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Using a Single Binge Drinking Question to Identify Russian Women at Risk for an Alcohol-Exposed Pregnancy

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Abstract

Introduction—Low rates of contraception and at-risk drinking place many Russian women at risk of an alcohol-exposed pregnancy (AEP). The only realistic way to determine when women are at risk of AEP is by self-reports. A U.S. study found that a single binge-drinking question (SBD) effectively identified nearly all women whose drinking placed them at risk of AEP.

Methods—The present study replicated the U.S. study. Participants were 689 non-pregnant Russian women of childbearing age who were at AEP risk. Their answers to SBD, “During the previous three months, how often did you have four or more drinks on one occasion”, were compared with their reports of binge drinking on a 90-day Timeline Followback (TLFB) calendar.

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Contributors

All authors have made substantial contributions to conception, design, gathering data, analysis, or interpretation of data and have contributed to the intellectual content and writing of the article. Tatiana Balachova and Linda Sobell designed the study, conducted literature searches, and lead development of the study protocol, and measures. Linda Sobell was a consultant to the study. Linda and Tatiana jointly prepared the first draft of the manuscript. Tatiana Balachova prepared measures and project materials and supervised all aspects of the study. Galina Isurina, Larissa Tsvetkova, and Elena Volkova, participated in preparation of the study protocol and materials and supervised data collection. Sangeeta Agrawal and Som Bohora conducted the statistical analysis and participated in the manuscript preparation. All authors contributed to and have approved the final manuscript.

Conflict of interest

No author has any conflict of interests. The study was supported by Grant #R01AA016234 from the National Institutes of Health/ National Institute on Alcohol Abuse and Alcoholism and Fogarty International Center (Brain Disorders in the Developing World: Research Across the Lifespan).

Results—The SBD identified 99% of at-risk Russian women as binge drinkers, replicating U.S. findings. Only 8% of the women were identified at-risk using a second AEP criterion of ≥ 8 drinks on average per week. Although Russian women did not report heavy weekly drinking and two-thirds did not meet AUDIT criteria for problem drinking, when they did drink, 40% of the time it was binge drinking.

Conclusions—Almost all Russian women who were at risk of an AEP were identified by a single binge-drinking question. Results from this study suggest that Russian health care practitioners can use SBD to successfully screen women for AEP risk. SBD identified 99% of Russian women who were at AEP risk. Consequently, it is recommended that SBD be incorporated into routine health care screenings at OB/GYN clinic visits.

Keywords

Women at risk; alcohol-exposed pregnancy; binge drinking; alcohol; single binge drinking question; Fetal Alcohol Spectrum Disorders; Timeline Followback

1. Introduction

Alcohol use during pregnancy is associated with a range of negative effects on the embryo/fetus (National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2000). The adverse effects of prenatal alcohol exposure have been conceptualized as lying on a continuum called Fetal Alcohol Spectrum Disorders (FASD) (Centers for Disease Control and Prevention (CDC), 2005). Although the adverse effects of prenatal alcohol exposure range from mild to moderate to severe, the public and the media more often focus on the most visible form of the disorder, Fetal Alcohol Syndrome (FAS) (Jacobson & Jacobson, 1999). Very heavy drinking by pregnant women is most often associated with children diagnosed with FAS (Stratton, Howe, & Battaglia, 1996). While effects of heavy drinking during pregnancy are often serious (Sokol, Delaney-Black, & Nordstrom, 2003), moderate drinking has also been shown to be associated with developmental problems (Jacobson & Jacobson, 1999). The concurrence of two behaviors, risky alcohol use, and becoming pregnant, puts women of childbearing age at risk of an Alcohol-Exposed Pregnancy (AEP). Although the amount of alcohol that will put unborn children at risk of developmental disabilities has not been clearly established, several U.S. studies (Department of Health and Human Services (DHHS), 2005; Gunzerath, Faden, Zakhari, & Warren, 2004) have shown that women are at risk of an AEP by one of two drinking criteria: consumption of either ≥ 8 standard drinks per week (1 standard drink = 14 g) or ≥ 4 standard drinks on a single occasion (i.e., binge drinking). Further, binge drinking may produce greater fetal damage than an equivalent amount of drinking consumed in lesser amounts over several days (Barry, et al., 2009). Although the consequences of AEPs are costly and lifelong, they are preventable.

Low rates of contraception and high levels of alcohol consumption place many Russian women at risk of AEP (Perlman & McKee, 2009). A recent review concluded that AEP prevention measures are needed for screening Russian women of childbearing age (Popova, et al., 2014). While the preconception period is a risk window for women, it also presents a prevention opportunity. In this regard, a recent Russian study involving several public women's clinics found that 89% of non-pregnant women reported consuming alcohol and

65% reported binge drinking over the past 90 days. About one-third (32%) of women at urban clinics and over half (54%) at rural clinics were evaluated at risk for an AEP (Balachova, et al., 2012).

Unfortunately, for several reasons prevention efforts are difficult: (a) the drinking criteria (i.e., ≥ 8 drinks per week on average or ≥ 4 on any one occasion) above which AEPs can occur may not be diagnostic or even viewed as problematic by many women; (b) almost half of all pregnancies are unplanned; and (c) many women of child bearing age do not use contraception or use it ineffectively (e.g., do not take birth control pills regularly and do not use a backup method). To prevent AEPs health care practitioners need to assess women of childbearing age for both risky drinking and effective contraception..

The present study had two objectives: (a) to evaluate how effective a SBD question (≥ 4 standard drinks on at least one occasion) is in identifying Russian women at risk of AEP, and (b) to compare these results with those of a similar study with women in the US.

2. Methods

The study was approved by the Institutional Review Boards of St. Petersburg State University (SPSU) in St. Petersburg, Russia and the University of Oklahoma Health Sciences Center (OUHSC) in Oklahoma City, OK.

2.1. Study Participants

Participants were part of a larger study in Russia that recruited women who were at risk of an AEP. Women were recruited over a two-year period (July 2009 through July 2011). Because this study has been described in detail elsewhere (Balachova, et al., 2013) only procedures relevant to the present manuscript will be reported. Readers interested in further details about the parent study are referred to the original publication.

Russia has a well-established OB/GYN health care system that provides free services at women's clinics (e.g., prenatal care and family planning and contraception services). Data show that that almost all (96%) women in Russia receive prenatal services from public women's clinics (Sukhanova, 2008). Study participants were recruited at public women's clinics in two locations in Russia (SPB: St. Petersburg, a major urban area; NNR: the Nizhny Novgorod Region, a more rural area). Twenty clinics, 10 at each location, participated in the study and varied from a small rural clinic in the NNR area with one OB/GYN physician to a large urban clinic in SPB with over 20 OB/GYNs. Thus, the study sample represents women who receive services through the major Russian OB/GYN service delivery system.

Based on their self-reports, participants were initially screened for study eligibility (i.e., at risk for AEP) based on the following criteria: (a) women of child-bearing age (18–44 years old) who were fertile (i.e., able to become pregnant) and currently were not pregnant by self-report; (c) living in the area served by one of the study clinics; (d) gave voluntary informed consent for the study; (e) were available for follow-up for 12 months; and (f) engaging in AEP risk behaviors defined as (i) used no or ineffective contraceptive methods, and (ii) over

the 90 days prior to the interview had either consumed an average of ≥ 8 standard drinks per week or had engaged in binge drinking (i.e., ≥ 4 standard drinks in one day). Over 2,000 women were screened. A total of 689 eligible women reported at-risk drinking and were included in the current study. After the assessment interview, participants received a gift (equivalent of approximately $25.00 U.S. dollars).

2.2. Measures

The study materials were prepared with the help of Russian project consultants, obstetricians, and behavioral health experts, including Russian women. As in other cross-cultural studies (Babor, et al., 1994; Room, Janca, Bennett, Schmidt, & Sartorius, 1996) to achieve good translations of all English language study questionnaires and materials (i.e., semantic equivalence), a process of translation and retrotranslation (i.e., back translation) to Russian was followed. Bi-lingual behavioral health experts were used for the translation and back translation procedures to ensure that the materials were culturally congruent, accurate, and would be correctly comprehended by Russian women. All measures were provided to women in the Russian language.

2.2.1. Assessment Interview—A 40-minute face-to-face structured assessment interview was conducted with each participant by female graduate psychology students trained and supervised by PhD level psychologists. The assessment interview included demographic questions (e.g., age, education, gender, and marital status), and assessment of alcohol use behavior, including the Timeline Followback (TLFB).

2.2.2. Timeline Followback (TLFB)—The TLFB is a psychometrically sound assessment method that uses a retrospective self-report calendar to obtain daily drinking data about a person's alcohol use over a period ranging from 1 to 12 months (Agrawal, Sobell, & Sobell, 2008; Sobell & Sobell, 2003; Sobell & Sobell, 2008). In the current study a 90-day TLFB was administered to all participants at the end of the assessment interview. The TLFB has been extensively evaluated with clinical and nonclinical drinker populations and yields data on the pattern, variability, and level of drinking. The TLFB, translated into Russian as described earlier, has been used in several studies focused on the prevention of AEPs (Fleming, Lund, Wilton, Landry, & Scheets, 2008; Floyd, et al., 2007). On the TLFB, alcohol use is reported using a standard drink format for each day of the target interval. The US standard drink (SD) definition was utilized in the present study (National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2005). A SD in Russia was reported using the metric system (milliliters).

2.2.3. Single Binge Drinking (SBD) Question—The National Institute on Alcohol Abuse and Alcoholism has recommended that SBD question can be used to screen people whose drinking puts them at risk of an alcohol problem. In a study with 286 primary care patients, a SBD question correctly identified 82% of those with "unhealthy" alcohol use, defined as the presence of an alcohol use disorder or risky consumption (Smith, Schmidt, Allensworth-Davies, & Saitz, 2009). Several other studies of problem drinkers have found similar results using a SBD question (Cyr & Wartman, 1988; Stewart, Borg, & Miller, 2010; Taj, Devera-Sales, & Vinson, 1998). A U.S. study that evaluated an intervention for 354

women who were at risk of AEPs also used a SBD question (Johnson, Sobell, & Sobell, 2010) and found that almost all of the women (97.74%, n = 346) were correctly identified as at risk of an AEP based on the SBD question (i.e., *"How often did you have ≥ 5 drinks on one occasion?"*). When this U.S. study was conducted epidemiological data at the time defined binge drinking as ≥ 5 drinks (Jacobson & Jacobson, 1999). In the present study the SBD question was part of the Quick Drinking Screen (QDS; Dum et al., 2009), a short self-report summary measure that contains four questions about alcohol use including one question on binge drinking (i.e., ≥ 4 drinks on at least one occasion). The interval for all questions on the QDS including the binge drinking questions was 90 days ("*During the previous three months, how often did you have four or more drinks on one occasion?*"), the same interval as for the TLFB. Based on current guidelines (National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2004), any confirmative answer (i.e., any frequency of binge drinking) was considered as at-risk drinking for an AEP.

2.3. Data analysis

Data for the present analysis were derived from the SBD question that was part of the assessment interview and the TLFB that was administered at the end of the interview. Women who self-reported ≥ 4 drinks on at least one occasion (i.e., binge drinking) on the SBQ and on the 90-day TLFB calendar were considered at risk of an AEP. Answers to any binge drinking on the SBQ and the TLFB were coded as at-risk drinking (i.e., Yes binge drinking) or not at risk (i.e., No binge drinking). Contingency tables for risk of an AEP category were produced with the use of SPSS crosstabs command. Descriptive statistics on demographics and drinking variables are also presented.

3. Results

3.1. Sample characteristics

Table 1 presents demographic and drinking data for all participants in this study. As shown Table 1, on average study participants were almost 30 years old, a little more than two-thirds were married/living together and had more than a high school education. About three-quarters were employed, and the great majority lived in an urban area. About a third of the women (32.12%, n=221) had an AUDIT score of ≥8, which is suggestive of an alcohol problem (Babor et al., 2001; Reinert & Allen, 2007). Based on the TLFB, Table 1 shows that the 689 women reported drinking on average 12.53 days (i.e., 13.92%) of the prior 90-days, and 41.47% of those days were binge-drinking (i.e., ≥ 4 drinks). The women also reported consuming a mean (SD) of 3.33 (4.18) drinks per week and a mean (SD) of 3.23 (1.32) drinks on days when they did drink.

3.2. Identification of the AEP risk

Table 2 displays two contingency tables (Table 2a and Table 2b) showing the percentage of women who were identified at risk of AEP based on their self-reports at two different occasions, using two different drinking measures (i.e., SBD question from the QDS that was administered at the start of the assessment interview and the 90-day TLFB administered after the assessment interview). In addition, for the TLFB two criterion of at-risk drinking were used (i.e., ≥ 4 standard drinks or binge drinking on any single occasion during the

interval, or an average ≥ 8 standard drinks per week during the interval). Table 2a shows the percentage (n) of Russian women (N = 689) who were at risk of an AEP in the 90 days prior to the interview based on two sources asking about binge drinking (i.e., ≥ 4 standard drinks on at least 1 occasion). Table 2b shows the percentage (n) of Russian women (N = 689) who were at risk of an AEP in the 90 days prior to the interview based on two different drinking criteria using the TLFB: average weekly consumption of ≥ 8 standard drinks, and binge drinking, ≥ 4 standard drinks on at least 1 occasion. Two notable things stand out about the data in Tables 2a and b. First, based on either the TLFB data or the SBD question, 99% (683 of 689 women) of all women reported at least 1 binge-drinking day in the previous 90 days and thus were at risk of an AEP. Second, when the two AEP risky drinking criteria are compared (i.e., binge drinking on at least one occasion in the interval or consuming an average of ≥ 8 drinks per week), while all but one woman answered the SBD question positively, only a small percentage of the women (8.13%) reported consuming an average of ≥ 8 drinks per week.

Based on answers to a SBD question, and TLFB reports of drinking using two different at risk criteria derived, Table 3 shows the percentage of non-pregnant women in the U.S. (Johnson, et al., 2010) and Russia (present study) who were identified as at risk of an AEP. This comparison was possible because both studies used the same drinking measures (i.e., TLFB; SBD question) and the same assessment interval for drinking (i.e., 90-days prior to the assessment). Although the SBD question identified nearly all women in both countries who were at risk for an AEP, the average weekly drinking criterion of ≥ 8 drinks per week failed to identify 92% of Russian women and 41% of U.S. women.

4. Discussion

This study was designed to replicate a U.S. study that evaluated a SBD question as the most effective and efficient screening measure for identifying the vast majority of non-pregnant women whose drinking places them at risk of an AEP. In both countries, the SBD question identified nearly all of the non-pregnant women at risk of AEP. Thus, the use of a SBD question is recommended in Russia and the U.S. for identifying women at risk of AEP. Whether these results will generalize to other countries awaits further test.

Although women in both countries had similar reports of average drinks per drinking day in the 90 days prior to the interview (U.S. = 3.81; Russia = 3.23), their drinking differed in two important ways. First, women in the U.S. reported drinking on 42% of all days and Russian women reported drinking on only 14% of all days, an almost three-fold difference. Second, when using the second risky drinking criterion (i.e., average drinking ≥ 8 drinks per week) to identify women at risk of an AEP, only 8% of at-risk Russian women were identified compared to 59% of U.S. women. These two very different drinking patterns highlight the importance of conducting cross-cultural research versus generalizing from one country to another.

When the U.S. study (Johnson, et al., 2010) was conducted, the epidemiologic data suggested using an AEP risk criterion of ≥ 5 drinks on at least one occasion (Jacobson & Jacobson, 1999). In subsequent years, the CDC adopted a slightly lower binge threshold

level of ≥ 4 or drinks on at least one occasion (Bertrand, Floyd, & Weber, 2005; Sayal, et al., 2009). This, difference, however, does not impact the results or conclusions of the current study as the binge criterion of ≥ 5 drinks captured all but 2.3% of the U.S. women. If the lower drink criterion had been used, it would have had even greater sensitivity, but even then, it could have only identified 2.3% (n = 8) more of U.S. women missed by the ≥ 5 criterion.

Currently, the NIAAA recommends using consumption of ≥ 8 drinks per week or ≥ 4 drinks on at least one occasion (i.e., binge drinking) as criteria for at risk drinking for an AEP (National Institute on Alcohol Abuse and Alcoholism (NIAAA), 2005). These guidelines based on four different data sets are deemed to have the best sensitivity and specificity as they incorporated both daily and weekly limits and did the best job of predicting several different alcohol-related outcomes (e.g., dependence, several health problems, impaired driving; (Dawson, 2000).

This study had three key strengths: (a) a very large sample size; (b) highly cooperative Russian health care providers that made this study possible; and (c) cross-cultural replication of a SBD question to identify Russian women at risk of an AEP. As with all studies, this study also had some limitations. First, although participants' reports were gathered using procedures known to enhance the accuracy of reports (e.g., informing participants of confidentiality, using clinically trained interviewers (Maisto, McKay, & Connors, 1990), they were not corroborated with another data source. However, several studies have shown that women's self-reports of their pre-pregnancy alcohol use are reliable (Alvik, Haldorsen, Groholt, & Lindemann, 2006; Fox, Sexton, Hebel, & Thompson, 1989). Further, one study has shown that women give higher reports of their alcohol use compared to collateral reports (Chang, Goetz, Wilkins-Haug, & Berman, 1999).

Second, while the presentation of the TLFB and the SBD question were not counterbalanced in the assessment materials, it is highly unlikely the SBD question which was embedded in the QDS (i.e., frequency of consuming ≥ 4 drinks in the past 90 days) would appear to participants as redundant with the TLFB which contains a detailed set of instructions at the start and then asked the women to report their drinking using standard drinks over the last 90 days prior to the interview. Further, the TLFB never mentions a certain number of drinks (e.g., ≥ 4 drinks) as a possible answer. Instead, each participant is asked to write down the number of drinks they consumed on each day on the calendar.

In summary, like a U.S. study, this study with Russian women found that a SBD question can quickly and easily identify almost all women for risk of an AEP. Therefore, it is recommended that it be incorporated into routine health care screenings by physicians and at OB/GYN clinics.

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Highlights

- Screening for binge drinking identifies 99% at-risk Russian women.
- Screening for heavy weekly drinking identifies 8% of at-risk Russian women.
- Two-thirds of at-risk Russian women did not meet the AUDIT risk criteria.
- A single binge drinking question can effectively identify almost all women at risk for an alcohol-exposed pregnancy.

Table 1

Demographic and drinking variables for 689 Russian women.

Variable	Mean (SD) or %
Age (years)	28.80 (6.55)
Education	
Less than high school	6.50%
High school	29.80%
Greater than high school	63.70%
Caucasian	100.00%
Marital status[a]	
Single	23.10%
Married/living together	68.20%
Divorced/windowed/separated	8.70%
Employed	73.30%
Home location[a]	
Urban area	87.40%
Rural area	12.60%
AUDIT score ≥ 8[a]	32.12%
AUDIT score[a]	7.0 (5.0)
% days drinking in previous 90 days	13.91 (11.60)
% days binge drinking (≥ 4 drinks) in previous 90 days	41.47 (27.68)
Drinks per week drinking in previous 90 days	3.33 (4.18)
Drinks per drinking day in previous 90 days	3.23 (1.32)

Note: AUDIT = Alcohol Use Disorders Identification Test (scores range from 0 to 40).

[a] $n = 688$.

Table 2

Table 2a Percentage (n) of Russian women (N = 689) who were at risk of an AEP in the 90 days prior to the interview based on two sources asking about binge drinking.[a]

		Report from a single binge drinking question		Total
		Yes	No	
Binge drinking reports from the TLFB[a]	Yes	99.13% (683)	0.73% (5)	99.86% (688)
	No	0.14% (1)	0.00% (0)	0.14% (1)
Total		99.27% (684)	0.73% (5)	100.0% (689)

Table 2b Percentage (n) of Russian women (N = 689) who were at risk of an AEP in the 90 days prior to the interview based on two different drinking criteria using the TLFB.

		Binge drinking from the TLFB[a]		Total
		Yes	No	
Average ≥ 8 drinks per week from TLFB	Yes	7.98% (55)	0.15% (1)	8.13% (56)
	No	91.87% (633)	0.00% (0)	91.87% (633)
Total		99.85% (688)	0.15% (1)	100.0% (689)

Note: TLFB = Timeline Followback;

[a]Binge drinking = ≥ 4 standard drinks on at least 1 occasion

Table 3

Percentage of non-pregnant women in the U.S. (N=354) and Russia (N=689) identified at risk of an AEP using two drinking criteria in the 90 days prior to the interview.

Country	*Binge drinking*[a]	
	Yes	**No**
Russia	99.27%	0.73%
United States	97.74%	2.26%

Country	*On average ≥ 8 drinks per week*	
	Yes	**No**
Russia	8.13%	91.87%
United States	59.04%	40.96%

Note: Russian women from the current study, and the U.S. women (Johnson, et al., 2010)

[a] Binge drinking definition: Russian study = ≥ 4 drinks on at least one occasion; U.S. study = 5 ≥ drinks on at least one occasion.