Short Communication

The utility of collateral student drinking reports: Evidence from a biomarker study

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HIGHLIGHTS

- Collateral informants are often used to validate college student drinking reports
- We used EtG, a direct biomarker, to assess the utility of collateral reports
- Collaterals rarely provided new information about heavy drinking
- Collateral informants have limited utility in studies of college students

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ABSTRACT

Introduction: Researchers have increasingly used collateral informants to validate the reports provided by primary research subjects. We assessed the utility of collateral informants for college students in a study that incorporates biomarkers to validate student reports of recent drinking behavior.

Methods: Students from a Midwestern university were randomly selected for a study in which they provided 90-day Timeline Followback data, hair and fingernail specimens for ethylglucuronide (EtG) testing, and information about collateral (friends or peers) informants who were familiar with their drinking behavior. We compared summary measures of recent drinking to collateral informant reports for the subset of 72 students who were selected to participate in the collateral validation process who had complete measures. Kappa, weighted kappa, and McNemar tests were performed to evaluate levels of agreement. We compared levels of use indicated by each informant within the context of EtG findings. We also compared respondent and collateral reports with respect to heavy drinking directly to EtG test results.

Results: There was considerable overlap between the reports provided by the student participants and their collateral informants. Within the context of EtG-informed analyses, collaterals rarely provided new information about heavy use beyond that provided by the study subjects.

Conclusions: Collateral informants have limited utility in non-clinical studies of heavy drinking in randomly selected college students.

1. Introduction

In alcohol research, a collateral informant – typically a person who is familiar with the behavior of the subject in a social situation – is often used to verify the accuracy of student reporting. Although a number of studies have investigated how reports by collateral informants correspond to those provided by the original subjects (e.g., Borsari & Muellerleile, 2009), in the absence of objective indicators of drinking reports, it is difficult to evaluate the utility of collaterals. By incorporating a direct biomarker of individual alcohol use, ethylglucuronide (EtG; Jones et al., 2012; SAMHSA, 2006), this paper provides the first objective evidence directly addressing collateral informant utility.

2. Materials and method

2.1. Design

Details about the design are available in a previous report (Berger et al., 2014). Randomly selected student participants from a large, Midwestern university completed a web-assisted interview, a web-based survey, and at the end of the survey provided permission plus contact details for up to three, peer-collateral candidates. Participants also provided a hair and/or fingernail sample for EtG analysis. In total, 527 student participants (87%) provided permission and collateral contact details. To contact collaterals, student participants were

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first categorized into three groups based on their past 12 month Alcohol Use Disorders Identification Test (AUDIT; Saunders, Aasland, Babor, de la Fuente, & Grant, 1993) total score (range 0 to 40): abstainers (AUDIT score = 0); nonhazardous drinkers (AUDIT score ≤ 7); and hazardous drinkers (AUDIT score ≥ 8). In order to achieve at least 30 collateral reports for each drinking group, 40 student participants from each group were randomly selected and their collaterals contacted by phone. If study interviewers were unable to reach the first collateral listed by student participants, then the second and/or third collateral was contacted if provided by the student participant. In the end, 31 collaterals of abstainers, 32 collaterals of nonhazardous drinkers, and 34 collaterals of hazardous drinkers were reached and gave permission to be interviewed for a total of 97 collateral interviews. Collateral participants were compensated $20.00 for their participation.

Our final student sample consisted of 72 observations with sufficient testable hair and fingernail sample weight (≥5 mg), complete TLFB data, and collateral reports. Regarding the relationship between the student participants and collateral informants, 54% were friends of the informants, 17% were boyfriends or girlfriends, 4% were roommates, 7% were brothers or sisters of the study participants, and 18% were related family members. The three groups of collateral informants were combined in our analyses.

2.2. Measures

Student participants were asked to complete the Timeline Followback method (Sobell, Maisto, Sobell, & Cooper, 1979; Sobell & Sobell, 1992), which was used to document daily intake of alcoholic beverages during the previous 90 days as measured in standard drink units (National Institute on Alcohol Abuse and Alcoholism, 2005). Using 90-day Timeline Followback data (TLFB; Sobell et al., 1979; Sobell & Sobell, 1992), average drinks per drinking day (DDD; Longabaugh & Wirtz, 2001) was determined and two categorical measures derived from DDD. The first measure had six categories that classified average DDD of student participants as either "0 drinks," "1 or 2 drinks," "3 or 4 drinks," "5 or 6 drinks," "7 to 9 drinks," and "10 or more drinks." The second measure was dichotomous and classified average DDD of student participants as either "heavy drinkers," those drinking at least 5 or 6 drinks per occasion on average, and "non-heavy drinkers," those classified as drinking between 0 and 4 drinks on average per drinking occasion.

After being asked a general question about whether their student participants drank, collaterals were asked the following question based on the AUDIT in relation to their student participant's alcohol use during the past 12 months: "How many drinks containing alcohol does (name of student participant) have on a typical day when drinking?" Collateral participants could select from the following responses: "1 or 2," "3 or 4," "5 or 6," "7 to 9," or "10 or more," similar to the student participant measure based on average DDD. When collaterals reported "never" to the first question, the quantity consumed was set to 0. These response categories were then used to categorize collateral participant response about their student participant into either student

"heavy drinkers," collateral report of "5 or 6" or more drinks on a typical day when drinking, and student "non-heavy drinkers," collateral report of no more than "3 or 4" drinks on a typical day when drinking.

Student participants' hair and/or fingernail samples were tested for EtG at United States Drug Testing Laboratories, Des Plaines, IL using liquid chromatography–tandem mass spectrometry. For the purposes of the current study, we classified student participants according to whether or not there was the presence of any EtG detected in their hair and/or fingernail specimen.

3. Results

3.1. Overall agreement

Evaluating overall agreement on average drinks per occasion between the 72 student participants and their collateral informants, we obtained a significant (p < .001) weighted Kappa of .63 (95% C.I.: .52,.73) suggesting "moderate" to "substantial" overall agreement on drinking levels (See Table 1; Fleiss, 1981; Fleiss & Cohen, 1973; Landis & Koch, 1977).

With respect to overall classification of "heavy" drinking status, a simple Kappa of .53 (95% C.I.: .30,.75) reflected moderate levels of agreement between the two groups but with a wide confidence interval. McNemar's test was non-significant and the proportions of overall agreement, positive agreement and negative agreement were 81.9%, 64.9% and 87.9%, respectively. Four-fold table results (not shown here) suggested that 90% of those who did not classify themselves as heavy drinkers were classified the same way by collaterals. In contrast, only 60% of those self-identifying as heavy drinkers were similarly identified as such by collaterals.

3.2. Agreement: hair EtG +

The overall agreement among the 24 study subjects with a positive hair EtG produced a weighted Kappa of .49 (95% CI: .23,.75). The point estimate might suggest "moderate" agreement between ordinal ratings of drinking status while the confidence limit includes agreement levels considered "fair" to "substantial." The simple Kappa statistic for binary ratings was .42 (95% CI: .05,.78), indicating a "moderate" level of agreement. This statistic was measured with low precision as indicated by the wide confidence band. McNemar's test was non-significant and the proportions of overall, positive, and negative agreement were 70.8%, 69.6% and 72.0%, respectively. There were potentially 12 underreports of heavy drinking among the student participants. For all but three of these participants (75%; 9/12), heavy drinking was also underreported by collaterals.

3.3. Agreement: hair EtG −

For participants where no hair EtG was detected (n = 48), we found "substantial" agreement. The weighted Kappa coefficient between ordinal drinking ratings was .64 (95% C.I.: .52, .77). Binary agreement in the absence of hair EtG was "moderate" with a simple Kappa of .50 (95% CI:

Table 1
Respondent-collateral agreement on drinking by biomarker test status.

Comparison	N	DDD[a] (ordinal) Weighted kappa (95% C.I.)	Heavy drinking (binary measure) Simple kappa (95% C.I.)	Overall agreement (%)	Positive agreement (%)	Negative agreement (%)	McNemar's p-value
Overall	72	.63 (.52, .73)	.53 (.30, .75)	81.9	64.9	87.9	.58
Hair positive respondents	24	.49 (.23, .75)	.42 (.05, .78)	70.8	69.6	72.0	1.0
Hair negative respondents	48	.64 (.52, .77)	.50 (.16, .84)	87.5	57.1	92.7	.69
Nail positive respondents	21	.22 (−.01, .45)	.32 (−.07, .71)	66.7	72.0	58.8	.45
Nail negative respondents	51	.65 (.51, .79)	.43 (.06, .81)	88.2	50.0	93.3	1.0

[a] Drinks per drinking day.