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Convergence of online daily diaries and timeline followback among women at risk for alcohol exposed pregnancy☆

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ABSTRACT

Researchers and clinicians interested in assessing drinking and unprotected sex in evaluating risk for alcohol-exposed pregnancy (AEP) have limited options. The current investigation examined the degree to which data collected from online prospectively collected daily diaries (Diaries) converged with data from interviewer-administered retrospective timeline follow back (TLFB), the standard in AEP intervention studies. 71 women (M_{age} = 27.7, SD = 6.2) at risk for AEP were recruited via online advertising and were randomly assigned to an online patient education condition or a tailored, online internet intervention to reduce AEP risk. All participants were administered both Diaries and TLFB at baseline and 6 months after intervention. Key outcomes were variables of drinking rates and unprotected sex that combined to indicate risk for AEP. Zero-order and intra-class correlations (ICC) between Diaries and TLFB were strong for each outcome. Examination of ICC confidence intervals indicated that condition assignment did not have a significant impact on the degree of convergence between Diaries and TLFB. With the exception of proportion of days drinking and proportion of days with unprotected sex at baseline, none of the paired *t*-tests reached significance. Examination of descriptive statistics revealed that 63% of participants reported problem alcohol use and unprotected sex in both the 10-day Diaries and 90-day TLFB at baseline, with 70% agreement at post 6-month follow up. Findings indicate overall strong agreement between TLFB and Diaries in detecting alcohol use and unprotected sex in women at risk for AEP, and each method has benefits and challenges that should be weighed carefully by researchers and treatment providers.

1. Introduction

Alcohol exposure can have a critical impact on the organ systems of a developing fetus, leading to fetal alcohol spectrum disorders (FASD; Abel, 1990; Niccols, 2007). In particular, for women who have an elevated risk of an alcohol-exposed pregnancy (AEP) because of their engagement in frequent drinking and unprotected sexual intercourse, primary prevention of FASDs is a top priority (Floyd, Weber, Denny, & O'Connor, 2009). Thus, researchers and treatment providers must have multiple ways to assess drinking and unprotected sex in order to develop and evaluate interventions that attenuate AEP risk.

A variety of retrospective self-report measures are used to assess alcohol use (e.g., Allen & Wilson, 2003; Sobell et al., 2003) and risky sexual behavior (for a recent review, see Mirzaei, Ahmadi, Saadat, & Ramezani, 2016). Among these, the Timeline Followback (TLFB), a daily estimation instrument that is administered in a single interview, is the standard in AEP intervention studies (e.g., Ceperich & Ingersoll, 2011; Farrell-Carnahan et al., 2013; Floyd et al., 2007; Ingersoll, Ceperich, Hettema, Farrell-Carnahan, & Penberthy, 2013; Parrish, von Sternberg, Castro, & Velasquez, 2016). While TLFB allows data to be captured in a single time point, the interview required to collect this data can be lengthy and burdensome to both the interviewer and interviewee. This can be problematic for researchers and treatment providers that want to assess key behaviors in AEP risk while minimizing burden and costs. Thus, identifying alternative methods that can capture the frequency of drinking and unprotected sex, while reducing burden, could prove worthwhile.

One obvious alternative is to utilize a web-based, prospective daily diary approach (Diaries). In 2015, 84% of American adults and 96% of young adults reported using the Internet (Perrin & Duggan, 2015). Although there exists some disparity in internet access, in 2016, 88% of Hispanic adults and 85% of Black adults reported using the internet (compared to 88% of White adults), as well as 79% of those with an income under $30,000 annually ("Internet/Broadband Fact Sheet", 2017). Like TLFB, Diaries can capture the frequency of drinking and unprotected sex. While one disadvantage is that collecting data using Diaries requires multiple days and time points, increasing the likelihood of

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missing data, a clear advantage to Diaries is that participants can complete entries quickly and with limited support, and online data collection eliminates traditional obstacles of pencil-and-paper measures (e.g., transporting data, data entry errors).

While previous studies have compared and contrasted TLFB with other self-report measures (e.g., Sobell et al., 2003), no published studies have compared TLFB with Diaries in assessing behaviors linked to AEP. Thus, while TLFB has strong empirical support as a valid and reliable tool in assessing AEP risk (e.g., Ceperich & Ingersoll, 2011; Farrell-Carnahan et al., 2013; Floyd et al., 2007; Ingersoll et al., 2013), it is worth examining Diaries as an alternative method that can be adopted by researchers and treatment providers depending on available resources.

The aim of the current investigation was to examine the degree to which data on AEP risk collected from online Diaries would converge with data from interviewer-administered TLFB. Data were drawn from a study testing the efficacy of an online program designed to reduce AEP risk, and therefore drinking and unprotected sex served as the primary outcome variables. In the present investigation, all outcome variables were examined at baseline and at 6-month follow up, which allowed for determining whether convergence between TLFB and Diary was affected by an active intervention. Because the details of this intervention study are presented in a separate paper (Ingersoll et al., in preparation), and because the current investigation focuses on comparing TLFB and Diary methods, only details relevant to the current study are presented.

2. Method

2.1. Participants

The majority of participants responded to craigslist ads placed in the "seeking volunteers" section in selected cities across the U.S. Applicants answered an initial interest form online and a research coordinator had a follow-up phone call with applicants who met the initial criteria to assess their drinking and intercourse behaviors over the past 90 days. Eligibility criteria included: female; age 18–44; not surgically sterile; reports sexual intercourse with a man in the past 90 days; using no contraception, intermittent contraception, or ineffective methods of contraception; reports drinking above NIAAA recommended levels for women (>3 standard drinks per occasion or >7 per week, on average); and has regular access to a computer connected to the Internet. The current study was based on data from 71 eligible women (M_{age} = 27.7, SD = 6.2) who completed the online study forms indicating interest in participation and ultimately enrolled in the intervention study. Participants had an average of 15.2 years of education (SD = 2.3), and were 63.4% White, 19.7% Black, 4.2% Asian, and 12.7% other or Multiracial. The study was approved by the Institutional Review Board at the University of Virginia and participants were treated in accordance with the ethical standards of the Helsinki Accords.

2.2. Conditions

Participants were randomly assigned to one of two Internet conditions. Half were assigned to a patient education condition, which provided accurate but untailored and static information about reducing the risk of alcohol-exposed pregnancy. The other half was assigned to the experimental condition, the Contraception and Alcohol Risk Reduction Internet Intervention (CARRII.org), which featured information that was tailored, personalized, and highly interactive. CARRII includes six cores that are metered out weekly, to mimic the pace of face-to-face counseling, and to allow for between-core behavior change. CARRII content was adapted from CHOICES (Floyd et al., 2007), the most potent AEP risk reduction intervention, and featured components designed to convey the tone of a Motivational Interviewing counseling style as well as behavioral therapy components.

2.3. Instruments

Only the two instruments relevant to this project will be described. First, the TLFB is a self-report, retrospective daily recall procedure that guides the respondent to identify routine and unusual work/school and social events to anchor days to specific activities. TLFB yields a daily count of standard drinks and sexual intercourse episodes, with additional specification of type of contraception used and how it was used to assist the interviewer in determining likely effectiveness. At baseline and 6-months after intervention, TLFB was used to obtain day-by-day estimates of drinking and unprotected sex over the previous 90 days, a timeframe adopted in prior AEP studies (e.g., Ceperich & Ingersoll, 2011; Farrell-Carnahan et al., 2013; Floyd et al., 2007). For TLFB, data is collected via face-to-face or phone interview by a research coordinator who presents participants with a calendar to identify important dates that serve as memory prompts for problem drinking and unprotected sex. TLFB is a well-validated assessment tool for alcohol intake with good psychometric properties (e.g., Sobell & Sobell, 2000). The version used in this study was previously modified to include intercourse events, contraception behaviors, and menstrual periods (e.g., Ceperich & Ingersoll, 2011; Farrell-Carnahan et al., 2013; Floyd et al., 2007; Ingersoll et al., 2013; Parrish et al., 2016). In the present study, average interview lengths at baseline (not including the consent process) and 6-months after intervention were approximately 75 min and 45 min, respectively.

In addition to TLFB, all participants completed online diaries at baseline and 6-months after the intervention period. Diaries were administered and completed online, in people's natural environments, and participants were required to complete 10 diaries over a 14-day span. Diaries were used as a data collection method and those at pre, post, and follow-up were administered to both conditions and were not considered part of the intervention. Self-monitoring was encouraged during the CARRII intervention, but those diaries were not used as data. Because there is no prior literature on timeframe for Diaries in AEP risk, a 14-day span was chosen to minimize user burden while allowing for enough time to assess occurrence of drinking and risky sexual behavior. Prior research using Diaries have utilized a one to two week span (e.g., Buysse, Ancoli-Israel, Edinger, Lichstein, & Morin, 2006; Ritterband et al., 2017). Diaries prompted participants to report on behaviors such as daily drinking and risky sexual behavior, which were also assessed with TLFB. Online diaries are widely used in other areas of health research and have good psychometric properties (e.g., Buysse et al., 2006; Ritterband et al., 2017). Table 1 contains questions in TLFB and Diaries.

Because TLFB and Diaries encompassed different lengths of time (90 vs. 10–14 days, respectively), primary outcomes were computed to be time-invariant. Specifically, for both TLFB and Diaries, the main outcomes examined were: (1) proportion of days with at least 1 drink;

Table 1
Questions asked in TLFB and Diary.

Questions asked for each day	TLFB	Diaries
	90 days	10 days
Did you drink alcohol this day?	✓	✓
If drank alcohol, how many standard drinks?	✓	✓
If drank alcohol, what was your main drinking location?	✗	✓
How many times did you have intercourse this day?	✓	✓
If had intercourse, which method of contraception used (if any) for each time?	✓	✓
Was contraception used exactly as directed?	✓	✓
Specify type of birth control pill.	✓	✗
If missed birth control pill, did you double-up the next day?	✓	✗
If missed birth control pill twice in a row, did you double up the following two days?	✓	✗
Were you on your period this day?	✓	✗
For those who reported becoming pregnant, were you pregnant this day?	✓	✗