drinking.

Our study is unique in that it was conducted in general medical clinics and among patients receiving ongoing care for HIV and other medical conditions and not seeking treatment for alcohol problems. In addition, no other studies have detailed comparisons in such patients between 7-, 14-, and 30-day time horizons using the TLFB. Other studies have evaluated quantity–frequency measures, such as the Quick Drinking Screen, and have reported favorable comparisons with the TLFB (Roy et al., 2008; Sobell et al., 2003). Quantity–frequency assessments, however, are considered to be less sensitive to sporadic days of heavy drinking (Sobell et al., 2003). Of note, heavy episodic drinking was observed in 6%–9% of subjects in the current study, and its prevalence increased as longer time horizons were evaluated. Our findings add to the literature including a study that demonstrated stability of alcohol reports over the three consecutive 30-day periods of a 90-day window (Carey et al., 2004). In contrast to the stability demonstrated within the 30-day periods in a 90-day window, our findings demonstrated enough variability over the shorter time frames (e.g., 7- vs. 30-day compared with 14- vs. 30-day) to support caution when relying on reports covering only 7 days. Our conclusions differ from those drawn from another study that supported the use of a 7-day time horizon for percentage of days abstinent, percentage of heavy drinking days, and number of drinks per drinking day (Toll et al., 2008). These disparate findings may reflect the different settings of the two studies, with one being a randomized clinical trial of smoking cessation (Toll et al., 2008) and the higher rates of alcohol abstinence reported in the clinical trial.

These data should be considered in the context of some limitations to our study. First, the population was predominantly male veterans. Future studies should evaluate various time horizons for the TLFB in populations with a larger proportion of women and those who are not receiving care in the Veteran's Administration in an attempt to verify our findings. Second, our findings only reflect the correlation between 7-, 14-, and 30-day reports of alcohol consumption using TLFB and cannot be extrapolated to other strategies used to collect information such as quantity–frequency or ecological momentary assessments. Third, our gold or reference standard was limited to 30-day report, a measure supported by prior work (Vakili et al., 2008). The correlation between shorter drinking horizons and longer time windows (e.g., 90 days to 1 year) could not be addressed with our data. Fourth, the 7- and 14-day reports were extracted from the 30-day report data and not obtained independently. Fifth, our findings were obtained in non-alcohol-treatment-seeking general medical clinic populations who were not characterized with respect to alcohol use disorders. Although these findings can inform efforts to move screening and treatment

into primary care and other non-substance-related specialty settings, such as those aimed at supporting screening, brief intervention, and referral to treatment (SBIRT), their relevance to clinical care in these settings and to patients with alcohol use disorders who are seeking treatment in specialty treatment settings is unknown. Finally, this work, conducted in a research format, has greater implications for future research than for clinical care. Strategies for screening such as the Alcohol Use Disorders Identification Test–consumption questions (McGinnis et al., 2012) and the one question screen (National Institute on Alcohol Abuse and Alcoholism, 2007) should be considered standard practice for clinical care.

The current study has relevance to clinical research. Our findings support the conclusion that to decrease response burden, researchers can measure self-report of alcohol consumption using the TLFB over a 14-day, instead of 30-day, horizon. This holds true for patients with and without HIV infection. Future research should be conducted that collects detailed information regarding patient and provider burden with respect to time to help quantify the potential tradeoffs of shifting to shorter time horizons.

Research has demonstrated a close temporal relationship between alcohol consumption and important clinical events including medication nonadherence and risky sexual behavior (Braithwaite et al., 2005; Cook et al., 2006). One advantage of daily estimation methods, such as the TLFB, over quantity–frequency estimates is that one can assess the temporal proximity of alcohol consumption and such events. Further research should explore the optimal time horizons for calendar-based daily estimation measures such as the TLFB for other behaviors (e.g., medication nonadherence and unprotected sex) when collected along with information on alcohol consumption. As efforts to increase the treatment of patients with unhealthy alcohol use expand in primary care, future research should examine the validity of briefer time horizons among patients receiving alcohol interventions in general medical settings.

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