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What's the agreement between self-reported and biochemical verification of drug use? A look at permanent supportive housing residents

Alexis Rendon [a,*], Melvin Livingston [b], Sumihiro Suzuki [b], Whitney Hill [a], Scott Walters [a]

[a] University of North Texas Health Science Center, School of Public Health, Department of Behavioral and Community Health, Fort Worth, TX, United States
[b] University of North Texas Health Science Center, School of Public Health, Department of Biostatistics and Epidemiology, Fort Worth, TX, United States

HIGHLIGHTS

- Timeline Follow-back self-reported drug use is compared to an oral fluid test.
- Self-report may not adequately capture recent drug use in similar populations.
- Older, non-White, and uninsured participants were more likely to misreport use.
- With marijuana, relying on an oral fluid test may underestimate actual drug use.

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ABSTRACT

Self-reported substance use is commonly used as an outcome measure in treatment research. We evaluated the validity of self-reported drug use in a sample of 334 adults with mental health problems who were residing in supportive housing programs. The primary analysis was the calculation of the positive predictive values (PPVs) of self-report compared to an oral fluid test taken at the same time. A sensitivity analysis compared the positive predictive values of two self-reported drug use histories: biological testing window (ranging between the past 96 h to 30 days depending on drug type) or the full past 90-day comparison window (maximum length recorded during interview). A multivariable logistic regression was used to predict discordance between self-report and the drug test for users. Self-reported drug use and oral fluid drug tests were compared to determine the positive predictive value for amphetamines/methamphetamines/PCP (47.1% agreement), cocaine (43.8% agreement), and marijuana (69.7% agreement) drug tests. Participants who misreported their drug use were more likely to be older, non-White, have no medical insurance, and not report any alcohol use. In general, amphetamine/methamphetamine/PCP and cocaine use was adequately captured by the biological test, while marijuana use was best captured by a combination of self-report and biological data. Using the full past 90 day comparison window resulted in higher concordance with the oral fluid drug test, indicating that self-reported drug use in the past 90 days may be a proxy for drug use within the biological testing window. Self-report has some disadvantages when used as the sole measure of drug use in this population.

1. Introduction

The most severe type of homelessness is chronic homelessness (CH), defined as individuals who are homeless for at least a year within the last three years or who have had four separate, distinct, and sustained stays of homelessness in the past year (The Substance Abuse and Mental Health Services Administration [SAMHSA], 2011; Tsai, Lapidos, Rosenheck, & Harpaz-Rotem, 2013; United States Department of Housing and Development, 2007). Although CH individuals make up about 25% of the homeless population, they account for a disproportionate share of health and social services costs (Burt & Aron, 2001; Caton, Wilkins, & Anderson, 2007; Larimer et al., 2009). Two common features of CH individuals are mental health problems and substance use. For instance, the prevalence of lifetime mental illness in the CH population is 74%–83% (Edens, Mares, & Rosenheck, 2011), compared to lifetime rates of 4.2% in the general population (The Substance Abuse and Mental Health Services Administration [SAMHSA], 2010). Similarly, rates of

* Corresponding author at: School of Public Health, The University of North Texas Health Science Center, 3500 Camp Bowie Blvd Suite 708, Fort Worth, TX 76107, United States.
E-mail address: alexis.rendon@live.unthsc.edu (A. Rendon).

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lifetime substance use disorders among CH individuals are approximately 68%–73% (Edens, Mares, & Rosenheck, 2011) compared to lifetime rates of 9.4% in the general population (SAMHSA, 2011). Those with co-occurring mental health and substance use disorders often suffer from more severe non-compliant behaviors compared to those with mental health difficulties or substance use alone (Drake & Wallach, 1989).

Permanent supportive housing (PSH) combines housing and supportive case management to meet the needs of CH individuals (Larimer et al., 2009; Polcin, 2016). There is evidence that PSH reduces overall healthcare costs (Larimer et al., 2009); however, the effect of PSH on substance use remains under debate (Edens, Mares, Tsai, & Rosenheck, 2011; Kirst, Zerger, Misir, Hwang, & Stergiopoulos, 2015; Polcin, 2016). Several studies have reported declines in alcohol use, but not in illicit drug use after entering PSH (Kirst et al., 2015; Larimer et al., 2009; Padgett, 2006). While these studies found no change in rates of illicit substance use, another study reported that PSH residents increased drug treatment services by 22% after being housed, which resulted in decreased drug use (Mondello & House, 2007). One limitation of these studies is that they tend to rely exclusively on self-report as a measure of substance use (Kirst et al., 2015; Padgett, 2006).

Verbal recall of substance use is common in research studies assessing drug use behavior (Darke, 1998; Hjorthøj, Hjorthøj, & Nordentoft, 2012; Schumacher et al., 1995), and likewise assessments of the efficacy of supportive housing programs tend to rely on this method (Napper, Fisher, Johnson, & Wood, 2010; Larimer et al., 2009). The most common method, Timeline Follow-back (TLFB), is a self-report instrument that utilizes a visual calendar to enhance recall of substance use (Sobell & Sobell, 1992). Originally developed to measure alcohol consumption, the TLFB has since been widely used in cross sectional and prospective studies of drug use (Hjorthøj et al., 2012). While researchers have used the TLFB method for recall of up to the past 12 months, a 90-day TLFB is common in substance abuse treatment studies (Dennis, Funk, Godley, Godley, & Waldron, 2004; Sobell, Brown, Leo, & Sobell, 1996).

While the TLFB is generally concordant with biological measures, some populations may be more accurate in their reporting (Harrison, 1997; Hjorthøj et al., 2012; Napper et al., 2010; Rosay, Najaka, & Herz, 2007; Secades-Villa & Fernandez-Hermida, 2003). For example, in a study of people being discharged from drug treatment, self-report was an accurate measure of amphetamine use within the past 48 h, with 95% agreement when compared to drug urine tests (Napper et al., 2010). However, in other studies, discordance has been as high as 34.9% among users, depending on the substance type and the reporting population (Hjorthøj et al., 2012; Schumacher et al., 1995). For example, Schumacher et al. (1995) found an average 30-day concordance rate of 68% among 131 homeless crack cocaine users, compared to urinalysis. A meta-analysis found that the percent agreement between self-report and biological measures ranged from 87.3%–90.9% for marijuana and 79.3%–84.1% for cocaine (Hjorthøj et al., 2012). Among studies in which substance users had psychiatric co-morbidities, the percent agreement ranged from 80.4%–83.8% (Hjorthøj et al., 2012). There are several reasons studies might report differences in the accuracy of self-report. The lack of standardized methodology, social desirability or stigma of reporting illicit drug use, inability to recall drug use further back in time, and fear of legal repercussions may lead individuals to misreport their substance use (Napper et al., 2010).

Despite the acknowledged tendency of self-report to underestimate actual drug use, self-report is still the primary measure of drug use in studies of homeless substance users (Napper et al., 2010). A study conducted during 2004–2008 estimated the prevalence of past 30 day illicit drug use among 756 CH research participants as 36%–39% at baseline (Edens, Mares, & Rosenheck, 2011). However, because these data were collected exclusively by self-report, it is possible that this underestimates true drug use in this population. The validity of self-reported drug use in both CH and supportive housing populations has not been adequately studied (Polcin, 2016). To our knowledge, no other study has estimated the prevalence of substance use in a supportive housing or a similar low-income population with mental health disorders using a biological measure to validate self-report.

Demographic factors have sometimes been associated with misreporting, but the overall patterns are unclear. For instance, there is disagreement in the literature about whether age is a predictor of misreporting drug use (Katz, Webb, Gartin, & Marshall, 1997; McElrath, Dunham, & Cromwell, 1995; McNagny & Parker, 1992; Rosay et al., 2007). The relationship between race and reporting drug use has also been a point of disagreement (Rosay et al., 2007). Studies of other vulnerable populations have found that Blacks are less likely to have a concordant self-report and urinalysis (White et al., 2014). Race was not a significant contributor to a study of self-reporting drug use validity among arrestees (Sloan, Odapati, & Ucker, 2004), but was in another study of arrestees (McElrath et al., 1995). This demonstrates that the relationship between race and misreported drug use may be population-specific. However, evidence suggests that sex is not a predictor of misreporting (Sloan et al., 2004). Finally, it is unclear whether insurance status is a predictor of misreporting. However, compared to those with private insurance, uninsured individuals have increased odds of alcohol and substance abuse disorders and also experience barriers to accessing substance abuse treatment services (Wu, Kouzis, & Schlenger, 2003), and thus there is reason to believe that insurance status might be associated with misreporting.

While it is known that supportive housing individuals incur large healthcare related costs, knowing who is more likely to misreport drug use can be helpful to researchers who design and evaluate programs for similar populations. For instance, without knowing the validity of self-reported drug use, researchers will not be able to accurately measure drug use or make valid conclusions about the efficacy of interventions. This study aimed to determine the validity of self-reported drug use compared to a biological drug test and assess predictors of misreporting in a group of people residing in supportive housing. The overall goal was to provide further information for others who are seeking to obtain accurate measures of substance abuse in vulnerable populations.

2. Methods

2.1. Participants

Participants were adults (18 years and older), residing in PSH in Fort Worth, TX, who were interested in participating in a voluntary health coaching program. To be eligible, participants must have been Medicaid-enrolled or low-income uninsured (Medicaid eligible), and self-reported one of the following mental health problems: prescribed medication for psychological or emotional problems, experiencing hallucinations, receiving a pension for a psychiatric disability, or scoring > 9 on the 9-item Patient Health Questionnaire (PHQ-9) depression screener. Exclusion criteria included (1) residing in other types of housing not considered PSH (e.g., Transitional Housing or homeless shelter), (2) any physical or sensory impairment that would substantially limit program participation or prevent accurate assessment of their health status, (3) non-English-speaking, and/or (4) limited autonomy or decision-making capabilities (e.g., substantially neurologically or cognitively impaired). Convenience sampling of six local housing agencies resulted in 463 people who were screened for eligibility. The final sample consisted of 334 participants who met the inclusion criteria (Fig. 1). (Among the 399 PHS residents who were screened for eligibility, approximately 83.7% met the other inclusion criteria.) The project was approved by the Institutional Review Board of the University of North Texas Health Science Center, and participants were given assurances of confidentiality. Informed consent was obtained from each study participant.