

# Paternal Drinking, Intimate Relationship Quality, and Alcohol Consumption in Pregnant Ukrainian Women\*

LUDMILA N. BAKHIREVA, M.D., PH.D., M.P.H.,<sup>†</sup> SHARON C. WILSNACK, PH.D.,<sup>†</sup> ARLINDA KRISTJANSON, PH.D.,<sup>†</sup> LYUBOV YEVTUSHOK, M.D.,<sup>†</sup> SVETLANA ONISHENKO, M.D.,<sup>†</sup> WLADIMIR WERTELECKI, M.D.,<sup>†</sup> AND CHRISTINA D. CHAMBERS, PH.D., M.P.H.<sup>†</sup>

*Departments of Pediatrics and Family and Preventive Medicine, University of California, San Diego. 9500 Gilman Drive MC 0828, La Jolla, California 92093*

**ABSTRACT. Objective:** Maternal alcohol consumption during pregnancy and fetal alcohol spectrum disorders (FASDs) represent a significant public health problem. The influence of the male partner's alcohol consumption patterns and the quality of the partner's intimate relationship might be important factors to consider in the design of successful FASD prevention programs. **Method:** As part of the Collaborative Initiative on Fetal Alcohol Spectrum Disorders, 166 pregnant women in two regions in Ukraine participated in an in-person interview at an average gestational age of 18–19 weeks. Subjects were classified cross-sectionally as abstainers/light drinkers ( $n = 80$ ), defined as low or no consumption of alcohol in the periconceptional period and none in the most recent 2 weeks of pregnancy; discontinuers ( $n = 43$ ), defined as moderate to heavy alcohol use in the periconceptional period but none during the most recent 2 weeks of pregnancy; or continuing drinkers

( $n = 43$ ), defined as continued moderate to heavy alcohol use within the most recent 2 weeks of pregnancy. Women also reported on their partner's drinking behavior and on the quality of their intimate relationship. **Results:** Heavy paternal drinking was significantly associated with both continuing maternal drinking in the most recent 2 weeks (adjusted odds ratio [OR] = 34.1; 95% CI [5.9, 195.8]) and being a risky drinker only around conception (adjusted OR = 27.0; 95% CI [5.0, 147.7]). In addition, women who consumed alcohol during pregnancy had lower mean scores for satisfaction with partners' relationship and ability to discuss problems ( $p < .05$ ) compared with light drinkers/abstainers. **Conclusions:** This study suggests that development of partner-based interventions, as opposed to those solely focused on maternal drinking, might be warranted as a strategy to prevent FASD. (*J. Stud. Alcohol Drugs*, 72, 536–544, 2011)

**D**ESPITE PUBLIC HEALTH EFFORTS to minimize alcohol consumption among pregnant women, recent data from the Centers for Disease Control and Prevention (CDC) indicate that 11%–12% of pregnant U.S. women consume alcohol during pregnancy (Anderson et al., 2006; CDC, 2009). The prevalence of any alcohol consumption among pregnant women in Europe has been estimated in the range of 23%–54% (Alvik et al., 2006; Donnelly et al., 2008; Göransson et al., 2003; Palma et al., 2007), and some studies report that as many as 23%–30% of women continue to drink after pregnancy recognition (Alvik et al., 2006; Göransson et al., 2003). In the United States, older, more educated, employed, and unmarried women may have a higher prevalence of alcohol use during pregnancy (CDC, 2009; Waterson et al., 1990). This is in contrast to nonpregnant women, in whom higher rates of drinking are reported among younger as opposed to older women (Wilsnack et al., 2006). Alcohol is a well-established teratogen, and prenatal exposure to alcohol

can lead to the development of fetal alcohol spectrum disorders (FASDs). FASD encompasses a continuum of clinical presentations caused by prenatal alcohol exposure, ranging from full-blown fetal alcohol syndrome (FAS) to partial FAS, alcohol-related birth defects, and alcohol-related neurodevelopmental disorder (Hoyme et al., 2005).

Although a specific pattern of malformations associated with prenatal alcohol exposure, termed FAS, was described in the 1970s (Jones et al., 1973), attempts to accurately estimate the prevalence of FASD have been challenging because of numerous methodological issues. These include diagnostic criteria, passive versus active surveillance, and difficulties with ascertainment of milder cases of FASD in the absence of fetal alcohol-induced birth defects. The prevalence of full-blown FAS ranges from 0.5–2.0 per 1,000 live births in the general population to 9.8 per 1,000 live births in high-risk groups (May and Gossage, 2001). The prevalence of the entire continuum of FASD has been estimated to be as high as 10 per 1,000 live births (1%) in the United States (Lupton et al., 2004; May and Gossage, 2001), a level that is at least

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<sup>†</sup>Correspondence may be sent to Christina D. Chambers at the above address or via email at: [chchambers@ucsd.edu](mailto:chchambers@ucsd.edu). Ludmila N. Bakhireva is

with the Departments of Pharmacy Practice and Administrative Sciences and Family/Community Medicine, University of New Mexico, Albuquerque, NM. Sharon C. Wilsnack and Arlinda Kristjanson are with the Department of Clinical Neuroscience, University of North Dakota School of Medicine & Health Sciences, Grand Forks, ND. Lyubov Yevtushok and Svetlana Onishenko are with Omni-Net Centers, Rivne and Kherson Oblasts, Ukraine. Wladimir Wertelecki is with the Department of Medical Genetics, University of South Alabama, Mobile, AL.

as high as the prevalence of autism spectrum disorders. Increased risks for alcohol-related birth outcomes also include spontaneous abortion, stillbirth, preterm delivery, neonatal death, sudden infant death syndrome, prenatal and postnatal growth deficiencies, and cognitive and behavioral problems (Iyasu et al., 2002; Russell and Skinner, 1988).

Although paternal drinking per se is not thought to be teratogenic, to the extent that it encourages similar behavior in the mother, it may represent a risk factor for FASD. Similarly, for pregnant women, the quality of their intimate relationships with their partners might be an important predictor of their drinking habits during pregnancy. In addition, alcohol use and intimate partner violence are often closely related behaviors, thus representing a serious public health issue (Caetano et al., 2001; Graham et al., 2008). The severity of physical aggression has been shown to be significantly greater when one or both partners were drinking compared with incidents that did not include alcohol consumption (Graham et al., 2010). Moreover, the link between substance use and intimate partner violence, including physical assaults, psychological aggression, and sexual coercion, may be stronger among pregnant women than among nonpregnant women (Martin et al., 2003).

Furthermore, to our knowledge, the influence of paternal drinking and associations between the quality of the partner relationship and the mother's alcohol consumption during pregnancy have not been extensively explored. To the extent that these factors are related, development of partner-based interventions, as opposed to interventions solely focused on the mother, among pregnant or pre-pregnant couples might be warranted. The purpose of this report is to describe the relationship of paternal alcohol consumption, as reported by the mother, and the quality of the intimate couple's relationship to maternal alcohol use during pregnancy in a sample of pregnant women in Ukraine.

## Method

### *Study design and sampling*

A prospective cohort study was conducted among pregnant women in Ukraine as a part of the Collaborative Initiative on Fetal Alcohol Spectrum Disorders (CIFASD) supported by the U.S. National Institute on Alcohol Abuse and Alcoholism. CIFASD is a multidisciplinary initiative conducted in several countries around the world. Its primary goals are to further characterize the entire spectrum of physical and neurodevelopmental outcomes resulting from fetal alcohol exposure and to develop prevention and treatment approaches for FASD. The detailed methodology of CIFASD studies has been described elsewhere (Arenson et al., 2010; Mattson et al., 2010).

The present analysis used cross-sectional data collected at the time of enrollment. The sample consisted of 166

pregnant women who were recruited between 2004 and 2006 during the first stage of the CIFASD project in Ukraine. Pregnant women who reported to one of two regional clinical facilities for prenatal ultrasound, a routine procedure for pregnant women in Ukraine, served as the study population. During the first visit, patients were screened for eligibility into the study as either risky-to-moderate drinkers or light drinkers/abstainers. The methodology of the screening process has been described elsewhere (Chambers et al., 2006). Briefly, women were asked to report quantity and frequency of alcohol consumption in the month just before pregnancy and during the most recent month of pregnancy. In addition, standard screening questionnaires—TWEAK, T-ACE, CAGE, and the Alcohol Use Disorders Identification Test (AUDIT)—were administered to capture any signs of problem alcohol use in the past 12-month period (Russell et al., 1996).

Women met the criteria for enrollment in the alcohol-exposed group if they reported at least 4 episodes of consuming five or more standard drinks, at least 5 episodes of three to four standard drinks, or at least 10 episodes of one to two standard drinks either in the month just before pregnancy or in the most recent month before the interview. In addition, women who scored above the cutoff scores on the screening questionnaires ( $\geq 2$  on the TWEAK or  $\geq 6$  on the AUDIT) were eligible for recruitment into the exposed group. Women met the criteria for enrollment in the comparison group if they reported no more than two drinks in any week in the month before their last menstrual period, no more than two drinks in any week in the most recent month before enrollment, no occasions in those time periods where they drank two drinks in a single day, and scores below the established cutoff on the screening questionnaires (i.e., TWEAK < 2, AUDIT < 6). All four inclusion criteria must have been met for a woman to enroll in the comparison group.

Patients who met eligibility criteria for risky exposure and the next screened woman who met eligibility criteria for low or no exposure from the screener were offered participation, and those who agreed signed a statement of informed consent. Of those women who were eligible and offered participation, the overall participation rate in both the exposed and unexposed groups was approximately 76%. Demographics of nonparticipants did not differ substantially from those who agreed to take part in the study. The most common reasons for nonparticipation were lack of interest and time constraints. Enrolled subjects then participated in the baseline interview, typically during the same clinic visit in which they were screened and at an average of 18.8 weeks gestation. The interviews were conducted at the clinic by trained study staff members (obstetric nurses or geneticists). All interviewers underwent extensive training in interviewing techniques for assessing alcohol consumption conducted by the principal investigator (C.D.C.). The study was approved by the human subjects committees at both the University of

California, San Diego, and the Lviv Medical University in Ukraine.

### Measures

At the baseline interview, patients were asked to report their alcohol consumption during the periconceptional period (typical week around the time of conception) and during the 2 weeks immediately preceding the interview, using the Timeline Followback (TLFB) procedure (Sobell and Sobell, 1992). Subjects were asked to report exact quantities of specific alcoholic beverages, which were then converted into absolute ounces of alcohol per day and per drinking day using the standard TLFB methodology (Bowman et al., 1975; Jacobson et al., 2002). The baseline questionnaire also included questions about demographic characteristics (age, marital status, education level, socioeconomic status), medical and reproductive health (gravidity, parity, outcomes of prior pregnancies), the current pregnancy (pregnancy dating, any complications, timing of pregnancy recognition, and access to prenatal care), tobacco and illicit drug use, and use of any medications. Socioeconomic status was assessed by the Hollingshead four-factor index, which incorporates both education and occupation of the mother, father, or other family support person (Hollingshead, 1975). Pregnancy dates were confirmed by ultrasound examinations.

Women who were married, were living with a partner, or had a noncohabiting romantic partner were asked to report on their partner's drinking behavior and on the quality of their intimate relationship. Women were asked to assess their partner's alcohol consumption on the standardized AUDIT with embedded TWEAK questionnaires, which included questions about potential signs of alcohol abuse (e.g., the need for a drink first thing in the morning) and about quantity and frequency of alcohol consumption, including frequency of heavy drinking episodes (consuming five or more standard drinks on one occasion).

With respect to quality of relationship, women were asked to report on a 5-point Likert-type scale (a) how happy they were with their relationship, (b) how easy it was for them to talk about feelings or problems with their partner, and (c) how often they quarreled with their partner and whether the quarrels involved physical fights. The relationship questions were drawn from the National Study of Health and Life Experiences of Women, a 20-year longitudinal study of drinking among U.S. women (Wilsnack et al., 1991, 1998, 2004, 2006), where they were initially adapted from instruments with demonstrated reliability and validity (Spanier, 1976).

### Data analysis

Based on the data obtained on quantity and frequency of alcohol consumption around conception and during pregnancy, women were classified into three groups. Women who

denied any alcohol use around the time of conception and in the most recent 2 weeks of pregnancy or who consumed no more than two drinks a week in any week and less than two drinks on any one day covered by the interview were classified as abstainers/light drinkers ( $n = 80$ ). Subjects who reported more frequent or heavier alcohol use in the periconceptional period but quit during pregnancy were classified as discontinuers ( $n = 43$ ). Finally, women who reported more frequent or heavier alcohol use and continued use of alcohol in the most recent 2 weeks were classified as continuing drinkers ( $n = 43$ ).

The distributions of maternal characteristics among study groups were compared by chi-square analyses. The crude associations between paternal drinking as reported by the mother (i.e., frequency of any drinking and heavy episodic drinking and TWEAK score above the established cutoff) and the dependent variable of maternal drinking category were examined by chi-square analyses. To further examine the association between paternal frequent or heavy episodic drinking as reported by the mother (defined for this analysis as consuming alcohol three or more times per week and/or consuming five or more drinks on an occasion) and the dependent variable of maternal drinking category (being a light drinker/abstainer, consuming alcohol only around conception and then quitting, or being a continuing drinker in the most recent 2 weeks), a multinomial logistic regression analysis was conducted adjusting for maternal age, marital status, family socioeconomic status, maternal smoking status, pregnancy planning, and parity. The chi-square test for the proportional odds assumption in this model yielded a  $p$  value of .003, indicating that the assumption was not met; thus, a polychotomous logistic regression model (i.e., the generalized logit model), instead of a cumulative logit model, was used. In the polychotomous logistic regression, two logits were constructed: (a) comparing the odds of the mother being a continuing drinker versus a light drinker/abstainer and (b) comparing the odds of the mother being a risky drinker but quitting versus being a light drinker/abstainer.

To assess the association between the quality of the couple's relationship and maternal drinking, mean scores for each variable describing relationship quality were compared among the three maternal drinking groups by analysis of variance. The analysis was repeated using an analysis of covariance, adjusting for maternal age, gravidity, pregnancy planning, and family socioeconomic status. In addition, a nonparametric Wilcoxon-Mann-Whitney rank-sum test was used to compare medians of the quality of relationship variables across the three study groups. Finally, an analysis of the relationship between paternal drinking and maternal drinking that tested two-way interaction terms for paternal drinking and each of the relationship variables was conducted. An  $\alpha$  of .05 was the cutoff used to determine statistical significance. All statistical analyses were conducted using SAS 9.1 (SAS Institute Inc., Cary, NC).

## Results

As presented in Table 1, there were some differences among the three maternal drinking categories with respect to age distribution, marital status, socioeconomic status, pregnancy planning, and tobacco use. Specifically, compared with light drinkers/abstainers, heavier drinkers were more likely to be older than 30 years of age ( $p = .032$ ), were marginally more likely to be single or separated/divorced ( $p = .087$ ), and had lower socioeconomic status ( $p = .002$ ). A larger proportion of continuing drinkers had an unplanned pregnancy (65.1%) compared with women who drank around the time of conception but quit (48.8%) or who were light drinkers or abstained from alcohol (35.0%;  $p = .006$ ). In addition, 23.8% of continuing drinkers and 11.6% of women who were risky drinkers in early pregnancy but quit were current smokers, whereas none of the light drinkers/abstainers reported smoking in the most recent 2 weeks ( $p < .0001$ ).

In this study population, alcohol consumption, including heavy drinking, was quite prevalent among male partners of study participants, as reported by the mothers. According to maternal reports, 15.1% of the partners consumed alcohol at least three times a week, with 18.7% of partners engaging in heavy episodic drinking behavior. Almost half of the partners (43.4%) scored above the cutoff point on the TWEAK questionnaire, indicative of potential problem alcohol use. Overall, 25.9% of male partners were categorized as frequent (three or more times/week) or heavy episodic (five or more drinks/occasion) drinkers based on the assessments provided by study participants (data not shown).

Paternal drinking was highly correlated with maternal drinking during pregnancy. Overall, 51.2% of pregnant women continued to drink during pregnancy if their partners were heavy episodic or frequent drinkers, compared with 17.1% of women whose partners were not categorized as frequent or heavy episodic drinkers ( $p < .001$ ; data not shown). As shown in Table 2, pregnant women who consumed alcohol

TABLE 1. Maternal characteristics by alcohol consumption study groups ( $N = 166$ )

Characteristics	Light drinkers/ abstainers ( $n = 80$ ) %	Risky drinkers around conception, quit in pregnancy ( $n = 43$ ) %	Continuing drinkers last 2 weeks ( $n = 43$ ) %	$p^a$
Age				.032
<18 years	5.0	9.3	4.7	
18–30 years	83.8	58.1	69.8	
>30 years	11.2	32.6	25.6	
Marital status				.087
Single	1.3	11.6	9.3	
Married or living with partner	96.3	83.7	83.7	
Separated/divorced	2.5	4.7	7.0	
Maternal education level				.182
Less than high school	3.8	7.0	14.0	
High school or vocational school	43.8	46.5	51.2	
Some college or higher	52.5	46.5	34.9	
Socioeconomic status <sup>b</sup>				.002
Average or higher	77.2	58.1	46.5	
Below average	22.8	41.9	53.5	
Pregnancy planning				.006
Planned	65.0	51.2	34.9	
Unplanned	35.0	48.8	65.1	
Gravidity				.108
Primigravid	46.3	46.5	27.9	
Multigravid	53.8	53.5	72.1	
Parity				.102
Nulliparous	62.3	70.7	47.2	
Multiparous	37.7	29.3	52.8	
Smoking status				<.0001
Never smoker	97.5	51.2	50.0	
Past smoker, quit before pregnancy	0.0	9.3	7.1	
Past smoker, quit during pregnancy	2.5	27.9	19.1	
Current smoker	0.0	11.6	23.8	
	<i>M (SD)</i>	<i>M (SD)</i>	<i>M (SD)</i>	
Gestational age at enrollment, years	19.1 (6.5)	17.0 (7.6)	19.8 (7.7)	.159

Notes: <sup>a</sup>Chi-square; <sup>b</sup>based on the Hollingshead family four factor socioeconomic score.

TABLE 2. Association between paternal alcohol consumption and maternal drinking in pregnancy: Results of univariate analysis ( $N = 166$ )

Characteristics of paternal drinking as reported by the mother	Maternal drinking						$p^a$
	Light drinkers/abstainers ( $n = 80$ )		Risky drinkers around conception, quit in pregnancy ( $n = 43$ )		Continuing drinkers last 2 weeks ( $n = 43$ )		
	$n$	%	$n$	%	$n$	%	
Frequency of paternal drinking							
<3 times/week	78	97.5	31	72.1	32	74.4	<.0001
≥3 times/week	2	2.5	12	27.9	11	25.6	
Heavy episodic drinking							
No	80	100	30	69.8	25	58.1	<.0001
Yes (≥5 drinks/occasion)	0	0	13	30.2	18	41.9	
Risky drinking <sup>b</sup>							
No	78	97.5	24	55.8	21	48.8	<.0001
Yes	2	2.5	19	44.2	22	51.2	
Paternal TWEAK score							
<2	67	87.0	17	39.5	7	16.3	<.0001
≥2 (hazardous drinking)	10	13.0	26	60.5	36	83.7	

Notes: <sup>a</sup>Chi-square; <sup>b</sup>frequent (≥3 times/week) or heavy episodic (≥5 drinks/occasion) drinker.

during the most recent 2 weeks of pregnancy were much more likely to have partners who were risky drinkers and/or had signs of problem alcohol use, as indicated by elevated TWEAK scores, compared with women who abstained from alcohol or were light drinkers (all  $p$  values < .0001). As shown in Table 3, risky paternal drinking, as reported by the mother, was significantly associated with both continuing maternal drinking (adjusted odds ratio [OR] = 34.1; 95% CI [5.9, 195.8]) and being a risky drinker but quitting (adjusted OR = 27.0; 95% CI [5.0, 147.7]). The strength of association was greater among continuing drinkers; however, con-

fidence intervals overlap. The association was independent of maternal age, marital status, family socioeconomic status, maternal smoking status, pregnancy planning, and parity.

In a univariate analysis, mean scores for variables describing the quality of intimate relationships (i.e., satisfaction with the relationship, ability to discuss problems, and problem resolution) were all significantly lower among alcohol-using pregnant women (Table 4). Interestingly, continuing drinkers had lower mean scores than women who used alcohol in early pregnancy but discontinued later on. Results of the Wilcoxon–Mann–Whitney rank-sum test to compare

TABLE 3. Association between paternal alcohol consumption and maternal drinking in pregnancy ( $N = 166$ )

Risk factors	Risky drinkers around conception vs. light drinkers/abstainers		Continued drinking during last 2 weeks vs. light drinkers/abstainers	
	aOR <sup>a</sup>	[95% CI]	aOR <sup>a</sup>	[95% CI]
Risky paternal drinking, yes vs. no <sup>b</sup>	27.0	[5.0, 147.7]	34.1	[5.9, 195.8]
Maternal age				
≤18 years vs. 18.1–30 years	3.4	[0.58, 19.7]	2.2	[0.25, 19.6]
>30 years vs. 18.1–30 years	7.8	[2.06, 29.4]	3.3	[0.83, 13.3]
Marital status				
Single vs. married/partner	0.51	[0.03, 8.9]	0.34	[0.02, 6.8]
Separated vs. married/partner	0.46	[0.01, 22.3]	1.7	[0.05, 59.8]
Family socioeconomic status				
Below average vs. average/above	2.0	[0.67, 6.3]	1.9	[0.61, 6.2]
Maternal smoking				
During pregnancy vs. never/past	25.2	[4.7, 135.2]	28.5	[5.1, 160.5]
Pregnancy planning				
Unplanned vs. planned	1.4	[0.50, 4.1]	2.5	[0.82, 7.5]
Parity				
Multiparous vs. nulliparous	0.44	[0.13, 1.49]	1.97	[0.57, 6.7]

Notes: aOR = adjusted odds ratio; CI = confidence interval. <sup>a</sup>Results of polychotomous logistic regression; odds ratios are adjusted for all variables in the model. <sup>b</sup>Frequent (≥3 times/week) or heavy episodic (≥5 drinks/occasion) drinker as reported by the mother.



TABLE 4. Association between couple relationship characteristics and maternal drinking during pregnancy ( $N = 166$ )

Relationship variable	Model <sup>a</sup>	Risky drinkers around conception, quit in pregnancy			$p^a$
		Light drinkers/abstainers ( $n = 80$ ) $M (SD/SE)$	( $n = 43$ ) $M (SD/SE)$	Continuing drinkers last 2 weeks ( $n = 43$ ) $M (SD/SE)$	
Satisfaction with the relationship <sup>b</sup>	Unadjusted	3.91 (0.60)	3.74 (0.82)	3.35 (0.48)	<.001
	Adjusted	4.01 (0.10)	3.84 (0.10)	3.54 (0.11)	.001
Ability to discuss problems with partner <sup>c</sup>	Unadjusted	3.95 (0.57)	3.70 (0.91)	3.40 (0.69)	<.001
	Adjusted	3.91 (0.11)	3.74 (0.11)	3.56 (0.12)	.032
Problem resolution with partner <sup>d</sup>	Unadjusted	3.37 (0.77)	3.05 (1.11)	2.79 (0.89)	.003
	Adjusted	3.20 (0.14)	2.99 (0.15)	2.83 (0.16)	.111

Notes: <sup>a</sup>Unadjusted means, standard deviations and  $p$  value using analysis of variance; adjusted means, standard errors, and  $p$  value using analysis of covariance (ANCOVA); each ANCOVA model is adjusted for maternal age, gravidity, pregnancy planning, and family socioeconomic status. <sup>b</sup>Women were asked to report how happy they are with their relationship on a 1–5 scale, with 1 being *extremely unhappy* and 5 being *extremely happy*. <sup>c</sup>Women were asked to report how easy it is for them to talk about their feelings or problems with their partner on a 1–5 scale, with 1 being *very difficult* and 5 being *very easy*. <sup>d</sup>Women were asked to report how often they quarrel with their partner, with 1 being *we don't only quarrel, we also have physical fights* and 4 being *we almost always solve disagreements without quarreling*.

medians across study groups yielded similar results (all  $ps < .001$ ; data not shown). After adjustment for maternal age, gravidity, pregnancy planning, and socioeconomic status, differences in problem resolution became statistically nonsignificant ( $p > .10$ ). However, satisfaction with the relationship ( $p = .001$ ) and ability to discuss problems ( $p = .032$ ) were still significantly lower among alcohol users independent of other risk factors.

Finally, in models evaluating the interaction between paternal drinking and each of the relationship variables with respect to maternal drinking as the outcome, only satisfaction with the relationship met the criteria for significant interaction. In the model containing the independent variables paternal drinking, satisfaction with the relationship, and the two-way interaction term for Satisfaction With the Relationship  $\times$  Paternal Drinking, the two main effect terms as well as the interaction term were statistically significantly associated with maternal drinking in the expected direction (i.e., the combination of a higher level of paternal drinking with a lower level of satisfaction was associated with the greatest risk of continued maternal drinking; data not shown). In the remaining models, two-way interaction terms for Paternal Drinking  $\times$  Ability to Discuss Problems or Problem Resolution were not statistically significant.

## Discussion

In Eastern Europe, countries of the former Soviet Union have some of the highest alcohol consumption prevalence rates (Pomerleau et al., 2008; Popova et al., 2007). Most studies report much heavier and more prevalent alcohol consumption in men compared with women. For instance, in

Russia and Ukraine, the rates of monthly heavy episodic or heavy alcohol use vary from 31% to 82% for men and from 1% to 11% for women (Bobak et al., 1999, 2004; Malyutina et al., 2001; Pakriev et al., 1998; Webb et al., 2005). Two recent surveys conducted in Russia estimated the prevalence of any alcohol consumption among pregnant women to be as high as 25.5%–60%; however, results should be generalized with caution (Grjibovski et al., 2002; Kristjanson et al., 2007). Prior research also indicates that women in post-Soviet societies experience a much greater level of psychosocial distress than men, although at least one study suggests that such elevated stress levels do not translate to risky alcohol consumption patterns in women (Cockerham et al., 2006). Research conducted primarily in the United States has found that discrepancies between drinking patterns of marital partners are associated with indicators of marital discord, including lower relationship satisfaction, poorer communication, and increased risks of intimate partner violence (Homish and Leonard, 2007; Mudar et al., 2001; Wiersma et al., 2010).

Results of our study indicate that paternal frequent or heavy episodic drinking, as reported by the mother, was strongly associated with maternal drinking during pregnancy independent of other risk factors. The magnitude of association was extremely high in this study population, and a dose–response pattern was observed between maternally reported paternal drinking and the pattern of maternal drinking, with the strongest association for women who continued drinking in the most recent 2 weeks of pregnancy. Although the effects of smoking, age, parity, unintended pregnancy, race/ethnicity, and education on alcohol consumption during pregnancy have been studied quite extensively (Chambers et al., 2005; Ethen et al., 2009; Perreira and Cortes, 2006),

studies evaluating the potential effect of the partner's drinking patterns on female drinking in expectant couples are limited (Leonardson et al., 2007). An extensive body of literature, mostly from English-speaking countries, demonstrates that married or cohabiting partners tend to have similar substance use patterns, problem drinking, and alcohol use disorders (Wilsnack et al., 2010). In expectant parents, a few prior studies reported positive associations between partners' levels of smoking and their levels of alcohol consumption (Everett et al., 2005, 2007; Waterson et al., 1990). In addition, pregnant women may be more likely to reduce their alcohol consumption if their partners also decrease their consumption (Waterson et al., 1990).

Our study also demonstrated that the quality of the intimate partner relationship, specifically satisfaction with the relationship and ability to discuss problems with the partner, was lower among women who consumed moderate to heavy amounts of alcohol during pregnancy compared with light drinkers/abstainers, independent of other risk factors. Even among women who reported risky alcohol use in the periconceptional period, women who quit drinking in pregnancy had slightly higher relationship quality than those who continued drinking later in pregnancy. The impact of spouses and romantic partners on individuals' drinking patterns and problems is already important for treatment and prevention programs, as in couple's therapy (Walitzer and Dermen, 2004). However, much of the recent research has focused on intimate partner violence, with less attention paid to how drinking relates to other aspects of intimate relationships. Heavy episodic drinking, intoxication, and drinking problems have been associated with more conflict and dissatisfaction in intimate relationships for male and female drinkers (Fischer et al., 2005; Whisman et al., 2000). Our study examined this association in expectant couples.

Several limitations of the study should be mentioned. First, the generalizability of the results may be limited because alcohol consumption patterns among pregnant women in Ukraine likely differ in at least some respects from drinking patterns of pregnant women in other countries. Second, the magnitude of association between maternally reported paternal and maternal drinking might be explained, at least partially, by the selection of high-risk women for the sample of continuing drinkers, given the overall study's primary focus on FASD epidemiology. Third, the level of paternal drinking was ascertained through surrogate reporters (their female partners) and thus could be subject to reporting bias. However, prospective maternal interviews before knowledge of pregnancy outcomes should have minimized recall bias with respect to both maternal and paternal drinking habits. Fourth, wide confidence intervals for the association between maternal and paternal drinking patterns might be indicative of limited statistical power (even though results were statistically significant given the magnitude of association) or the effect of other factors not captured in this study. In addition,

odds ratios might overestimate the true effect size when the background prevalence of the condition under study is high; however, the prevalence of continued alcohol consumption among pregnant women in the United States typically does not exceed 10%.

Although in this study we primarily focused on the separate associations between partner drinking vis-à-vis maternal drinking and quality of the intimate partner relationship vis-à-vis maternal drinking, we did find that partner drinking significantly interacted with relationship satisfaction relative to maternal drinking outcomes, suggesting that the effect of partner drinking on maternal drinking behavior may be moderated by some aspects of relationship quality in a synergistic fashion. Future research should examine the relationship between concordant versus discordant patterns of partner drinking, relationship quality, and continued risky drinking in pregnancy. For example, in couples where relationship quality is poor but only the woman drinks heavily, does the woman's risk of continued drinking in pregnancy differ from situations in which both partners drink? In addition, it will be important to explore how characteristics of the larger cultural context (e.g., societal-level gender inequality and economic development) interact with individual-level variables such as paternal drinking and relationship quality to influence alcohol consumption patterns in expectant couples. Future research might also explore the value of intervening to reduce the alcohol consumption of the father and/or the couple as a strategy to reduce maternal drinking in pregnancy.

In summary, our research indicates that in this sample of pregnant women in Ukraine the male partner's alcohol consumption patterns, as reported by the mother, were strongly associated with maternal drinking during pregnancy after adjustment for several other risk factors. Paternal drinking and the quality of the partners' intimate relationship are important factors that cannot be ignored in developing effective approaches to primary and secondary FASD prevention.

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