

## REGULAR ARTICLES

---

# Clinical Characteristics of Under-Reporters on Urine Drug Screens in a Cocaine Treatment Study

Hugh Myrick, M.D., Scott Henderson, B.A., Bonnie Dansky, Ph.D.,  
Christine Pelic, M.D., Kathleen T. Brady, M.D., Ph.D.

*To explore the concordance between urine drug screen (UDS) results and self-report of cocaine use, results in a pharmacologic treatment trial for cocaine dependence were evaluated. Subjects with at least two occurrences of a positive UDS for cocaine were characterized as either an under-reporter (UR, n=43) or a truthful reporter (TR, n=32). Interestingly, URs attended more study sessions and were more likely to complete the study. Significant differences were found in cocaine use patterns and the prevalence of Axis I and Axis II disorders. This information may be important in guiding the judicious use of UDS in clinical and research settings. (Am J Addict 2002;11:255-261)*

As early as 1892, medical texts have questioned the self-report of substance abusers and have even referred to them as “inveterate liars.”<sup>1</sup> Despite this negative view of the veracity of self-reported use in this population, the data generally confirm that substance abusers’ self-reports of substance use are both reliable and valid.<sup>2,3</sup> However, there is a

considerable amount of variability among studies.

Although self-reported drug use is highly correlated with the results of urinalysis,<sup>4</sup> there is a subgroup of individuals who under-report their substance use (under-reporters, URs). In a group of 248 clients in methadone treatment programs, 25% underreported use of one or more

---

Received February 15, 2002; accepted May 10, 2002.

From the Medical University of South Carolina, Department of Psychiatry, Center for Drug and Alcohol Programs, Charleston, SC (Drs. Myrick, Pelic, and Brady, and Mr. Henderson); and CB Technologies, Inc., Exton, Pa (Dr. Dansky). Address correspondence to Dr. Myrick, Medical University of South Carolina, Department of Psychiatry, Center for Drug and Alcohol Programs, 67 President Street, Charleston, SC 29425. E-mail: myrickh@ musc.edu.

drugs.<sup>5</sup> The authors of this study found that paraprofessional interviewers were more likely to elicit truthful responses to drug use, and that older clients were more likely to under-report drug use.

In terms of biologic assays to detect substance use, urinalysis has been the most commonly employed. Recent studies have demonstrated that hair analysis is more reliable for detecting chronic cocaine use.<sup>6,7</sup> Urinalysis can detect the presence of cocaine for 2-3 days after last use;<sup>8</sup> therefore, in order to determine the validity of an individual's self-report of cocaine usage, the interval measured must match the sensitivity of the bioassay employed.

Researchers and clinicians in the addictions field often require individuals with substance use disorders (SUDs) to report the amounts and types of drugs used. Measures such as the Time-Line Follow-Back<sup>9</sup> are specifically designed to facilitate accurate reporting of drug use. Since a common practice in treatment outcome research is to compare the extent of drug use at pre-treatment with that obtained at post-treatment and follow-up, reliable measurement of drug use is critical to obtaining valid results in this line of research. Accordingly, information about the clinical characteristics of those individuals most likely to be inaccurate reporters is important. In the present study, the extent of inaccurate reporting in individuals presenting for a cocaine treatment study was determined and the clinical characteristics of URs was evaluated.

---

## METHODS

---

### Subjects

Subjects were 180 individuals entering a twelve-week outpatient pharmacological treatment trial for cocaine dependence, all of whom recruited from several substance abuse treatment programs in the Charleston, South Carolina area. All sub-

jects met DSM-III-R criteria for current cocaine dependence. Subjects with current dependence on another substance (except nicotine or caffeine) were excluded from the study. Participants with a psychotic disorder or who were medically unstable were also excluded.

Most studies evaluating the validity of self-reported drug use have utilized a retrospective period longer than the detection period of urine drug screening techniques. In order to more appropriately identify each subject's veracity of cocaine use, the present study obtained weekly urine drug screens but only included a three-day window for the self-report and subjects who provided at least two urine drug screens that were positive for cocaine during the 12-week treatment trial.

From the original sample of 180 subjects, 76 (48 men and 28 women) participants provided at least two urine drug screens that were positive for cocaine. Data from these 76 participants were the focus of the current investigation. A majority of the participants were African-American (57.9%), with the remaining classified as Caucasian (42.1%). The average age was 32.28 (SD = 6.32) with a range from 22 to 48. Slightly more than one-half (52.6%) of the participants were employed, but most (63.5%) had a family income that fell below \$15,001.

### Assessments

After obtaining IRB-approved informed consent, subjects were administered a series of assessment instruments. Substance use assessments included the Cocaine Experience Questionnaire,<sup>10</sup> the Addiction Severity Index,<sup>11</sup> and the Quantitative Cocaine History. The Time-Line Follow-Back was used to determine baseline amounts of substance use. Subjects were administered the Structured Clinical Interview for DSM-III-R (SCID),<sup>12</sup> parts I and II, after 5-10 days of abstinence.

Psychiatric diagnoses were made only if the symptoms occurred prior to the onset of the substance use disorder or persisted for at least a seven-day period of monitored abstinence.

### Urine Testing

Urine drug screens were collected at baseline and weekly for 12 weeks. A urine sample was supplied by each subject immediately after their interview with study personnel. Collection of urine was not observed, though study personnel escorted subjects to the bathroom and waited outside. The urine samples were tested for osmolality and temperature immediately upon receipt to assure the specimen received was a recently voided, undiluted sample. Subjects knew urine drug screens would be obtained at each research visit and results would be confidential. The results of the drug screens were given to patients at the next scheduled visit.

Urine samples were analyzed for drugs of abuse at the Clinical Neurobiology Laboratory at the Institute of Psychiatry using the AxSYM Cocaine Metabolite assay (Abbott Laboratories). The AxSYM Cocaine Metabolite assay utilizes Fluorescence Polarization Immunoassay (FPIA) technology to detect benzoylecgonine, the primary urinary metabolite of cocaine. Urine samples were considered positive at a benzoylecgonine concentration of 300 ng/ml, the cut-off for screening assays recommended by NIDA.

### Study Design

Subjects were divided into a group of under-reporters (URs;  $n = 43$ ) and a group of truthful reporters (TRs;  $n = 32$ ). URs were defined as individuals who had at least two occurrences where they denied cocaine use in the past three days but the urine drug screen was positive for cocaine. The TRs were defined as individuals with at least two

cocaine-positive urine drug screens and who admitted to use within the past three days, for each cocaine positive UDS.

### Data Analysis

Descriptive statistics were calculated to provide demographic and diagnostic information about the UR and TR groups. Chi-square and t-tests were computed to determine differences between groups on outcome demographic, descriptive, and outcome measures.

## RESULTS

Of the 76 subjects who qualified, 58% were classified as URs, and the remaining 42% comprised the TR group. There were no significant differences between participants in the UR and TR groups for age, gender, race, education, or income (Table 1). The proportion of employed individuals was significantly higher among the URs than TRs (70.0% v. 30.0%;  $X^2[1] = 5.08$ ,  $p = 0.024$ ).

Drug use and compliance in the study also were compared between the groups. There were significant differences between URs and TRs in cocaine use parameters. URs reported a later age of having the first problem with cocaine ( $30.0 \pm 7.0$  v.  $26.4 \pm 5.6$ ;  $t[74] = 2.416$ ,  $p = 0.018$ ) and reported using cocaine a greater number of months in the previous year ( $10.6 \pm 2.7$  v.  $8.3 \pm 4.1$ ;  $t[71] = 2.873$ ,  $p = 0.005$ ). Although not reaching significance, URs used crack cocaine more frequently and were less likely to report other routes of cocaine use. However, as can be seen in Table 2, participants in the UR group were significantly more likely to attend study sessions than TRs (8.43% v. 6.23 sessions;  $t[73] = 2.647$ ,  $p = 0.010$ ). Moreover, when participants were classified as "completers" (8 or more study sessions) or "non-completers" (less than 8 sessions), participants in the UR group were twice as likely

# Clinical Characteristics of Under-Reporters

**TABLE 1. Demographics**

	Under-Reporters N = 43	Truthful Reporters N = 32	Statistics
Age	33.4 ± 6.3	30.7 ± 6.1	NS
<b>Gender</b>			
Male	63.6%	58.1%	NS
Female	36.4%	41.9%	
<b>Race</b>			
Caucasion	43.2%	40.6%	NS
Non-caucasian	56.8%	59.4%	
<b>Education</b>			
Grades 6-11	15.9%	31.3%	
HS Diploma	15.9%	21.9%	
Trade School	34.1%	21.9%	NS
Some College	27.3%	15.6%	
College Graduate	4.5%	3.1%	
Graduate School	2.3%	6.3%	
<b>Employment</b>			
Yes	63.6%	37.5%	$X^2(1) = 5.08,$ $p = 0.024$
No	36.4%	62.5%	
<b>Income</b>			
\$5,000 or less	30.2%	45.2%	
\$5,000 to 15,000	25.6%	29.0%	
\$15,001 to 25,000	20.9%	9.7%	NS
\$25,001 to 35,000	18.6%	6.5%	
\$35,001 to 50,000	4.7%	9.7%	

to be classified as a study completer than those in the TR group (69.8% v. 30.2%;  $X^2[1] = 5.12, p = 0.024$ ).

The presence of SCID Axis I and Axis II diagnoses among the UR and TR groups was compared. The results indicate that a significantly greater proportion of participants in the TR group had a history of affective illness than those in the

UR group (31.3% v. 6.8%;  $X^2 [1] = 7.79, p = 0.005$ ). The TR group had a greater proportion of individuals reporting a history of alcohol dependence than those in the UR group (40.6% v. 18.2%;  $X^2 [1] = 4.47, p = 0.031$ ). There was also a trend for more TRs reporting a history of polysubstance abuse ( $X^2[1] = 3.15, p = 0.076$ ). No significant differences between the groups were

**TABLE 2. Study Participation**

	Under-Reporters N = 43	Truthful Reporters N = 44	Statistics
Study sessions attended	8.43 ± 3.15	6.23 ± 4.06	$t(73) = 2.65, p = 0.010$
% Completing study	68.2%	41.9%	$X^2(1) = 5.12, p = 0.024$

observed for the prevalence of anxiety disorders or all other Axis I disorders considered together, after excluding affective illness and substance use disorders.

A group trend was observed in the prevalence of Axis II disorders, in that a greater proportion of participants in the TR group met criteria for Cluster C Axis II personality disorder than participants in the UR group (12.5% v. 2.3%;  $X^2[1] = 3.15$ ,  $p = 0.076$ ). For specific Axis II diagnoses, individuals in the TR group were significantly more likely to have dependent or passive/aggressive personality disorders than the UR group ( $X^2[1] = 6.13$ ,  $p = 0.013$ ;  $X^2[1] = 4.89$ ,  $p = 0.027$  respectively). There was also a trend for individuals in the TR group to have schizoid personality disorder ( $X^2[1] = 2.98$ ,  $p = 0.084$ ). In the UR group, there was a trend towards a higher incidence of histrionic personality disorder as compared to the TR group ( $X^2[1] = 2.93$ ,  $p = 0.087$ ). No significant group differences were found for the other types of personality disorders.

## DISCUSSION

The results of this study indicate that of 76 individuals who had at least two positive drug screens for cocaine, 58% under-reported drug use at least twice. The high percentage of under-reporting is quite surprising, considering that other investigators have noted the percentage of URs to range from 15-33% for individuals in treatment.<sup>5,13,14</sup> Furthermore, the current study employed techniques described by Babor et al. (1990) as important in promoting truthful reporting to enhance the veracity of self-report.<sup>15</sup> These techniques included informing subjects that urine drug screens would be obtained, collecting data at weekly intervals, and discussing with subjects that there would not be negative consequences to reporting drug use.

One reason that substantially more under-reporting was detected in the current study is that many previous studies utilized a self-report and urine sample based on the month *prior* to the interview. This design would not allow for urine drug screen detection of use unless it was within 2 to 3 days before the urine sample was obtained. Therefore, monthly urine drug screening allows for considerable substance use to go undetected by urinalysis. The current study addressed this limitation by using a self-report period that only included the three days prior to urine testing. This design maximizes the ability to measure cocaine in the urine and therefore gives a more accurate indication of recent cocaine use.

Individuals in the UR group were more likely to be employed than TRs. It is possible that this finding is attributable to the fact that employed individuals may be more accustomed to being secretive concerning drug use in order to retain their jobs. Upon comparison of cocaine use parameters at baseline, URs reported having their first problem with cocaine at a later age and reported less money spent on cocaine in the month prior to study entry. URs were also more likely than TRs to deny a history of abuse/dependence or current abuse of other substances. These findings could be interpreted as URs attempting to "look good" to the interviewer.

The presence of Axis I psychopathology was compared between URs and TRs. TRs were significantly more likely than URs to have a current affective illness or a history of affective illness. This finding is consistent with data that suggest individuals with depression may lack the energy or motivation to under-report. It is also possible that depressed individuals are less likely to try to present a positive image to the interviewer whereas non-depressed individuals may have an "illusion of control."<sup>16</sup> This gives credibility to the clinical apprehension commonly experienced by

clinicians when individuals in early recovery experience excessive optimism or a "flight into health."

Examination of the prevalence of Axis II disorders yielded group differences for dependent personality disorder and passive-aggressive personality disorder. More individuals in the TR group met SCID II criteria for these two personality disorders than did individuals in the UR group; likewise, more individuals in the UR group met criteria for histrionic personality disorder than did individuals in the TR group. It was somewhat surprising that individuals in the UR group were not more likely to meet criteria for antisocial personality disorder than were individuals in the TR group.

A close examination of participation in the study revealed surprising results. Individuals classified as URs were significantly more likely to attend a greater number of study sessions than those classified as TRs. In addition, URs were significantly more likely to be classified as study completers than TRs. This finding could be related to the employed status of URs as it is associated with a more responsible role in life.

There are several limitations of the current study. First, urine testing might not have detected cocaine use past 24-48 hours. Second, the urine drug screens were not witnessed by study personnel, which may have resulted in adulterated urine and the potential of a positive urine drug screen going undetected. Finally, the study sample only included individuals involved in a pharmacological trial and therefore may not represent all treatment-seeking patients.

### CONCLUSION

In this study, there were some counter-intuitive findings concerning URs. URs were less likely to have antisocial personality disorder and more likely to be employed. URs were also more likely to be considered study completers and attend more study sessions. These findings argue for more routine standardized urine testing policies, rather than leaving decisions completely in the hands of treating clinicians, because clinical intuition may not always lead to urine drug screening in those individuals most likely to under-report their use.

### REFERENCES

1. Osler W. *The Principles and Practice of Medicine*. Appleton, NY; 1892: p 1006.
2. Maisto SA, McKay JR, Connors GJ. Self-report issues in substance abuse: state of the art and future directions. *Behavioral Assessment*. 1990;2:117-134.
3. Sherman MF, Bigelow GE. Validity of patients' self-reported drug use as a function of treatment status. *Drug Alcohol Depend*. 1992;30:1-11.
4. Aiken LS, Lo Sciuto LA. Ex-addict versus nonaddict counselors' knowledge of clients' drug use. *Int J Addict*. 1985;20(3):417-433.
5. Magura SA, Goldsmith D, Casriel C, et al. The validity of methadone client's self-reported drug use. *Int J Addict*. 1987;27(1):51-59.
6. Mieczkowski T, Newel R, Wraight B. Using hair analysis, urinalysis, and self-reports to estimate drug use in a sample of detained juveniles. *Subst Use Misuse*. 1998;33(7):1547-1567.
7. Elman I, Krause S, Breiter H, et al. The validity of self-reported drug use in non-treatment seeking individuals with cocaine dependence: correlation with biochemical assays. *Am J Addict*. 2000;9:216-221.
8. Schwartz RH. Urine testing in the detection of drugs of abuse. *Arch Intern Med*. 1998;148:2407-2421.
9. Sobell MB, Sobell LC. *Behavioral Treatment of Alcohol Problems*. New York, NY: Plenum Press; 1978.

10. Satel SL, Southwick SM, Gawin FH. Clinical features of cocaine-induced paranoia. *Am J Psychiatry*. 1991;148(4):495-500.
11. McLellan AT, Kushner H, Metzger D, et al. The fifth edition of the Addiction Severity Index. *J Subst Abuse Treat*. 1992;9:199-213.
12. Spitzer RL, Williams JBW, Gibbon M, et al. *Structured Clinical Interview for DSM-III-R-Patient edition (Version 1.0)*. Washington, DC: American Psychiatric Press; 1990.
13. Zanis DA, McLellan AT, Randall M. Can you trust patient self-reports of drug use during treatment? *Drug Alcohol Depend*. 1994; 35:127-132.
14. Hoffman JA, Wish ED, Koman JJ, et al. Self-reported drug use compared with hair analysis and urinalysis. Paper presented at the College on Problems of Drug Dependence 56th Annual Scientific Meeting; June 18-23, 1994; Palm Beach, FL.
15. Babor TF, Brown J, Del Boca FK. Validity of self-reports in applied research on addictive behaviors: fact or fiction? *Behavioral Assessment*. 1990;12:5-31.
16. Taylor SE, Armor DA. Positive illusions and coping with adversity. *J Pers*. 1996;64(4): 873-898.