Published in final edited form as:
Addiction. 2012 January ; 107(1): 109–117. doi:10.1111/j.1360-0443.2011.03569.x.

Women's Alcohol Consumption and Risk for Alcohol-Exposed Pregnancies in Russia

Tatiana Balachova[1], **Barbara Bonner**[1], **Mark Chaffin**[1], **David Bard**[1], **Galina Isurina**[2], **Larissa Tsvetkova**[2], and **Elena Volkova**[3]

[1]University of Oklahoma Health Sciences Center, 1100 N.E. 13th Street, Oklahoma City, OK 73117

[2]St. Petersburg State University, 6, Makarova nab., St. Petersburg, 199034, Russia

[3]Nizhny Novgorod State Pedagogical University, 1 Ulynova Street, Nizhniy Novgorod, 603950, Russia

Abstract

Aims—Alcohol-exposed pregnancies (AEP) are the direct cause of Fetal Alcohol Spectrum Disorders (FASD). This study examines drinking patterns among pregnant and non-pregnant women of childbearing age in Russia, a country with one of the highest levels of alcohol consumption in the world.

Design—Cross-sectional survey.

Setting—7 public women's clinics in two locations: St. Petersburg (SPB) and the Nizhny Novgorod region (NNR).

Participants—648 pregnant and non-pregnant childbearing age women.

Measurements—A face-to-face structured interview assessed alcohol consumption, pregnancy status/possibility of becoming pregnant and consumption before and after pregnancy recognition.

Findings—89% of non-pregnant women reported consuming alcohol and 65% reported binge drinking in the past three months. 47% in NNR and 28% in SPB reported binges at least monthly. Women who might become pregnant consumed alcohol similarly to women who were not likely to become pregnant, and 32% of women in SPB and 54% in NNR were categorized as at-risk for AEP. There was a significant decline in drinking after pregnancy identification. 20% of pregnant women reported consuming alcohol and 6% in SBP (none in NNR) reported binge drinking; however, a high prevalence of binge drinking was found among women who might become pregnant or who were trying to conceive.

Conclusions—Russian women substantially reduce drinking after pregnancy recognition compared to pre-pregnancy levels. No reductions were found prior to pregnancy recognition, either when a woman might become pregnant or when she was trying to conceive. The preconception period presents a risk window and, therefore, a prevention opportunity.

Keywords

Fetal Alcohol Spectrum Disorders; prevention; alcohol-exposed pregnancies; pre-pregnancy retrospective reports; Russia

Conflict of Interest Declaration: None

INTRODUCTION

Alcohol-exposed pregnancies (AEP) can result in a range of Fetal Alcohol Spectrum Disorders (FASD) [1]. Fetal Alcohol Syndrome, which is due to high prenatal exposure, is the most debilitating FASD, but there is growing evidence lower levels of exposure can result in a range of less profound but more prevalent effects [2–5]. FASD are completely preventable by avoiding the confluence of pregnancy and drinking.

A majority of women reduce alcohol use once they recognize that they are pregnant. In the US, 12.2% of pregnant women use some alcohol and 1.9% meet binge drinking criteria, substantially less than among non-pregnant women (53.7% and 12.1% respectively) [5]. But stopping or reducing drinking after pregnancy recognition may not fully eliminate AEP risk. Since approximately half of all pregnancies are unplanned and women often do not recognize pregnancy until 4–6 weeks gestation, a preconceptional approach to AEP prevention has been recommended in the US [6]. Data is sparse on AEP risk outside the US, particularly AEP risk prior to pregnancy recognition.

The rate of alcohol consumption in Russia is among the highest in the world [7], and drinking traditions there have deep historical roots [8,9]. Among a national sample of Russian men and women interviewed during 1996, 44% of men and 6% of women reported binge drinking, including 31% of men and 3% of women doing so at least monthly [10]. According to an official report, a sharp increase in average alcohol consumption of 80% was seen between 1990 and 2005 [11]. Recent reports have indicated growing consumption among women and young people [11–13], and alcohol marketing targeting women in Russia is becoming more common.

Two important studies have contrasted drinking among cross-sectional groups of pregnant and non-pregnant Russian women [14,15]. Among women interviewed in groups at workplaces, schools, and OB/GYN clinics in St. Petersburg, 95.9% reported consuming alcohol in the last 12 months, 7.6% reported drinking heavily, and 18.4% reported binge drinking [16]. Pregnant women drank less, but 60% drank after they knew they were pregnant, 34.9% drank during the prior 30 days, and 7.4% reported binge drinking during pregnancy [14]. In a longitudinal pregnancy outcome study in Moscow, 85% of pregnant women reported some alcohol consumption and 20.2% reported at least one binge episode around the time of conception. After pregnancy recognition binge drinking dropped to 4.8% [15]. In both studies, pregnant and non-pregnant drinking rates were higher than in some other reports [5,16,17]. Neither study specifically asked about the within-subjects change in alcohol consumption amount in response to pregnancy recognition or how drinking behavior was impacted by two other landmark reproductive events—being likely to become pregnant and actively attempting to conceive. Understanding how women may alter their drinking when they are likely to become pregnant or actively attempting to conceive may be important for identifying key windows of opportunity for FASD prevention.

The current study was designed to estimate changes in drinking among Russian women around three reproductive landmarks: a) when a woman might become pregnant (i.e. is sexually active without consistent contraception), b) when a woman is actively attempting to conceive, and c) after recognizing pregnancy. It was hypothesized that many Russian women curtail drinking after recognizing pregnancy but may not when they are likely to become pregnant or are actively attempting to conceive.

METHODS

Sample

Participants were women of childbearing age (18–44) recruited at 7 public women's clinics ("*Zenskaya konsyltatsia*") between October 2004 and March 2005. Four clinics were in St. Petersburg (SPB), a major city in Northwest Russia, and 3 clinics were in the Nizhniy Novgorod Region (NNR), a centrally located, more rural area in the Volga Federal District, including 1 clinic in Nizhny Novgorod city and 2 clinics in rural districts. The study locations, SPB and NNR, represent a diverse sample of women from both urban and rural areas. In Russia, public women's clinics provide routine OB/GYN services, family planning, prenatal and postpartum care at no charge for women residing in areas served by the clinics. In addition to medical care, the clinics issue formal documents required for receiving medical leave and social welfare benefits. Government estimates are that 96.4% of women in Russia receive prenatal services from public women's clinics [18], and thus a reasonably representative sample of childbearing age women can be recruited there.

Recruitment was stratified and included pregnant and non-pregnant women at both sites. A face-to-face recruitment strategy was used for the study. Research assistants, who were young females, were present in the clinics 2–3 days per week and approached women in the waiting rooms to ask if they would volunteer to participate in the study about women's health. Among approached women, 89% in NNR and 80% in SPB volunteered to participate. Competing time demands and travel difficulties were reported as reasons for not participating. The study was reviewed and approved by institutional review boards at St. Petersburg State University (SPSU) and the University of Oklahoma Health Sciences Center (OUHSC) and approved by the clinics. A total of 657 women were enrolled in the study; 9 were excluded due to age or incomplete information in an analysis sample of 648 (146 pregnant and 196 non-pregnant in SPB; 155 pregnant and 151 non-pregnant in NNR).

Measures

The structured 40–50 minute interview included items from US and international measures [19–22] 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 over a group or phone interview or a self-administered questionnaire. Compared with self-administered questionnaires, interviews provided higher response rates, better internal consistency, and a higher proportion of women admitting binge drinking in another study in Europe [23], and therefore a face-to-face interview format was selected for the study. Self-reports about alcohol consumption may be vulnerable to desirability bias but are reasonably accurate among volunteers recruited in health care settings when confidentiality is protected [23–26].

Several cultural adaptations were made. The concept of "one drink" as a unit of consumption was not familiar in Russia. Therefore, a standard drink card that showed pictures of containers and alcohol beverages common in Russia was developed for the interview. Due to the lack of health guidelines regarding alcohol consumption in Russia, the US standard drink definition and cut scores for risky drinking were utilized in the study. Risky drinking for non-pregnant women was defined as consuming 8 or more drinks in a week or 4 or more drinks in a day, and binge drinking was defined as 4 or more drinks on one occasion [27]. This binge definition is slightly lower than in previous studies, but it reflects the most recent guidelines [28].

Non-pregnant women reported their consumption during the last 3 months; pregnant participants completed the measure both currently and retrospectively and described their

alcohol consumption in the 3 months before pregnancy and after recognizing pregnancy. A 3-month instead of 1-month alcohol consumption reporting timeframe was used to capture binge drinking patterns that are common within Russian culture. In addition, longer timeframes have been documented to improve sensitivity among women of childbearing age [29].

Quantity/frequency measure—Women reporting any drinking in the past year were asked to describe their drinking patterns. Similarly to beverage and container-specific approaches that have been used in other countries, a beverage-specific weekly (BSW) quantity/frequency approach was used [14, 30]. Questions included type of beverage, type of container, and number of containers consumed weekly by the participant. This information was transformed into ethanol volume and then into US standard drink units (i.e. 14 grams of pure alcohol) [27].

Binge drinking—Women were asked how often they consumed 4 or more drinks on a single occasion. The response options included 8 categories ranging from “not at all” to “daily”.

Embedded questions from *T-ACE (Tolerance, Annoyed, Cut down, Eye-opener)* [31] and *TWEAK (Tolerance, Worried, Eye-opener, Amnesia, Cut down)* [32], which are sensitive screening instruments [33,34], were administered. T-ACE and TWEAK-Hold version have demonstrated acceptable external predictive validity among Russian women [35].

Chances for pregnancy—Participants were asked about sexual intercourse and use of contraception during the 6 months prior to the interview or, for those currently pregnant, 6 months prior to pregnancy. Those reporting intercourse without contraception were coded positive for pregnancy potential. A second binary indicator was coded positive if the woman endorsed actively trying to conceive. Risk for AEP among non-pregnant women was defined as at-risk alcohol consumption (4 or more drinks on one occasion or 8 or more drinks per week) plus the chance or intent to become pregnant [36].

Data Analysis

Generalized estimating equations (GEE) were used to estimate overall-sample and stratum-specific means (or proportions), standard errors for the consumption and demographic variables, and to compare across chance of pregnancy groups. The GEE estimation of mean and variance functions was dependent on variable type and used the Normal moment equations for symmetric and continuous demographic variables (e.g. age), Poisson moments and a log link function for frequency outcomes (e.g. number of drinks, binge frequency), binomial moments and a logit link function for dichotomous variables (e.g. any binging), and multinomial moments and generalized logit link functions for polytomous, unordered, and ordinal variables. Following a recommendation of Hardin and Hilbe [37] for GEE used with a small number of clusters (7 clinics in this study), a robust sandwich estimator of standard error (modified for clustering structure) was calculated, assuming the independence-model covariance structure within clinics.

Four strata were formed for analysis by crossing the interview location (SPB or NNR) and pregnancy status (pregnant vs. non-pregnant). For the pregnant subsample, within-subject comparisons were performed using pre-pregnancy vs. during pregnancy consumption. Random effects Poisson and logistic regression models were constructed [38,39] to assess the significance of these within-subject differences using a sandwich estimator of standard errors and controlling for a grand mean centered city covariate. In addition, non-pregnant

women's *concurrent* reports about drinking were compared to pregnant women's *retrospective* reports about drinking in the 3 months prior to the pregnancy.

RESULTS

Sample descriptive information

The average age of non-pregnant women was 29 years; the average pregnant participant was 28 years old and at 21 (SD = 9.0) weeks of gestation. Pregnant women were more likely to be married or cohabitating (90%) compared to non-pregnant women (57%). SBP site participants had significantly higher education and income, fewer employed women, and more urban residences, as expected [40].

Non-pregnant women's alcohol consumption

Across both locations, non-pregnant women's reports about their *current* drinking indicated that 89% consumed alcohol and 65% reported binge episodes in the last 3 months, including 47% in NNR and 28% in SPB reported having at least monthly binges. The significant differences between NNR and SPB women's average weekly consumption (2.60 drinks/ week in NNR and 2.06 in SPB), and frequencies of any binge drinking indicated higher consumption among non-pregnant women in NNR ($p<0.05$) (see Table 1).

Non-pregnant at-risk drinking varied by definition from 2% (BSW) to 65% (binge drinking), reflecting a modal drinking pattern of lower average weekly consumption punctuated with binges. Binge risk fluctuated across the 4 sample strata as shown by significant interactions between location and pregnancy status on binge drinking [$z(N=638)=2.95$, $p<0.01$] (see Table 1).

Pregnant women's alcohol consumption

Among pregnant women, 20% reported consuming any alcohol and the average weekly consumption was 0.84 drinks/week, with no significant site differences (Table 2). Pregnant women at both study locations reported lower alcohol consumption compared to non-pregnant women (Tables 1 and 2). Differences between pregnant and non-pregnant groups were significant for drinking prevalence [$z(N=626)=2.30$, $p<0.03$], weekly amounts for drinkers only, and for the full sample [$z(N=351)=2.79$, $p<0.01$ and $z(N=626)=2.90$, $p<0.01$, respectively]. No one in the NNR sample reported a binge after pregnancy recognition, while 5.6% [95% C.I. = (0.03,0.11)] of the SPB sample reported at least one binge, 3.5% of which were less than monthly. T-ACE and TWEAK-HOLD scores also indicated greater risk among SPB pregnant women (Table 2).

We further investigated the relationship between number of weeks of gestation and alcohol consumption. Gestation length was examined as a continuous predictor and a trimester categorical factor with neither version being predictive of the number of drinkers, consumption amounts, or binge drinking. The sole significant comparison involved weekly alcohol consumption amount reported by women who were in their first and second trimester and continued to drink while pregnant. Reports indicated higher consumption by first trimester pregnant women (1.1 drinks/week) compared to women in their second trimester of pregnancy (0.7 drinks/week). However, there was no difference between either first or second trimester vs. third trimester (0.9 drinks/week).

Within-subject changes among pregnant women

Among pregnant women, 81% retrospectively reported alcohol use in the 3 months prior to pregnancy recognition compared to 20% reporting alcohol use during pregnancy. For the drinking status variable, estimated subject-specific [41] odds ratio of drinking in the 3

months prior to pregnancy was 0.01, a statistically significant decrease in drinking probability [z(N=301)=−4.86, p<0.01]. Similarly, Poisson models predicted a significant, subject-specific 68% decrease in drinking amount among women who continued to drink during pregnancy [z(N=242)=−12.41, p<0.01] and a 91% decrease in amount of weekly drinking for the full sample of pregnant women [z(N=301)=−7.68, p<0.01]. The sample ratios of before to during pregnancy average weekly consumption amount for the subgroup of women who continued to drink during pregnancy were 2.81:0.83, which indicated that women who continued drinking during pregnancy were those who were drinking more prior to pregnancy; however, even this group decreased their drinking substantially after pregnancy recognition. Combined, these between group and within group analyses suggest substantial declines after pregnancy recognition at both sites.

Chances of pregnancy

Among 347 non-pregnant women, 192 (44% in SPB and 70% in NNR; p<0.01) were sexually active and not using contraception consistently. Women's reasons for not using contraception included less enjoyment of sex (13%), trying to conceive (11%), partner's unwillingness (11%), trouble remembering (7%), side effects (6%), unavailability (5%), drinking and not thinking about contraception (4%), expense (2%), doubting contraception effectiveness (1%), and religious/moral beliefs (0.5%). Notably, among pregnant women, only 59% in SPB and 65% in NNR reported trying to conceive during the 6 months prior to the pregnancy, indicating that almost two-thirds of pregnancies were unplanned.

Risk for AEP

Women trying to conceive and those with a chance to become pregnant did not differ significantly from women who were using contraception regularly or were not sexually active in alcohol use prevalence and weekly drinking amounts (Table 1). Interaction terms comparing proportions of at-risk drinking in the 3 subgroups were non-significant and suggested that women who may become pregnant do not reduce their drinking and have drinking patterns similar to those of women with little or no changes of pregnancy. In SPB, women with a chance of pregnancy had higher binge prevalence than those who might not become pregnant (respectively, 66% vs. 47%, p<0.05). Based on combined contraception use and at-risk alcohol consumption, 32% of currently non-pregnant women in SPB and 54% in NNR would be classified as at-risk for an AEP.

Concurrent vs. retrospective reports of non-pregnant drinking

Retrospective reports by pregnant women about their drinking in the 3 months prior to pregnancy were compared with concurrent non-pregnant women's reports of current drinking (Table 3). Interactions between location and report type (retrospective vs. concurrent) were found for drinking prevalence [[z(N=619)=3.14, p<0.01] and consumption among pregnant women and pregnant drinkers only [z(N=619)=5.35, p<0.01 and z(N=528)=3.66, p<0.01, respectively]. These interactions suggest that pregnant women in NNR retrospectively reported lower pre-pregnancy alcohol consumption compared to non-pregnant women's concurrent reports, while in SPB pregnant women's retrospective reports were similar to non-pregnant women's concurrent reports. It is not clear whether this finding reflects lower pre-pregnancy drinking among pregnant women in NNR, or greater social desirability bias among pregnant women in NNR.

DISCUSSION

Results from this survey of 648 Russian women in public OB/GYN clinics suggest a number of conclusions about AEP risk in Russia. The majority of women consume alcohol and binge drinking is the modal drinking pattern in Russian women currently. This pattern is

especially concerning because it produces the high peak blood alcohol concentrations that are most harmful for fetal development [42;43]. Rates of women's alcohol use and binge drinking in this study are similar to recent reports about Russian women's drinking [14,15] but higher than reported previously [10,12,13]. The most likely explanations are data collection differences (e.g. interviews rather than questionnaires and imbedding alcohol questions in women's health surveys) and the sharp recent increase in women's drinking in Russia. The confluence of widespread binge drinking and a high proportion of women who might become pregnant suggests a substantial AEP risk in Russia. Compared to the estimated 2% of childbearing-age women at risk for AEP in the US, with the highest proportions found among women in jails (21%) and in substance abuse treatment centers (24%) [44], we found AEP risk among 32% of general population women in SPB and 54% in NNR.

As expected, most pregnant Russian women report drinking less than their non-pregnant counterparts, which replicates prior cross-sectional studies. New within-subjects findings from this study confirm that pregnant women substantially reduce drinking compared to their retrospective pre-pregnancy levels. Binge drinking after pregnancy recognition declined by a factor of 10 but did not disappear completely. About 6% in SBP had at least one binge and around 20% continued to consume alcohol after pregnancy recognition, both of which are higher than US and some other international levels [45–47]. This study pregnant drinking rate is similar to the recent 26% figure reported by Grjibovski et al. [48], but lower than the 50%–60% rates reported by Kristjanson et al. [14] and by Chambers et al. [15]. Between study differences may reflect, as indicated by Kesmodel [47], variations in definitions and methods or possibly recent positive changes in health beliefs and drinking after pregnancy recognition reported from other countries [45].

Unfortunately, no drinking reductions were found prior to pregnancy recognition, neither when a woman might have become pregnant nor when she was intentionally trying to conceive. Around these reproductive landmarks, women consumed alcohol at approximately the same rates and amounts as women who were unlikely to become pregnant. Of special note, women who were trying to conceive did not reduce their drinking, and 61% of these women in SPB 72% in NNR reported binge drinking.

Some limitations of the study should be mentioned. Despite the fact that a large majority of Russian women attend public women's clinics, those who receive no OBGYN or prenatal care were not sampled, and these groups may include the highest risk women. The study found substantial differences between SBP and NNR, which suggests that regional variations are important and thus our findings may not be representative of all Russian women. Data were limited to self-reports, but as discussed earlier these tend to be reliable among volunteers in health settings, as was the case here. Reports of pre-pregnancy drinking by pregnant women may be affected by retrospective biases. The possible effects of any seasonal variations in alcohol use could not be ascertained given the sampling timeframe.

The study has a number of implications for AEP prevention in Russia. The preconception period appears to be an important window that should be addressed. Drinking around the time of conception is concerning because this is a particularly sensitive period for teratologic insult [49–51]. Targeting the preconception period in AEP prevention, as suggested by Floyd et al. [6], appears particularly germane in Russia. There is good reason to believe that public health prevention strategies targeted at this window could be successful. Alcohol consumption is already a self-modifiable behavior for most Russian women. Although there may be a small number of alcohol dependent women for whom stopping or cutting down is unlikely or difficult, most Russian women reduce their drinking routinely during pregnancy, largely because they believe this is part of a healthy pregnancy lifestyle [52]. It seems

reasonable to presume that these women would be able to do likewise when planning a pregnancy by simply extending their current behavioral change mechanisms and health beliefs backward in time to cover the pre-conceptual period.

Women who are not planning a pregnancy but who use contraception inconsistently or not at all pose a different challenge. In the current study, this group of women was virtually indistinguishable in terms of their alcohol consumption from women in the general population with little chance for pregnancy. Data from currently pregnant women who became pregnant without planning suggest that many of these women would stop or reduce drinking once they identified a pregnancy. However, they may see little reason to do so when pregnancy is unintended or the result of inconsistent contraception. For this group of women, improving consistent contraception may be equally or more salient than changing their drinking behavior. A preconception dual-focus (alcohol use/pregnancy planning) approach might be particularly considered. Given the reach of women's clinics in Russia, these might be particularly useful settings for dual focus prevention efforts.

Acknowledgments

This project was supported by Grant Number R21TW006745 from the National Institutes for Health (NIH)--National Institute on Alcohol Abuse and Alcoholism (NIAAA), Fogarty International (FIC) Center to the University of Oklahoma Health Sciences Center. The content is solely the responsibility of the authors and does not necessarily represent the official views of the NIH/NIAAA/FIC. The investigators wish to thank Marcia Russell, PhD, of Prevention Research Center; Robert Sokol, MD, of Wayne State University School of Medicine; Lee Ann Kaskutas, DrPH, of the Alcohol Research Group; and Ulrik Kesmodel, MD, PhD, of University of Aarhus, Denmark for consultations on measures and acknowledge the contributions of John Mulvihill, MD, Mark Wolraich, MD, and Michelle Kees, PhD, of OUHSC; Jacqueline Bertrand, PhD, of the Centers for Disease Control; Oleg Erishev, MD, of Bekhterev Research Institute; Edward Riley, PhD, of San Diego State University; Alexander Palchik, MD, and Vladimir Shapkaitz, MD, of St. Petersburg Pediatric Academy; Maria Potapova, Alla Ioffe, and Maxim Gusev of St. Petersburg State University; and Olga Gluzdova and Oksana Maslennikova of Nizhniy Novgorod State Pedagogical University.

REFERENCES

1. Streissguth AP, O'Malley K. Neuropsychiatric implications and long-term consequences of fetal alcohol spectrum disorders. Seminars in Clinical Neuropsychiatry. 2000; 5(3):177–190. Available from PubMed PMID: 11291013. [PubMed: 11291013]
2. Jacobson J, Jacobson S. Effects of prenatal alcohol exposure on child development. Alcohol Research & Health. 2002; 26(4):282–286. Available from PubMed PMID: 12875038. [PubMed: 12875038]
3. Barr HM, Streissguth AP. Identifying maternal self-reported alcohol use associated with fetal alcohol spectrum disorders. Alcoholism: Clinical & Experimental Research. 2001; 25(2):283–287.
4. Willford J, Leech S, Day N. Moderate prenatal alcohol exposure and cognitive status of children at age 10. Alcohol Clin Exp Res. 2006; 30:1051–1059. [PubMed: 16737465]
5. Denny CH, Tsai J, Floyd RL, Green PP. Alcohol use among pregnant and non-pregnant women of childbearing age—United States, 1991–2005. MMWR Morb Mortal Wkly Rep. 2009; 58:529–532. [PubMed: 19478721]
6. Floyd RL, Ebrahim SH, Boyle CA. Observations from the CDC. Preventing alcohol-exposed pregnancies among women of childbearing age: the necessity of a preconceptional approach. Journal of Women's Health & Gender-Based Medicine. 1999; 8:733–736.
7. World Health Organization. Dept. of Mental Health and Substance Abuse. GENACIS. In: Obot, IS.; Room, R., editors. Alcohol, gender and drinking problems: perspectives from low and middle income countries. Geneva: 2005.
8. Stickley A, Razvodovsky Y, McKee M. Alcohol mortality in Russia: a historical perspective. Public Health. 2009; 123:20–26. [PubMed: 19084882]
9. Herlihy, P. The alcoholic empire: vodka & politics in late imperial Russia. Oxford: Oxford University Press; 2002.

10. Bobak M, McKee M, Rose R, Marmot M. Alcohol consumption in a national sample of the Russian population. Addiction. 1999; 94:857–866. [PubMed: 10665075]
11. Onischenko, G. 2007. Об усилении надзора за производством и оборотом алкогольной продукцией. [Strengthening the supervision over the production and sale of alcohol products] Resolution N. 7, Moscow. Russian. 2011-04-29. URL: http://rospotrebnadzor.ru/c/journal/view_article_content?groupId=10156&articleId=82037&version=1.0. (Archived by WebCite® at http://www.webcitation.org/5yJgzoUXj)
12. Malyutina S, Bobak M, Kurilovitch S, Ryizova E, Nikitin Y, Marmot M. Alcohol consumption and binge drinking in Novosibirsk, Russia, 1985–95. Addiction. 2001; 96:987–995. [PubMed: 11440608]
13. Perlman F. Drinking in transition: trends in alcohol consumption in Russia, 1994x02013;2004. BMC Public Health. 2010; 10:691. PMCID: PMC2997093. [PubMed: 21070625]
14. Kristjanson AF, Wilsnack SC, Zvartau E, Tsoy M, Novikov B. Alcohol use in pregnant and non-pregnant Russian women. Alcohol Clin Exp Res. 2007; 31:299–307. [PubMed: 17250623]
15. 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. 2006; 38:133–137. [PubMed: 16905438]
16. Goransson M, Magnusson ˚A, Bergman H, Rydberg U, Heilig M. Fetus at risk: prevalence of alcohol consumption during pregnancy estimated with a simple screening method in Swedish antenatal clinics. Addiction. 2003; 98(11):1513–1520. [PubMed: 14616177]
17. Tough S, Tofflemire K, Clarke M, Newburn-Cook C. Do women change their drinking behaviors while trying to conceive? An opportunity for preconception counseling. Clin Med Res. 2006; 2:97–105. [PubMed: 16809401]
18. Sukhanova LP. Статистика родовспоможения как фактор обеспечения качества акушерской и перинатальной помощи в России. (Statistics of obstetric aid as a factor of providing quality of obstetric and perinatal care in Russia). Information Analytical Report Social Aspects of Public Health. 2008 Russian. 2011-04-29. URL: http://vestnik.mednet.ru/content/view/47/30/. Accessed: 2011-04-29.(Archived by WebCite® at http://www.webcitation.org/5yJhAEPVM).
19. Sokol RJ, Martier SS, Ager JW. The T-ACE questions: practical prenatal detection of risk-drinking. American Journal of Obstetrics & Gynecology. 1989; 160:868–870.
20. Russell M. Assessment tools for drinking in pregnancy: T-ACE, TWEAK, and others. Alcohol Health and Research World. 1994; 18:55–61.
21. 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.
22. Kesmodel U, Olsen SF. Self reported alcohol intake in pregnancy: comparison between four methods. J Epidemiol Community Health. 2001; 55:738–745. [PubMed: 11553658]
23. Kesmodel U, Frydenberg M. Binge drinking during pregnancy--is it possible to obtain valid information on a weekly basis? Am J Epidemiol. 2004 Apr 15; 159(8):803–808. [PubMed: 15051590]
24. Babor TF, Steinberg K, Anton R, Del Boca F. Talk is cheap: measuring drinking outcomes in clinical trials. Journal of Studies on Alcohol. 2000; 61:55–63. [PubMed: 10627097]
25. Maisto, SA.; Connors, GJ. Using subject and collateral reports to measure alcohol consumption. In: Litten, RZ.; Allen, J., editors. Measuring alcohol consumption: psychosocial and biological methods. Towota, NJ: Humana Press; 1992.
26. Sobell, LC.; Sobell, MB. Alcohol consumption measures. In: Allen, JP.; Wilson, V., editors. Assessing alcohol problems. 2nd ed.. Rockville, MD: National Institute on Alcohol Abuse and Alcoholism; 2003.
27. National Institute on Alcohol Abuse and Alcoholism (NIAAA). Helping patients who drink too much: A clinician's guide (DHHS publication). 2005
28. National Institute on Alcohol Abuse and Alcoholism (NIAAA). NIAAA Council approves definition of binge drinking. NIAAA Newsletter. 2004 Winter;3:3.

29. 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]
30. Kesmodel U, Kesmodel PS, Larsen A, Secher NJ. Use of alcohol and illicit drugs among pregnant Danish women, 1998. Scand J Public Health. 2003; 31:5–11. [PubMed: 12623518]
31. Sokol RJ, Martier SS, Ager JW. The T-ACE questions: practical prenatal detection of risk-drinking. American Journal of Obstetrics & Gynecology. 1989; 160:868–870.
32. Russell M. Assessment tools for drinking in pregnancy: T-ACE, TWEAK, and others. Alcohol Health and Research World. 1994; 18:55–61.
33. Dawson DA, Das A, Faden VB, Bhaskar B, Krulewitch CJ, Wesley B. Screening for high- and moderate-risk drinking during pregnancy: a comparison of several TWEAK-based screeners. Alcoholism-Clinical and Experimental Research. 2001; 25:1342–1349.
34. Russell M, Martier SS, Sokol RJ, Mudar P, Jacobson S, Jacobson J. Detecting risk drinking during pregnancy: a comparison of four screening questionnaires. Am J Public Health. 1996; 86:1435–1439. [PubMed: 8876514]
35. Bard D, Balachova B, Bonner B, Chaffin M. Screening for FAS/ARND risk among pregnant and non-pregnant Russian women: a concurrent and predictive validity investigation. Forthcoming 2011.
36. Floyd RL, Sobell M, Velasquez MM, Ingersoll K, Nettleman M, Sobell L, Mullen PD, Ceperich S, von Sternberg K, Bolton B, Skarpness B, Ngaraja J. Preventing alcohol-exposed pregnancies: a randomized controlled trial. American Journal of Preventive Medicine. 2007; 32:1–10. [PubMed: 17218187]
37. Hardin, JW.; Hilbe, J. Generalized estimating equations. Boca Raton, FL: Chapman & Hall/CRC; 2003.
38. Gibbons RD, Hedeker D. Random effects probit and logistic regression models for three-level data. Biometrics. 1997; 53:1527–1537. [PubMed: 9423267]
39. Hedeker D, Gibbons RD. A random-effects ordinal regression model for multilevel analysis. Biometrics. 1994; 50:933–944. [PubMed: 7787006]
40. Russian Federation Federal State Statistics Service Федеральная служба государственной статистики.Демографический ужегодник России - 2009. Russian. 2011-04-29. URL: http://www.gks.ru/bgd/regl/B09_16/Main.htm. (Archived by WebCite® at http://www.webcitation.org/5yJhuVcBq).
41. Zeger SL, Liang KY, Albert PS. Models for longitudinal data - a generalized estimating equation approach. Biometrics. 1988; 44:1049–1060. [PubMed: 3233245]
42. Maier SE, West JR. Drinking patterns and alcohol-related birth defects. Alcohol Res Health. 2001; 25:168–174. [PubMed: 11810954]
43. Strandberg-Larsen K, Neilsen NR, Grønbeck M, Andersen PK, Olsen J, Andersen AM. Binge drinking in pregnancy and risk of fetal death. Obstetrics and Gynecology. 2008 March; 111(3): 602–609. [PubMed: 18310362]
44. Project CHOICES Intervention Research Group. Reducing the risk of alcohol-exposed pregnancies: A study of a motivational intervention in community settings. Pediatrics. 2003; 111:1131–1135. [PubMed: 12728125]
45. Nilsen P, Holmqvist M, Hultgren E, Bendtsen P, Cedergren M. Alcohol use before and during pregnancy and factors influencing change among Swedish women. Acta Obstetricia et Gynecologica. 2008:768–774.
46. Caetano R, Ramisetty-Mikler S, Floyd LR, McGrath C. The epidemiology of drinking among women of child-bearing age. Alcoholism: Clinical and Experimental Research. 2006 June; 30(6): 1023–1030.
47. Kesmodel U. Binge drinking in pregnancy – frequency and methodology. American Journal of Epidemiology. 2001; 154(8):777–782. [PubMed: 11590091]
48. Grjibovski A, Bygren LO, Svartbo B, Magnus P. Housing conditions, perceived stress, smoking, and alcohol: determinants of fetal growth in Northwest Russia. Acta Obstet Gynecol Scand. 2004; 83(12):1159–1166. [PubMed: 15548149]

49. Coles C. Critical periods for prenatal alcohol exposure: evidence from animal and human studies. Journal of the National Institute on Alcohol Abuse and Alcoholism, Alcohol Health and Research World. 1994; 18:22–29.

50. Day NL, Leech SL, Richardson GA, Cornelius MD, Robles N, Larkby C. Prenatal alcohol exposure predicts continued deficits in offspring size at 14 years of age. Alcohol Clin Exp Res. 2002; 26:1584–1591. [PubMed: 12394293]

51. Jacobson SW, Jacobson JL, Sokol RJ, Chiodo LM, Corobana R. Maternal age, alcohol abuse history, and quality of parenting as moderators of the effects of prenatal alcohol exposure on 7.5-year intellectual function. Alcohol Clin Exp Res. 2004; 28:1732–1745. [PubMed: 15547461]

52. Balachova TN, Bonner BL, Isurina GL, Tsvetkova LA. Use of focus groups in developing FAS/FASD prevention in Russia. Substance Use & Misuse. 2007; 42:881–894. [PubMed: 17613951]

Table 1

Non-pregnant Women's Alcohol Consumption: Estimates and Confidence Intervals

	Full sample[a]		Non-pregnant, current reports only	
Non-pregnant women's consumption (N-648)[a]	**Proportion or Mean**	**95% Confidence Interval**	**SPB (N=196) Proportion/Mean**	**NNR (N=151) Proportion/Mean**
Drinkers (proportion)	0.85	(0.78 – 0.91)	0.86	0.93
Binge drinkers (proportion)	0.60	(0.50 – 0.68)	0.55[e]	0.77[e]
Drinks/week, 8 or more (proportion)	0.02	(0.01–0.04)	0.03	0.01
Drinks/week (mean)	2.12	(1.94 – 2.32)	2.06[e]	2.60[e]
Drinks/week Drinkers only [b]	2.49	(2.30 – 2.69)	2.39	2.81
At-risk for pregnancy (N=469)[c]				
Drinkers (proportion)	0.86	(0.79 – 0.90)	0.91	0.93
Binge drinkers (proportion)	0.61	(0.53 – 0.69)	0.66	0.77
Drinks/week (mean), drinkers	2.13	(1.93 – 2.35)	2.19	2.52
Trying to conceive (N=222)[d]				
Drinkers (proportion)	0.78	(0.69 – 0.85)	0.86	0.94
Binge drinkers (proportion)	0.51	(0.39 – 0.63)	0.61	0.72
Drinks/Week (mean), drinkers	1.58	(1.39 – 1.79)	1.64	2.24

[a] Full sample data include both non-pregnant women's reports about current drinking and pregnant women's retrospective reports about pre-pregnancy drinking

[b] Drinkers only row excludes abstainers

[c] At-risk for pregnancy - a subgroup of non-pregnant women who reported sexual activity without contraception during the past 6 months

[d] Trying to conceive - a subgroup of non-pregnant women who reported sexual activity without contraception, with the intent to conceive, during the past 6 months

[e] Indicates significant (α_{set}=0.05) Bonferroni-adjusted Multiple Comparisons between SPB and NN

Table 2

Pregnant Women's Alcohol Consumption Prior and During Pregnancy[a] (N=301)

	SPB Pregnant (N=146)		NNR Pregnant (N=155)	
	Prior to Pregnancy	**During Pregnancy**	**Prior to Pregnancy**	**During Pregnancy**
Drinkers (proportion)	0.85[a]	0.22[a]	0.77[a]	0.18[a]
Binge drinkers (proportion)	0.65[a]	0.06[a]	0.43[a]	0.00[a]
Drinks/week (mean), drinkers only	2.71[ab]	0.72[a]	1.99[ab]	0.96[a]
T-ACE (proportion at risk)	0.62[b]		0.30[b]	
TWEAK-HOLD (proportion at risk)	0.53[b]		0.17[b]	

[a] Indicate significant (α_{set}=0.05) Bonferroni-adjusted Multiple Comparisons between prior and during pregnancy

[b] Indicate significant (α_{set}=0.05) Bonferroni-adjusted Multiple Comparisons between SPB and NN

Table 3

Non-pregnant women's concurrent reports and pregnant women's retrospective reports about their pre-pregnancy drinking

	SPB (N=342)		NNR (N=306)	
	Non-pregnant women, concurrent (N=196)	**Pregnant, pre-pregnancy retrospective (N=146)**	**Non-pregnant women, concurrent (N=151)**	**Pregnant, pre-pregnancy retrospective (N=155)**
Drinkers (proportion)	0.86	0.85	0.93[a]	0.77[a]
Binge drinkers (proportion)	0.55	0.65	0.77[a]	0.43[a]
Drinks/week (mean), drinkers only	2.39	2.71[b]	2.81[a]	1.99[ab]
T-ACE (proportion at risk)	0.62	0.67	0.60[a]	0.30[a]
TWEAK-HOLD (proportion at risk)	0.53	0.57	0.38[a]	0.17[a]

[a] Indicate significant (α_{set}=0.05) Bonferroni-adjusted Multiple Comparisons between retrospective and concurrent reports

[b] Indicate significant (α_{set}=0.05) Bonferroni-adjusted Multiple Comparisons between SPB and NN