Published in final edited form as:

Am J Drug Alcohol Abuse. 2016 May ; 42(3): 306–315. doi:10.3109/00952990.2016.1141914.

Do attitudes and knowledge predict at-risk drinking among Russian women?

Tatiana Balachova, PhD¹, David Bard, PhD¹, Barbara Bonner, PhD¹, Mark Chaffin, PhD¹, Galina Isurina, PhD², Larissa Tsvetkova, PhD, D.Sc.², and Elena Volkova, PhD, D.Sc.³

¹University of Oklahoma Health Sciences Center, Oklahoma City, Oklahoma

²St. Petersburg State University, Russia

³Nizhny Novgorod State Pedagogical University, Nizhny Novgorod, Russia

Abstract

Background—Drinking patterns among Russian women indicate substantial risk for alcohol-exposed pregnancies. Data about women's knowledge and attitudes related to alcohol consumption during pregnancy and the extent to which women's knowledge and attitudes affect their alcohol use remain limited.

Objectives—To describe Russian women's knowledge and attitudes and assess whether women's knowledge and attitudes were associated with their risky drinking.

Methods—Cross-sectional survey. Women of childbearing age ($n=648$) were recruited at women's health clinics and asked about their alcohol consumption, pregnancy status, attitudes, and knowledge about effects of alcohol and Fetal Alcohol Syndrome (FAS).

Results—Women exhibited misconceptions and 40% believed or were uncertain whether alcohol consumption during pregnancy was acceptable. Although 34% had heard of FAS, only 8% possessed accurate knowledge. Knowledge was associated with alcohol consumption among pregnant women, but there was no association between knowledge and risky drinking in non-pregnant women, including those who were at risk for an unplanned pregnancy or were trying to conceive. Attitudes were strongly associated with risky drinking by non-pregnant women across levels of knowledge about FAS and any alcohol use by pregnant women.

Conclusions—Russian women had limited knowledge and misconceptions about effects of alcohol on fetus, and risky alcohol consumption was strongly associated with women's attitudes and knowledge. The study provides strong evidence to support continuing public health education about effects of alcohol use during pregnancy. Correcting specific misconceptions and targeting

Corresponding author: Tatiana Balachova, Ph.D., The University of Oklahoma Health Sciences Center, 940 N.E. 13th Street, Nicholson Tower Suite 4900, Oklahoma City, Oklahoma 73104, Phone: (405) 271-8858, Fax : (405) 271-2931, Tatiana-Balachova@ouhsc.edu.

Declaration of interest

The authors report no conflicts of interest.

The study was supported by the National Institutes of Health (NIH) under Awards R21TW006745 and R01AA016234. The content is solely the responsibility of the authors and does not necessarily represent the official views of NIH. There was no involvement of a pharmaceutical or other company. Mr. Som Bohora, MS, and Ms. Kathy Kyler, MS, of OUHSC provided technical assistance with the manuscript preparation.

the preconceptional period in health communications are necessary to reduce at-risk drinking and the risk for alcohol-exposed pregnancies.

Introduction

Since the harmful effects of prenatal alcohol exposure were first recognized, public health initiatives have emphasized abstinence from alcohol among pregnant women and women who may become pregnant (1). Fetal Alcohol Syndrome (FAS) is the most widely known outcome of high levels of prenatal exposure, but there is growing evidence that even lower levels of exposure can produce a range of more prevalent Fetal Alcohol Spectrum Disorders (FASD) (2–4). FASD are completely preventable by avoiding the confluence of pregnancy and drinking (5). How public health efforts may address this goal varies depending upon drinking patterns, attitudes, and knowledge present within the target audience. Although public knowledge about the risks of alcohol use during pregnancy and FASDs is high in some countries, it remains low worldwide (6). Many women around the world continue alcohol consumption at time surrounding pregnancy (7). There is an urgent need to improve health communications to change social norms regarding drinking, whenever there is a risk of pregnancy (8).

The level of alcohol consumption in Russia is among the highest in the world (9). Studies indicate high rates of FASD among Russian youth (10). There is a strong tradition of drinking that has historical roots (11–13). Marketing has targeted youth and women, and alcohol consumption is prevalent among women (14–16). Our recent study found that binge drinking was reported by 61%–72% of Russian women of childbearing age, and 32%–54% of women met risk criteria for an alcohol-exposed pregnancy (AEP), that is, they were drinking at risk levels while they could become pregnant (17). Most Russian women reduce or eliminate drinking upon recognizing a pregnancy, with around 20% reporting alcohol consumption after pregnancy recognition. The highest drinking risk was concentrated in the preconceptional period. A recent review concluded that AEP prevention measures for Russian women of childbearing age warrant immediate attention (18).

In framing public health prevention efforts, it is important to understand Russian women's current knowledge about FASD, their beliefs and attitudes about drinking, and their perceptions about the potential harms and risks involved. Data about FASD knowledge in Russia are limited. The only study reported that 37% of Russian women had heard about FAS (19). A pilot qualitative study conducted by our research group suggested that Russian women had limited knowledge and under-recognized the potential impact of alcohol use on pregnancy (20). The effect of knowledge and attitudes on alcohol consumption during pregnancy is not well established. While the majority of studies found correlations between alcohol beliefs and risky drinking (21, 22), there are mixed data about effects of knowledge. Several studies reported that increased knowledge had limited, if any, effects on attitudes and alcohol consumption (23–26). In addition, a study of general health control beliefs in Russian population reported weaker and less consistent associations between beliefs and health behaviors in Russia compared to other countries (27). The extent to which Russian women's FASD knowledge and attitudes toward drinking during pregnancy are associated with their actual drinking behavior before and during pregnancy remains unknown. The aims

of the present study are to 1) identify FASD knowledge and beliefs among Russian women of childbearing age and 2) test whether FASD knowledge and attitudes toward alcohol consumption during pregnancy were associated with risky drinking during, before, and surrounding pregnancy.

Methods

Sample

The study was approved by the Institutional Review Boards of St. Petersburg State University, St. Petersburg, Russia and the University of Oklahoma Health Sciences Center (OUHSC), Oklahoma City, Oklahoma. Participants were women of childbearing age (18–44 years) recruited at 7 public women's health clinics. Four clinics were in St. Petersburg, a major city in Northwest Russia; three clinics were in the Nizhny Novgorod Region, a centrally located semirural area. In Russia, public women's health clinics provide routine obstetrics and gynecology (OB/GYN) services, family planning, and prenatal and postpartum care at no charge for women residing in the service areas; 96% of women receive services from these clinics (28). Thus, a reasonably representative sample of women of childbearing age can be recruited through these clinics. Recruitment was stratified by pregnancy status and location. Pregnant and non-pregnant women were recruited using a face-to-face strategy. Throughout the recruitment period, female research assistants approached women in clinic waiting rooms two to three days per week. The topic of alcohol was not mentioned during the initial approach. Of women approached, 89% in the Nizhny Novgorod Region and 80% in St. Petersburg volunteered to participate. Competing time demands and travel difficulties were the most common reasons for not participating. Informed consent procedures and data collection were conducted in face-to-face interviews with the research assistant. A total of 657 women were enrolled in the study. Nine were excluded due to age or incomplete information, resulting in an analysis sample of 648: 342 women from St. Petersburg (146 pregnant, 196 non-pregnant) and 306 women from the Nizhny Novgorod Region (155 pregnant, 151 non-pregnant).

Measures

The structured 40–50 minute interview included items from U.S. and international measures (29–32) that were reviewed for cultural appropriateness by bilingual project investigators. Selected questions underwent forward and backward translation and feasibility piloting before implementation. During pilot testing, women reported that they preferred face-to-face interviews to group or phone interviews or self-administered questionnaires. Alcohol consumption data was collected via self-report. Self-reports about alcohol consumption may be vulnerable to desirability bias, but tend to be reasonably accurate among volunteers recruited in health care settings when confidentiality is protected (29, 33).

Attitudes—Attitudes refer to subjective feelings about the advisability of using alcohol during pregnancy and perceptions of risk or harm. We included eight questions about the harmfulness or advisability of drinking during pregnancy, based on our previous focus group probes (20). Responses were given on a 5-point Likert scale. A ninth multiple-choice

question asked about the respondent's beliefs about the safety of consuming alcohol during specific trimesters of pregnancy. Table 2 lists these items.

Knowledge—Knowledge refers to basic facts about FAS and the effects of alcohol on a fetus. Knowledge was assessed using seven questions asking how certain the respondent was about a range of known effects. Respondents answered using a 5-point Likert scale. Items about unlikely effects of alcohol consumption, such as seizures or hallucinations, were included to gauge whether FASD knowledge was specific. Participants were then asked if they had heard about FAS. Those who answered “yes” were asked to answer three multiple choice questions to determine if their knowledge was correct (i.e., that FAS is a birth defect, lasts a lifetime, and is caused by maternal alcohol consumption during pregnancy). Table 3 lists these items.

Alcohol Consumption Measures—Following the recommendations of (34) women reporting any drinking in the previous year were asked to describe their drinking pattern. Non-pregnant women reported their consumption during the last three months. Pregnant participants reported their consumption for 1) the three months preceding pregnancy and 2) after pregnancy recognition through the interview day.

Quantity/Frequency Measure—Similar to previously reported beverage- and container-specific approaches (19, 34, 35), a beverage-specific weekly quantity/frequency approach was used. In Russia, the concept of “one drink” as a unit of consumption was unfamiliar and a standard drink card that showed pictures of common containers and alcoholic beverages was developed. Questions included type of beverage, type of container, and number of containers consumed weekly. This information was transformed into ethanol volume and then into U.S. standard drink units (36). Cut scores for risky drinking were based on standard U.S. guidelines. *Heavy episodic/binge drinking* was defined as four or more drinks on one occasion (37). Women were asked how often they consumed four or more drinks on a single occasion during the last three months. A binary indicator of binge drinking was used in the analyses; any binge drinking constituted risky drinking (37).

Screening for risky alcohol consumption—Pregnant and non-pregnant women completed T-ACE (32) and TWEAK (31) screening measures for risk of alcohol consumption during pregnancy. Risky drinking for non-pregnant women was defined as consuming eight or more drinks in a week or four or more drinks in a day (36). Any drinking was considered at-risk drinking for pregnant women (38).

Pregnancy—Participants were asked about sexual intercourse and use of contraception during the 6 months preceding the interview or, for those currently pregnant, 6 months preceding pregnancy. Non-pregnant women reporting intercourse without contraception were coded positive for pregnancy potential. A second binary indicator was coded positive if the woman endorsed a question about actively trying to conceive.

Data analysis

The SAS-callable version of SUDAAN® 10.0 (39) was used for analysis. For all analyses, variance estimation was adjusted for possible clustering effects of clinics via the Taylor linearization method. The pregnancy status and regional local strata were considered secondary design factors and were analytically controlled using main effect terms and a cross-factor interaction term. Results from omnibus tests of general differences between these four groups were conducted and are presented as secondary outcomes in Tables 2 and 3. The use of specific SUDAAN® procedures varied depending on the observed distribution of each outcome (e.g., logistic links for binomial outcomes, Poisson for counts). For Aim 1, descriptive statistics were produced using either the DESCRIPT, LOGLINK, or REGRESS procedure. Aim 2 analyses, regressing binary indicators of risk drinking on aggregate measures of attitudes and knowledge, were conducted using the RLOGIST procedure. When subgroup analyses were run, the SUBPOPN procedure of SUDAAN® was used to adjust the variance estimation for proper population inferences.

Eight of the items assessing *attitudes* toward alcohol consumption used a 5-point Likert-type response scale. To calculate the aggregate attitude score, reverse-scored items were recalculated to reflect the response direction of strict or permissive responses (Table 2). The extreme end responses of these scales were collapsed (e.g., strongly agree was collapsed with agree and strongly disagree was collapsed with disagree) to analyse 3-category items for simplicity and to avoid empty response categories in some cases. The only item that did not use a Likert-type response format asked whether a woman believed that alcohol was safe to consume during each of the trimesters; responses were given separately for each trimester. An aggregate score representing the average response of all nine attitudinal items was constructed to evaluate associations between attitudes that were favorable to alcohol consumption and drinking behaviors. The safe trimester responses were summed and placed on a scale from 1 (never safe) to 4 (always safe), before aggregation. Attitudinal items are shown in Table 2. The multiple choice *knowledge* items were scored to reflect accurate knowledge (see Table 3). Responses to Likert-type scale *knowledge* items about the adverse outcomes of prenatal exposure were also collapsed by combining the extreme-end responses. Knowledge items were later averaged to create an aggregate score of accurate knowledge.

Results

Demographics

The average age of non-pregnant women was 29 years. Pregnant women were on average 28 years old and at 21 (*standard deviation* = 9.0) weeks of gestation. When study location was crossed with women's pregnancy status, the demographics differed significantly by group, except for ethnicity, comparable to expectations based on the regional demographic characteristics reported by the government (40). Participants were part of a larger study and details about the sample and alcohol consumption were included in previous publications (17, 41). St. Petersburg participants had higher education, higher income, more urban residence, and were employed less often than Nizhny Novgorod Region participants (see Table 1).

Attitudes

The sample distribution of responses and confidence intervals is provided in Table 2. Sixty percent of women opposed the statement that “It is ok to drink a little during pregnancy”. However, 40% believed or were unsure whether alcohol consumption during pregnancy is acceptable. Most participants (72%) believed that alcohol consumption may be harmful in all trimesters. However, 28% reported that there is a safe trimester, but there was no consensus regarding which trimester was safe. A significant proportion (37%) believed that the type of alcohol a woman consumes during pregnancy matters. An additional 10% were unsure whether the type of alcohol is important. Among women who believed that the type of alcohol matters, the majority (93%) believed that vodka was the most harmful for pregnancy outcomes and red wine was the least harmful (73%).

A test of differences between study groups (the region by pregnancy strata) on the aggregate attitudes and beliefs score revealed a significant effect for region ($F(1,7) = 33.17, p < 0.01$). In St. Petersburg, both pregnant and non-pregnant drinkers reported more permissive attitudes towards drinking during pregnancy. There were no significant differences in the aggregate scores across pregnancy status groups (see Table 2).

Knowledge

Table 3 presents the responses to the knowledge items and the differences across study groups. There was a tendency to endorse any potential negative effects of alcohol consumption during pregnancy, including seizures (60%) and hallucinations (41%), symptoms which are not typically associated with fetal alcohol exposure. Only 34% of the full sample reported having heard about FAS. Of those, 46% correctly identified FAS as a birth defect, 42% understood its lifetime duration, 75% identified maternal drinking during pregnancy as the cause, and 23.4% answered all three knowledge questions correctly. In the total sample, only 8% of women possessed accurate knowledge. Knowledge varied significantly across the four groups (Table 3). Pregnant women, particularly pregnant drinkers, had lower knowledge scores than non-pregnant women at both study locations. There were significant differences in the aggregate accurate knowledge scores between locations, which appeared to be due to a difference for pregnancy status, with a higher proportion of women in the Nizhny Novgorod Region being pregnant ($F(1,7) = 12.68, p < 0.01$).

Attitude and knowledge associations with risky consumption

The aggregate scores of attitudes and knowledge were evaluated to assess the strength of association with alcohol consumption. Retrospective reports of non-pregnant drinking among pregnant women were aggregated with reports of currently non-pregnant women. Tests for association revealed a significant main effect of attitudes on the log odds of risky drinking ($F(1,7) = 27.51, p < 0.01$), while controlling for an individual's knowledge score. This effect suggested that the odds of risky drinking were 16.55 times higher for each unit increase on the attitudinal average item score (95% CI:4.67–58.66). This effect did not vary across levels of the knowledge score ($p = 0.17$) or across groups ($p = 0.31$).

The effect of knowledge on non-pregnant women's risky drinking was not statistically significant ($p = 0.32$), but varied significantly across groups ($F(3,7) = 4.94$, $p < 0.04$). This variation suggested a stronger relationship between knowledge and risky alcohol consumption among non-pregnant women in the Nizhny Novgorod Region. The odds of risk level drinking were 0.15 times lower for each unit increase in the average knowledge item score within this stratum (95% CI: 0.12–0.18). No other stratum demonstrated a significant relationship between risky drinking while non-pregnant and knowledge, suggesting that this was not a robust relationship.

Two subgroup analyses were performed to assess whether attitudes and knowledge were associated with alcohol consumption among women who were attempting to conceive or any alcohol consumption among pregnant women. The first subgroup included current reports from those actively trying to conceive and retrospective reports about pre-pregnancy drinking from pregnant women who reported that their pregnancy was planned. Among this subgroup, the attitudinal score significantly predicted risky alcohol consumption ($F(1,7) = 13.21$, $p < 0.01$). This effect suggested a 37% increase in the odds of risky alcohol consumption for each unit increase on the attitude score (95% CI: 3.68–370.87). This effect did not seem to depend on current pregnancy status ($p = 0.45$) or location ($p = 0.57$). The knowledge score was not predictive in this subsample ($p = 0.31$). Next, we examined drinking during pregnancy. The attitude score ($F(1,7) = 11.07$, $p < 0.02$), and the knowledge score ($F(1,7) = 7.21$, $p < 0.04$), significantly predicted alcohol consumption while pregnant. The odds ratio effect size per unit score increase was 7.44 (95% CI: 1.79–30.96) for attitude and 0.32 (95% CI: 0.11–0.87) for knowledge. Neither effect depended on location ($p = 0.27$ and $p = 0.83$, respectively).

Discussion

This study is the first to evaluate FASD knowledge, attitudes, and its associations with alcohol use among women in Russia, a country with one of the highest alcohol consumption levels in the world. The results of this study support concerns about the lack of FASD knowledge in many countries (42, 43). Consistent with previous findings (19) less than half of women in our study sample had heard of FAS. Our study indicated that only 8% of Russian women had correct information about basic FAS characteristics. Many women exhibited misconceptions, e.g., the type of alcohol a woman consumes during pregnancy matters and red wine is less harmful. Forty percent of women believed that some alcohol consumption during pregnancy is acceptable, or they were unsure whether it was acceptable. These findings are similar to a recent report from South Africa where a substantial proportion of people in the general population did not believe that alcohol use during pregnancy was harmful (44). These findings contrast with data from countries where FASD public awareness campaigns have been widely conducted, knowledge is higher and attitudes more strongly favour caution about alcohol use during pregnancy (45, 46). In our sample, more educated women demonstrated more accurate knowledge about the specific effects of alcohol consumption in pregnancy (26, 45). However in St. Petersburg, a major city where women were better educated, women's attitudes were more favourable towards alcohol consumption during pregnancy compared to more rural Nizhny Novgorod Region locations,

when we expected to find the opposite. Of greater concern was the fact that FASD knowledge was lower among pregnant women across locations in Russia.

Similar to reports from other countries, attitudes and perceptions of risk of harm are more impactful on women's drinking (25) or intention to drink during pregnancy (47) than their knowledge about FAS. In our study, attitudes were strongly associated with risky drinking among non-pregnant women and any alcohol consumption during pregnancy. The effect sizes were large. Women with more favourable attitudes toward drinking were more likely to drink at-risk while not pregnant and to consume alcohol during pregnancy.

Unlike findings from other studies reporting that knowledge about FAS was not predictive to alcohol consumption during pregnancy (23, 25), we found that pregnant women's knowledge about effects of alcohol consumption and FAS was strongly associated with their attitudes and alcohol consumption during pregnancy. However, knowledge was not associated with risky drinking among non-pregnant women, including those at risk for an unplanned pregnancy. We may expect that FASD knowledge does not affect these women's alcohol use because they may perceive themselves to be at low risk for pregnancy. Unexpectedly, there was no association between knowledge about effects of alcohol use during pregnancy and at-risk drinking by Russian women who were trying to conceive. Together with our previous findings that many Russian women who may become pregnant or who are trying to conceive drink at risk and do not reduce alcohol consumption until pregnancy is recognized (17), these data suggest that although FAS knowledge and risk perceptions have an impact on Russian women's drinking during pregnancy, this knowledge has not been applied to the preconceptional period.

While this study included a large sample of Russian women across two locations, there were limitations. First, the study was correlational and did not establish causal links between attitudes, knowledge, and alcohol consumption behavior. Attitudes may drive consumption behavior, but it is equally plausible that women construct their attitudes to support their drinking patterns. Additional research utilising longitudinal prospective study design is needed to determine whether there is a true prediction. This study findings were limited to two regions in Russia. How well these findings may generalize to other regions of Russia is undetermined. Given the high utilization of public OB/GYN clinics in Russia (20), the sample was reasonably representative, but may under-represent the highest risk group of women who do not seek care, including alcohol-dependent women or women with less mainstream attitudes. The study utilized self-reports about alcohol use obtained during face-to-face interviews and did not include biomarkers. Although self-reports may be affected by social desirability bias, alcohol consumption is prevalent among Russian women and, as discussed earlier, self-reports tend to be reliable among volunteers in health settings, as was the case here. In addition, procedures known to enhance the accuracy of reports (e.g., informing participants of confidentiality, using clinically trained research assistants to conduct interviews) were implemented in the study.

Our findings inform prevention efforts to reduce the risk for alcohol-exposed pregnancies and FASD. The fact that pregnant women's knowledge has a strong effect on their alcohol consumption supports education efforts to reduce prenatal alcohol exposure. As attitudes

and, to a lesser extent, knowledge, are strongly associated with risky alcohol consumption and are potentially malleable through education and public health campaigns, it is possible that prevention focused on increasing knowledge and changing attitudes may reduce the high AEP risk observed among Russian women. These types of public health efforts (e.g., public education, informational materials, and advocacy offered by primary health care providers) have the potential to impact numerous women of childbearing age. Strategies should reinforce existing perceptions that drinking during pregnancy is potentially harmful, specify the nature of the risks involved, and include efforts to correct two fairly prevalent misperceptions: 1) that there are safe trimesters for alcohol consumption and 2) that there are relatively safer forms of alcohol to consume during pregnancy. Prevention efforts should target attitudes related to pre-pregnancy drinking to extend the perception of risk beyond the time when a pregnancy is recognized to the preconception period and the beginning of pregnancy when a woman may not know she is pregnant. The findings suggest that these are promising public health prevention strategies to reduce alcohol consumption during pregnancy and at-risk drinking among Russian women of childbearing age. The study provides strong evidence to support continuing public health education to prevent FASDs worldwide.

Acknowledgments

The study was supported by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) and Fogarty International Center (Brain Disorders in the Developing World: Research Across the Lifespan) of the National Institutes of Health (NIH) under Awards R21TW006745 and R01AA016234. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

The authors thank Lee Ann Kaskutas, DrPH, of the Alcohol Research Group; Ulrik Kesmodel, MD, PhD, of University of Aarhus, Denmark; Marcia Russell, PhD, of Prevention Research Center; and Robert Sokol, MD, of Wayne State University School of Medicine for consultations on measures and acknowledge the contributions of Karen Beckman, MD, John Mulvihill, MD, and Mark Wolraich, MD, of OUHSC; and Jacqueline Bertrand, PhD, of the Centers for Disease Control and Prevention, for their consultation and support to conducting the international study. The authors wish to thank Som Bohora, MS, and Kathy Kyler, MS, of OUHSC for technical assistance with the manuscript preparation. Finally, the authors want to thank Maria Potapova, Maxim Gusev, Olga Gluzdova, Oksana Maslennikova, and other graduate students from St. Petersburg State University, Nizhny Novgorod State Pedagogical University, and the University of Oklahoma Health Sciences Center who assisted with data collection and database management and all the women who volunteered to participate in the study.

References

1. Department of Health and Human Services (DHHS). US Surgeon General releases advisory on alcohol use in pregnancy. Washington, DC: U.S. Government Printing Office; 2005.
2. Barr HM, Streissguth AP. Identifying Maternal Self-Reported Alcohol Use Associated With Fetal Alcohol Spectrum Disorders. *Alcoholism: Clinical and Experimental Research*. 2001; 25(2):283–287.
3. Jacobson JL, Jacobson SW. Effects of prenatal alcohol exposure on child development. *Alcohol Research and Health*. 2002; 26(4):282–286. [PubMed: 12875038]
4. May PA, Gossage JP, Kalberg WO, Robinson LK, Buckley D, Manning M, Hoyme HE. Prevalence and epidemiologic characteristics of FASD from various research methods with an emphasis on recent in-school studies. *Developmental disabilities research reviews*. 2009; 15(3):176–192. [PubMed: 19731384]
5. Floyd RL, O'Connor MJ, Sokol RJ, Bertrand J, Cordero JF. Recognition and prevention of fetal alcohol syndrome. *Obstetrics and gynecology*. 2005; 106(5 Pt 1):1059–1064. [PubMed: 16260526]

6. Jonsson E, Salmon A, Warren KR. The international charter on prevention of fetal alcohol spectrum disorder. *The Lancet Global Health*. 2(3):e135–e137. [PubMed: 25102841]
7. O’Keeffe LM, Kearney PM, McCarthy FP, Khashan AS, Greene RA, North RA, Poston L, McCowan LM, Baker PN, Dekker GA, Walker JJ, Taylor R, Kenny LC. Prevalence and predictors of alcohol use during pregnancy: findings from international multicentre cohort studies. *BMJ open*. 2015; 5(7):e006323.
8. Warren KR. A Review of the History of Attitudes Toward Drinking in Pregnancy. *Alcoholism, clinical and experimental research*. 2015; 39(7):1110–1117.
9. World Health Organization. Global status report on alcohol and health. Geneva, Switzerland: World Health Organization; 2014.
10. Lange S, Shield K, Rehm J, Popova S. Prevalence of Fetal Alcohol Spectrum Disorders in Child Care Settings: A Meta-analysis. *Pediatrics*. 2013
11. Bobak M, McKee M, Rose R, Marmot M. Alcohol consumption in a national sample of the Russian population. *Addiction*. 1999; 94(6):857–866. [PubMed: 10665075]
12. Herlihy, P. The alcoholic empire: vodka & politics in late imperial Russia. New York, USA: Oxford University Press, Inc; 2002.
13. Stickley A, Razvodovsky Y, McKee M. Alcohol mortality in Russia: a historical perspective. *Public Health*. 2009; 123(1):20–26. [PubMed: 19084882]
14. Chambers CD, Kavteladze L, Joutchenko L, Bakhireva LN, Jones KL. Alcohol consumption patterns among pregnant women in the Moscow region of the Russian Federation. *Alcohol (Fayetteville, NY)*. 2006; 38(3):133–137.
15. Malyutina S, Bobak M, Kurilovitch S, Ryizova E, Nikitin Y, Marmot M. Alcohol consumption and binge drinking in Novosibirsk, Russia, 1985–95. *Addiction*. 2001; 96(7):987–995. [PubMed: 11440608]
16. Onischenko, G. Об усилении надзора за производством и оборотом алкогольной продукцией. [Strengthening the supervision over the production and sale of alcohol products]. 2007. Retrieved from http://rospotrebnadzor.ru/c/journal/view_article_content?groupId=10156&articleId=82037&version=1.0
17. Balachova T, Bonner B, Chaffin M, Bard D, Isurina G, Tsvetkova L, Volkova E. Women’s alcohol consumption and risk for alcohol-exposed pregnancies in Russia. *Addiction*. 2012; 107(1):109–117. [PubMed: 21752144]
18. Popova S, Yaltonskaya A, Yaltonsky V, Kolpakov Y, Abrosimov I, Pervakov K, Tanner V, Rehm J. What research is being done on prenatal alcohol exposure and fetal alcohol spectrum disorders in the Russian research community? *Alcohol Alcohol*. 2014; 49(1):84–95. [PubMed: 24158024]
19. Kristjanson AF, Wilsnack SC, Zvartau E, Tsoy M, Novikov B. Alcohol use in pregnant and nonpregnant Russian women. *Alcoholism, clinical and experimental research*. 2007; 31(2):299–307.
20. Balachova T, Bonner B, Isurina G, Tsvetkova L. Use of focus groups in developing FAS/FASD prevention in Russia. *Substance use & misuse*. 2007; 42(5):881–894. [PubMed: 17613951]
21. Cornelius MD, Lebow HA, Day NL. Attitudes and knowledge about drinking: relationships with drinking behavior among pregnant teenagers. *Journal of drug education*. 1997; 27(3):231–243. [PubMed: 9366129]
22. Stickley A, Koyanagi A, Kaposov R, McKee M, Roberts B, Murphy A, Ruchkin V. Binge drinking among adolescents in Russia: prevalence, risk and protective factors. *Addictive behaviors*. 2013; 38(4):1988–1995. [PubMed: 23384452]
23. Chambers CD, Hughes S, Meltzer SB, Wahlgren D, Kassem N, Larson S, Riley EP, Hovell MF. Alcohol consumption among low-income pregnant Latinas. *Alcoholism, clinical and experimental research*. 2005; 29(11):2022–2028.
24. Chang G, McNamara TK, Orav EJ, Wilkins-Haug L. Alcohol use by pregnant women: partners, knowledge, and other predictors. *Journal of studies on alcohol*. 2006; 67(2):245–251. [PubMed: 16562406]
25. Kesmodel U, Kesmodel P. Drinking during pregnancy: attitudes and knowledge among pregnant Danish women, 1998. *Alcoholism, clinical and experimental research*. 2002; 26(10):1553–1560.

26. Peadon E, Payne J, Henley N, D'Antoine H, Bartu A, O'Leary C, Bower C, Elliott E. Women's knowledge and attitudes regarding alcohol consumption in pregnancy: a national survey. *BMC Public Health*. 2010; 10(1):510. [PubMed: 20727217]
27. Perlman F, Bobak M, Steptoe A, Rose R, Marmot M. Do health control beliefs predict behaviour in Russians? *Preventive medicine*. 2003; 37(2):73–81. [PubMed: 12855206]
28. Sukhanova, LP. Статистика родовспоможения как фактор обеспечения качества акушерской перинатальной помощи в России. [Statistics of obstetric aid as a factor of providing quality of obstetric and perinatal care in Russia]. 2008. Retrived from <http://vestnik.mednet.ru/content/view/47/30>
29. Babor TF, Steinberg K, Anton R, Del Boca F. Talk is cheap: measuring drinking outcomes in clinical trials. *Journal of studies on alcohol*. 2000; 61(1):55–63. [PubMed: 10627097]
30. Kaskutas LA. Understanding drinking during pregnancy among urban American Indians and African Americans: health messages, risk beliefs, and how we measure consumption. *Alcoholism, clinical and experimental research*. 2000; 24(8):1241–1250.
31. Russell M, Martier SS, Sokol RJ, Mudar P, Bottoms S, Jacobson S, Jacobson J. Screening for pregnancy risk-drinking. *Alcoholism, clinical and experimental research*. 1994; 18(5):1156–1161.
32. Sokol RJ, Martier SS, Ager JW. The T-ACE questions: practical prenatal detection of risk-drinking. *American journal of obstetrics and gynecology*. 1989; 160(4):863–868. discussion 868–870. [PubMed: 2712118]
33. Kesmodel U, Frydenberg M. Binge drinking during pregnancy--is it possible to obtain valid information on a weekly basis? *American journal of epidemiology*. 2004; 159(8):803–808. [PubMed: 15051590]
34. Nayak MB, Kaskutas LA. Risky drinking and alcohol use patterns in a national sample of women of childbearing age. *Addiction*. 2004; 99(11):1393–1402. [PubMed: 15500592]
35. Kesmodel U, Kesmodel PS, Larsen A, Secher NJ. Use of alcohol and illicit drugs among pregnant Danish women, 1998. *Scandinavian journal of public health*. 2003; 31(1):5–11. [PubMed: 12623518]
36. National Institute on Alcohol Abuse and Alcoholism. Helping patients who drink too much: a clinician's guide. NIAAA: DHHS publication. 2005. Retrieved from <http://pubs.niaaa.nih.gov/publications/Practitioner/CliniciansGuide2005/guide.pdf>
37. National Institute on Alcohol Abuse and Alcoholism. NIAAA Council approves definition of binge drinking. NIAAA: DHHS publication. 2004. Retrieved from http://pubs.niaaa.nih.gov/publications/Newsletter/winter2004/Newsletter_Number3.pdf
38. Department of Health and Human Services. US Surgeon General releases advisory on alcohol use in pregnancy. U.S. Department of Health and Human Services; Washington, DC: U.S. Government Printing Office; 2005.
39. SUDAAN. User's Manual, Release 10.0. Research Triangle Park, NC: Research Triangle Institute; 2008.
40. Russian Federation Federal State Statistics Service. Федеральная служба государственной статистики. [Federal State Statistics Services Website]. 2009. Retrieved from <http://www.gks.ru/>
41. Balachova T, Bonner B, Bard D, Chaffin M, Isurina G, Owora A, Tsvetkova L, Volkova E. Women's receptivity to Fetal Alcohol Spectrum Disorders prevention approaches: A case study of two regions in Russia. 2014; 3(1):11.
42. Warren KR, Calhoun FJ, May PA, Viljoen DL, Li TK, Tanaka H, Marinicheva GS, Robinson LK, Mundle G. Fetal alcohol syndrome: an international perspective. *Alcoholism, clinical and experimental research*. 2001; 25(5 Suppl ISBRA):202S–206S.
43. Johnson ME, Robinson RV, Corey S, Dewane SL, Brems C, Diane Casto L. Knowledge, attitudes, and behaviors of health, education, and service professionals as related to fetal alcohol spectrum disorders. *International journal of public health*. 2010; 55(6):627–635. [PubMed: 20809348]
44. Eaton LA, Pitpitan EV, Kalichman SC, Sikkema KJ, Skinner D, Watt MH, Pieterse D, Cain DN. Beliefs about fetal alcohol spectrum disorder among men and women at alcohol serving establishments in South Africa. *The American journal of drug and alcohol abuse*. 2014; 40(2):87–94. [PubMed: 24588417]

45. Environics Research Group Limited. Final Report. Toronto, Ontario, Canada: 2006. Alcohol use during pregnancy and awareness of Fetal Alcohol Syndrome and Fetal Alcohol Spectrum Disorder. Retrieved from <http://www.phac-aspc.gc.ca/publicat/fas-saf-natsurv-2006/index-eng.php>
46. Ihlen BM, Amundsen A, Tronnes L. Reduced alcohol use in pregnancy and changed attitudes in the population. *Addiction*. 1993; 88(3):389–394. [PubMed: 8461856]
47. Peadon E, Payne J, Henley N, D'Antoine H, Bartu A, O'Leary C, Bower C, Elliott E. Attitudes and behaviour predict women's intention to drink alcohol during pregnancy: the challenge for health professionals. *BMC Public Health*. 2011; 11(1):584. [PubMed: 21781309]

Table 1

Demographic characteristics of the sample ($N=648$)

Location	St. Petersburg			The Nizhny Novgorod Region		
	Total	Preg	Npreg	Preg	Npreg	
Number of Women	($N=648$)	($N=146$)	($N=196$)	($N=155$)	($N=151$)	
Average age in years (Standard Deviation, SD)	28.2 (6.2)	26.9 (4.8)	26.5 (6.3)	28.1 (5.6)	31.9 (6.5)	
Ethnicity						
Russian	627 (97%)	142 (97%)	188 (96%)	151 (97%)	146 (97%)	
Other	20 (3%)	4 (3%)	7 (4%)	4 (3%)	5 (3%)	
Marital status						
Married	350 (54%)	98 (67%)	65 (33%)	124 (80%)	63 (42%)	
Cohabiting	116 (18%)	34 (23%)	34 (17%)	16 (10%)	32 (21%)	
Single/divorced ^a	181 (28%)	14 (10%)	96 (49%)	15 (10%)	56 (37%)	
Living environment						
Urban inner city	510 (79%)	141 (97%)	190 (97%)	84 (54%)	95 (63%)	
Rural/small city/suburban	137 (21%)	5 (3%)	5 (3%)	71 (46%)	56 (37%)	
Education						
No school diploma	9 (1%)	0 (0%)	2 (1%)	4 (3%)	3 (1%)	
School diploma	235 (36%)	17 (12%)	34 (17%)	91 (59%)	93 (62%)	
Middle level college	139 (21%)	61 (42%)	72 (37%)	5 (3%)	1 (1%)	
Higher education/PhD	264 (41%)	68 (47%)	87 (44%)	55 (36%)	54 (36%)	
Employment ^c						
Employed	470 (72%)	81 (56%)	130 (66%)	129 (83%)	130 (86%)	
Student	69 (11%)	11 (8%)	41 (21%)	6 (4%)	11 (7%)	
Homemaker	45 (7%)	18 (12%)	9 (5%)	13 (8%)	5 (3%)	
Maternity leave	33 (5%)	23 (16%)	9 (5%)	0 (0%)	1 (1%)	
Unemployed/disability	29 (4%)	13 (9%)	5 (3%)	7 (5%)	4 (3%)	
Household income/per person						
< 3000 rubles ^d	156 (24%)	8 (5.5%)	21 (11%)	48 (31%)	79 (52%)	
3001–5000 rubles	224 (35%)	51 (35%)	61 (31%)	61 (39%)	51 (34%)	
5001–10000 rubles	170 (26%)	55 (38%)	74 (38%)	30 (19.4)	11 (7%)	

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Location	St. Petersburg		The Nizhny Novgorod Region		
	Total	Preg	Npreg	Preg	Npreg
10001–18000 and more rubles	76 (11.7%)	30 (15%)	30 (15%)	7 (5%)	9 (6%)
Missing ^e	22 (4%)	2 (1.4%)	10 (5%)	9 (6%)	1 (0.7%)

^aSingle/Divorced category also included women who were separated and widowed.

^dBetween September 2004 and May 2005, exchange rates were 27.5 to 29.2 rubles per dollar.

^eMissingness is suppressed for all but the income variable due to minimal non-response (non-response ranged from 0 to 4 women on all other variables).

Table 2

Beliefs and attitudes towards alcohol consumption during pregnancy

Attitudes and Beliefs	Proportion	95% Confidence		St. Petersburg		The Nizhny Novgorod Region		Wald F ^a
		Lower	Upper	Preg	Npreg	Preg	Npreg	
Do you believe that it is ok to drink a little during pregnancy? <i>RV</i>								48.95 *** <i>d</i>
Agree or Strongly agree	0.20	0.11	0.35	0.34	0.22	0.09	0.16	
Strongly disagree or Disagree	0.60	0.46	0.72	0.40	0.56	0.75	0.68	
Not sure	0.20	0.15	0.28	0.27	0.22	0.16	0.17	
The type of alcohol a woman drinks when she is pregnant affects the outcome of her pregnancy <i>RV</i>								5.40 ** <i>c</i>
Agree and Strongly Agree	0.37	0.18	0.61	0.53	0.53	0.15	0.23	
Disagree and Strongly disagree	0.53	0.31	0.74	0.31	0.38	0.70	0.76	
Not sure	0.10	0.06	0.16	0.16	0.09	0.14	0.01	
Rate the amount of harm alcohol might cause due to prenatal exposure								7.56 ** <i>c</i>
Harmful and Very harmful	0.93	0.90	0.95	0.88	0.93	0.96	0.95	
Not Harmful and Absolutely not harmful	0.01	0.00	0.03	0.00	0.03	0.00	0.01	
Not sure	0.06	0.04	0.09	0.12	0.05	0.04	0.05	
Do you believe that drinking alcohol during pregnancy may:								1.83
Benefit the baby <i>RV</i>								
Agree and Strongly agree	0.01	0.00	0.05	0.03	0.01	0.01	0.00	
Disagree and Strongly disagree	0.93	0.88	0.96	0.90	0.92	0.94	0.97	
Not sure	0.06	0.04	0.09	0.07	0.07	0.06	0.03	
Benefit the mother <i>RV</i>								2.97 ^c
Agree and Strongly agree	0.04	0.01	0.13	0.08	0.05	0.01	0.00	
Disagree and Strongly disagree	0.84	0.77	0.89	0.79	0.80	0.85	0.93	
Not sure	0.12	0.09	0.17	0.13	0.15	0.14	0.07	
Harm the baby								29.95 *** <i>d</i>
Agree and Strongly agree	0.91	0.79	0.97	0.84	0.90	0.97	0.93	
Disagree and Strongly disagree	0.02	0.01	0.04	0.01	0.05	0.01	0.03	

Attitudes and Beliefs	Full Sample							
	95% Confidence		St. Petersburg		The Nizhny Novgorod Region		Strata Difference	
	Proportion	Lower	Upper	Preg	Npreg	Preg	Npreg	Wald F ^a
Not sure	0.06	0.02	0.18	0.14	0.05	0.02	0.04	
Harm the mother								1.26
Agree and Strongly agree	0.78	0.66	0.86	0.68	0.74	0.84	0.85	
Disagree and Strongly disagree	0.07	0.03	0.13	0.09	0.12	0.01	0.04	
Not sure	0.16	0.09	0.25	0.23	0.14	0.15	0.11	
Does not have any effect ^{RV}								1.47
Agree and Strongly agree	0.02	0.01	0.03	0.03	0.02	0.02	0.01	
Disagree and Strongly disagree	0.86	0.77	0.91	0.77	0.87	0.88	0.89	
Not sure	0.12	0.07	0.20	0.19	0.11	0.10	0.09	
I believe that occasional alcohol consumption is safe during the following trimesters ^{RV e}								
First	0.11	0.06	0.19	0.19	0.14	0.05	0.04	31.06 *** ^c
Second	0.10	0.06	0.18	0.21	0.11	0.05	0.04	12.77 *** ^c
Third	0.16	0.09	0.27	0.30	0.19	0.08	0.09	50.93 *** ^c
May be harmful in all trimesters	0.72	0.53	0.85	0.52	0.63	0.88	0.85	117.66 *** ^d
Aggregate Attitude Score ^f Average Item Response	1.31	1.18	1.44	1.47	1.37	1.18	1.19	58.43 *** ^c

^a Omnibus test of distribution (proportion) or location (mean) differences among the four strata. Numerator degrees of freedom equal 3. Denominator degrees of freedom equal 7.

^b Test for main effect of pregnancy status reached significance, p-value < 0.05. Numerator degrees of freedom equal 1. Denominator degrees of freedom equal 7.

^c Test for main effect of region reached significance, p-value < 0.05. Numerator degrees of freedom equal 1. Denominator degrees of freedom equal 7.

^d Test of interaction effects for the region and pregnancy status stratum factors approached, p-value < 0.10, or reached, p-value < 0.05, significance. Numerator degrees of freedom equal 1. Denominator degrees of freedom equal 7.

^e A participant may select more than one trimester.

^f To calculate the aggregate attitude score, reverse-scored items were recalculated to reflect the aggregate score response direction of strict or permissive responses.

^{RV} The reverse-scored items.

*** p-value < 0.01,

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p-value-d
*
'50.0 < 0.05
**

Table 3

Knowledge about the effects of alcohol on a foetus and FAS

Knowledge	Proportion	95% CI		St. Petersburg		The Nizhny Novgorod Region		Strata Difference
		Lower	Upper	Preg	Npreg	Preg	NPreg	Wald F^a
Indicate whether or not prenatal consumption increases the chance of any of the following:								
Miscarriage								2.08 ^d
Agree or Strongly Agree	0.71	0.59	0.81	0.62	0.65	0.70	0.89	
Disagree or Strongly disagree	0.05	0.02	0.10	0.10	0.08	0.01	0.01	
Not sure	0.24	0.16	0.35	0.28	0.28	0.29	0.10	
Infantile withdrawal symptoms								0.03
Agree or Strongly Agree	0.57	0.45	0.68	0.59	0.56	0.55	0.57	
Disagree or Strongly disagree	0.06	0.04	0.08	0.05	0.05	0.07	0.05	
Not sure	0.38	0.28	0.48	0.36	0.39	0.37	0.38	
Low birth weight								8.66 ^{***d}
Agree or Strongly Agree	0.71	0.64	0.76	0.75	0.64	0.64	0.81	
Disagree or Strongly disagree	0.03	0.02	0.05	0.01	0.06	0.01	0.04	
Not sure	0.26	0.22	0.31	0.25	0.30	0.35	0.15	
Seizures								46.12 ^{***d}
Agree or Strongly Agree	0.60	0.48	0.71	0.53	0.55	0.55	0.79	
Disagree or Strongly disagree	0.03	0.01	0.05	0.03	0.04	0.02	0.02	
Not sure	0.37	0.28	0.48	0.45	0.42	0.43	0.19	
Birth defects/Malformations								11.20 ^{***b}
Agree or Strongly Agree	0.87	0.78	0.93	0.77	0.88	0.88	0.93	
Disagree or Strongly disagree	0.02	0.01	0.03	0.03	0.01	0.01	0.02	
Not sure	0.12	0.06	0.20	0.20	0.12	0.10	0.05	
Hallucinations								2.40
Agree or Strongly Agree	0.41	0.31	0.51	0.33	0.39	0.36	0.54	
Disagree or Strongly disagree	0.06	0.04	0.09	0.07	0.06	0.06	0.05	
Not sure	0.54	0.44	0.63	0.60	0.55	0.58	0.41	
Lower IQ/Mental retardation								1.62
Agree or Strongly Agree	0.86	0.81	0.91	0.85	0.87	0.83	0.91	

Knowledge	95% CI		St. Petersburg		The Nizhny Novgorod Region		Strata Difference	
	Proportion	Lower	Upper	Preg	Npreg	Preg	Npreg	Wald F^d
Disagree or Strongly disagree	0.01	0.00	0.03	0.01	0.00	0.02	0.02	
Not sure	0.13	0.08	0.18	0.14	0.13	0.15	0.07	
Knowledge of FAS ("Have you ever heard of ...FAS"?) (proportion answered "yes")	0.34	0.28	0.41	0.25	0.36	0.35	0.40	3.44 ^{*b}
Among those who heard of FAS, correct answers on multiple choice questions (proportion answered correctly):								
In FAS, a baby is born (drunk/with a birth defect/addicted to alcohol/with seizures)	0.46	0.30	0.63	0.39	0.36	0.61	0.49	1.58
How long FAS lasts (days, weeks, months, years, lifetime)	0.42	0.21	0.67	0.24	0.47	0.54	0.38	6.90 ^{**}
A child may have FAS if (father abused alcohol in the past, mother drunk during the pregnancy, mother was drunk at the time of conception, father was drunk at the time of conception)	0.75	0.64	0.84	0.58	0.71	0.87	0.80	4.43 ^{***c}
Aggregate Knowledge Score								
Average Item Response	2.55	2.46	2.63	2.46	2.52	2.54	2.66	6.79 ^{**b}

^a Omnibus test of distribution (proportion) or location (mean) differences between the four groups. Numerator degrees of freedom equal 3. Denominator degrees of freedom equal 7.

^b Test for main effect of pregnancy status reached significance, p-value < 0.05. Numerator degrees of freedom equal 1. Denominator degrees of freedom equal 7.

^c Test for main effect of region reached significance, p-value < 0.05. Numerator degrees of freedom equal 1. Denominator degrees of freedom equal 7.

^d Test of interaction effects for the region and pregnancy status stratum factors approached, p-value < 0.10, or reached, p-value < 0.05, significance. Numerator degrees of freedom equal 1. Denominator degrees of freedom equal 7.

^{***} p-value < 0.01,

^{**} p-value < 0.05,

^{*} p-value < 0.10