

Maternal Drinking Patterns and Drug Use Increase Impact of Terrorism Among Pregnant Women Attending Prenatal Care

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Abstract: None available.

Full Text: Headnote ABSTRACT: This is the first known study of the psychosocial impact of terrorism among pregnant women. Ninety-nine women attending prenatal care in New York City were interviewed after September 11, 2001 and classified by drinking patterns. Current drinkers with a history of alcohol dependence perceived less social support following the disaster compared to other women. History of illegal drug use prior to maternal awareness of pregnancy was related to a weaker maternal-fetal bond. Greater exposure to trauma predicted stronger subjective effects and more depressive symptoms. These data support findings in non-pregnant samples that exposure of terrorist attacks predicts the subjective experience. KEY WORDS: terrorism, disaster, pregnant women, alcohol and drug use. INTRODUCTION The September 11, 2001 (9/11) attacks on the World Trade Center (WTC) caused the largest man-made disaster on U.S. soil with the loss of life 18 times greater than the Oklahoma City bombings of the Murrah Federal Building. In a random digit-dialed epidemiological comparison of residents of Oklahoma City and Indianapolis (Smith, Christiansen, Vincent, & Hann, 1992) increased alcohol use was related to proximity to the bombings and exposure to the trauma. However in a non-random clinical sample of Oklahoma City bombing victims, Pfefferbaum and Doughty (2001) report that increased drinking was related to the extent of injury rather than degree of exposure or proximity to the event. North and colleagues (North, Nixon, Shariat, Mallonee, McMillan, Spitznagel, & Smith, 1999) present the position that among survivors directly exposed to the Oklahoma City bombing, the only ones who had trouble with alcohol were those with prior alcohol problems. Findings of drinking behavior following the September 11th attacks also have been mixed. Increased drinking did not emerge in a cross-sectional sample of 1,009 Manhattan residents (DeLisi, Maurizio, Yost, Papparozi, Fulchino, Katz, Altesman, Biel, Lee, Stevens, 2003) or a longitudinal daily self-report study in a sample of 86 New England residents (Perrine, Schröder, Forester, McGonagle-Moulton, & Huessy, 2004). A 3% increase was found among current drinkers living in New York, New Jersey, and Connecticut using a post-9/11 module of the Behavioral Risk Factor Surveillance Survey (BRFSS) an ongoing epidemiologic study (CDC, 2002). In another epidemiologic sample of 988 New Yorkers living below 110th street in Manhattan more people drank during the week following the attacks (64.4%) compared to the week before (59.1%) (Vlahov, Galea, Resnick, Ahern, Boscarino, Bucuvalas, Gold, & Kilpatrick, 2002). Increased drinking was also found in a sample of adults meeting current DSM-IV (APA, 1994) criteria for alcohol dependence who recently had been discharged from a New England detoxification center but no increased drinking among patients who had been discharged from detox prior to the attacks (Zywiak, Stout, Trefry, LaGrutta, Lawson, Khan, Swift, & Schneider, 2003). Overall, these data indicate that pregnant women who survived terrorism and are current drinkers or had a prior history of drinking problems may be more vulnerable to the disaster than other pregnant survivors without a current or past alcohol problem. However, to our knowledge no one has studied the impact of terrorism on psychosocial variables in a sample of pregnant women. Pregnant women are particularly vulnerable to a disaster because a critical task of pregnancy is to protect the viability of the fetus (Leifer, 1977). This concern for protecting the fetus' well-being extends to changes in maternal behaviors. Because pregnant women are warned about potential harm to the fetus from alcohol (Ockene, Ma, Zapka, Pbert, Goins, & Stoddard, 2002) most stop or reduce their substance use after pregnancy recognition (Reading, Campbell, Cox, & Sledmere, 1982). Thus, among pregnant women the relationship of maternal alcohol use to a community disaster such as the 9/11 terrorist attacks may be better

studied by investigating long-term alcohol drinking patterns and lifetime history of alcohol problems. The aim of this study was to determine if maternal drinking patterns predicted a greater impact of the 9/11 terrorist attacks on psychosocial variables. It was hypothesized that compared to lifetime abstainers or ex-drinkers, current drinkers would report: greater subjective effects of the attacks, greater negative impact on the maternal-fetal bond, less perceived social support following the disaster, and more current depressive symptoms. METHODS Sample Ninety-nine pregnant women were recruited from one of four New York City Hospital prenatal clinics. The interviews occurred from 11 to 31 weeks after September 11th (21.3 ± 5.7). To increase the probability that binge drinkers and heavy drinkers were recruited, women who were not raised in the American culture were excluded (Wilsnack & Wilsnack, 1995) and only women who had moved to the continental U.S. before the age of six were included. As this was a cross-sectional study women were not recruited until their third trimester to include alcohol-abusing women who often fail to obtain prenatal care until late in their pregnancies (Howard & Beckwith, 1996). Interviewers recruited participants by distributing flyers in the clinic waiting room. No statistics were kept on the refusal rate. IRB committees of Columbia University and each participating hospital approved this study. Instruments Drinker type: Drinker type was measured using a modified Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS) (Grant & Hasin, 1992). The AUDADIS is a standardized instrument that has been used in national and international epidemiologic studies and has shown good reliability and validity (Grant, Dawson, Stinson, Chou, Kay, & Pickering, 2003; Grant, Hartford, Dawson, Chou, & Pickering, 1995; Hasin, Carpenter, McCloud, Smith, & Grant, 1997; Canino, Bravo, Ramirez, Febo, Rubio-Stipec, Fernandez, & Hasin, 1999). Drinker type is classified based on consumption of at least 12 drinks within a 12-month period. In this study the AUDADIS was modified to classify current drinkers as those women whose last drink occurred during their pregnancy (estimated gestational weeks +2 weeks) even though they may have drunk fewer than 12 drinks throughout the past 12 months. Exdrinkers were classified as women who had drunk at least 12 drinks within a 12-month period and whose last drink was prior to her pregnancy (estimated gestational age +2 weeks). Lifetime Abstainers were classified according to the AUDADIS: women who had drunk fewer than 12 drinks during a 12-month period or fewer than 12 drinks throughout their entire lives. Alcohol dependence: Lifetime history of alcohol dependence was determined using the AUDADIS section of alcohol-related symptoms (Grant & Hasin, 1992) which is based on the Diagnostic and Statistical Manual of Mental Disorders (Fourth Edition) (DSM-IV) (APA, 1994). The DSM-IV classifies alcohol dependence as a cluster of three or more alcohol-related symptoms co-occurring during a 12-month period if they create clinically significant impairment or distress. Drug use: Quantity and frequency of tobacco, marijuana, stimulants, opiates, Club Drugs, hallucinogenics and inhalants were measured using a widely used screen for obstetric populations (Streissguth, Grant, Barr, Brown, Martin, Mayock, Ramey, & Moore, 1991). Proximity: Women were recruited from three distinct New York City neighborhoods: the Bronx, Harlem, and the Lower East Side. The women's prenatal clinics differed in distance from the terrorist event with the Lower East Side closest and the Bronx the farthest in distance. Proximity to the disaster was operationalized as the neighborhood clinic and the clinic variable was treated as ordinal. Exposure: Exposure to terrorism-related trauma was assessed with an exploratory question asking each woman to explain how she had been affected by the terrorist attacks. Answers were then coded into 17 categories ranging from "Saw on TV only", to "A loved one died." Categories were rank ordered by severity from low (1) to very high (4) and frequencies were calculated. Subjective effect of attacks: Women were asked to indicate on a 4-point ordinal scale "How directly affected" they had been by the terrorist attacks. Answers ranged from 1 (not at all) to 4 (very affected). Effect of 9/11 on maternal-fetal bonding: An original 4-item, 5-point scale was created and was added to a standardized scale of attachment. The questions explore the impact of the terrorist attacks on the maternal-fetal bond. Questions were: "Since the attacks ... : 'I don't want to bring a child into this world'; 'I wish I had gotten an abortion'; 'I'm unsure I want this baby'; 'I feel less bonded to this baby'. Individual item scores ranged from "definitely yes" = 1, to "definitely no" = 5. A mean was calculated by averaging the sum of the items' scores. Lower scores indicate a weaker bond and therefore a

greater effect of the attacks. Cronbach's alpha coefficient was .84. Support: Perceived social support following the disaster was measured using a modification of the Multidimensional Scale of Perceived Social Support (MSPSS) (Zimet, Dahlem, Zimet, & Parley, 1988). Women were asked if they perceived a change in support from three sources (baby's father, woman's family, and friends) and if they perceived an increase in support from those three sources. The six items were rated on a 7-point scale and an average was derived from the six items. Cronbach's alpha coefficient for the scale was .82. Depression: Current depressive symptoms were measured using the Center for Epidemiological Studies Depression (CESD) scale (Radloff, 1977). The CESD is a 20-item, 4-point scale that has been used extensively with economically disadvantaged samples, has shown high internal consistency, and is moderately stable over several weeks (Wasserman, Rauh, Brunelli, Garcia-Castro, & Necos, 1990). Two items that co-occur during pregnancy (restless sleep, poor appetite) were eliminated from the total score to avoid confounding. The revised CESD had a reliability coefficient of .75 in this sample, which was similar to the original scale (.78). Statistical Analyses Demographic characteristics of the sample were analyzed using standard descriptive univariate statistics. Basic rules of statistics were applied to test the relationship between predictor and criterion variables. Of this sample 25 (25.3%) women were current drinkers, 33 (33.3%) were ex-drinkers and 41 (41.4%) were lifetime abstainers. Bivariate analyses were conducted to explore the relationship of the grouping variable (drinker type) and outcome variables: perceived support following the attacks; the effect of the attacks on maternal-fetal bonding; current depressive symptoms; and the subjective effect of the disaster. General Linear Model (GLM) analysis was employed to determine the impact of drinker type on the four outcomes controlling for confounders that emerged in descriptive analyses. In the multivariate analyses group (drinker type), lifetime history of terminated pregnancy, lifetime history of alcohol problems, and illegal drug use prior to pregnancy recognition were entered as fixed variables and the woman's neighborhood clinic was entered as a continuous weighted variable. RESULTS Descriptive Analyses of Sample As shown in Table 1, groups of drinkers were similar on most variables. Based on drinker type, women differed on whether they had a lifetime history of alcohol dependence ($p < .05$) and if they used illegal drugs prior to pregnancy recognition ($p < .01$). The groups also differed on the number of pregnancies they had terminated, with current drinkers reporting more than lifetime abstainers ($p < .05$). Neighborhood clinics differed by drinker type as well as by ethnicity $X^2(8) = 31.15, p < .001$. More current drinkers attended clinic in the Bronx while more lifetime abstainers attended clinic in Harlem. The Bronx sample was primarily Latina (58.1%) and African American (29.0%) while the Harlem sample was predominantly African American women (82.1%). Future analyses controlled for lifetime history of terminated pregnancies and clinic. Bivariate Relationship between Drinker Type and Outcome Variables Exposure: Exposure to terrorist-related trauma in the overall sample ranged from TV exposure only (35.4%) to experiencing a loved one's death (3.0%). No group differences were found in level of exposure. On average each group endorsed a medium level of exposure indicating that either they had become stranded following the attacks, had visited the epicenter of the disaster in the past, or currently knew someone who lived or worked in the neighborhood that was attacked. No group differences were found in the level of subjective effects of the disaster or on the overall effect of the terrorist event on their bond the fetus. Support: Significant differences emerged between groups of drinkers on perceived social support following the attacks. Current drinkers perceived less social support compared to lifetime abstainers ($p < .01$). Depression: CESD scores in the overall sample were elevated (15.1 ± 9.7) with current drinkers endorsing higher levels of current depressive symptomology compared to lifetime abstainers ($p < .05$).

Table 1
Participant Characteristics by Drinker Type

Characteristics	Participant Characteristics by Drinker Type			Test Value	p <
	Current Drinker (N = 25)	Ex-Drinker (N = 33)	Lifetime Abstainer (N = 41)		
Age (years)	25.3 ± 5.1	26.9 ± 6.6	25.3 ± 5.5	F (2,96) = 0.86	NS
Gestational age (weeks)	34.7 ± 3.4	32.6 ± 4.2	33.2 ± 4.2	F (2,96) = 2.05	NS
Number weeks interviewed after 9/11	19.8 ± 5.6	21.1 ± 6.0	22.4 ± 5.4	F (2,96) = 1.74	NS
Lifetime history alcohol dependence N (%)	16.7*	9.1	0.0*	X ² (2) = 6.63	.05
Drug use before recognized pregnancy N (%)	28.0**	18.2	2.4**	X ² (2) = 9.02	.01
Ethnicity N (%)				X ² (6) = 3.89	NS
African American	44.0	57.6	58.5		
Latina	40.0	33.3	22.0		
Caucasian	4.0	3.0	4.9		
Other	12.0	6.1	14.6		
Neighborhood N (%)				X ² (4) = 17.10	.01
Bronx	60.0**	24.2**	19.5		
Harlem	16.0	36.4	56.1		
Lower East Side	24.0	39.4	24.4		

* Indicates significant differences between groups at p < .05; ** Indicates significant differences between groups at p < .01; NS = Not significant.

Table 1
Participant Characteristics by Drinker Type

Characteristics	Participant Characteristics by Drinker Type			Test Value	p <
	Current Drinker (N = 25)	Ex-Drinker (N = 33)	Lifetime Abstainer (N = 41)		
Exposure to terrorist attacks N (%)				X ² (6) = 8.44	NS
Low	24.0	42.4	36.6		
Medium	36.0	27.3	26.8		
High	8.0	21.2	9.8		
Very High	32.0	9.1	26.8		
Father's status N (%)				X ² (6) = 12.13	NS
Boyfriend	68.0	45.5	72.5		
Husband	16.0	30.3	20.0		
Friend/Acquaintance	0.0	9.1	7.5		
Other/Unknown	16.0	15.2	0.0		
Reproductive History					
Number children living w/ woman	1.1 ± 1.5	1.2 ± 1.5	1.5 ± 1.2	F (2,96) = 0.84	NS
Pregnancies	4.2 ± 3.7	4.3 ± 3.5	3.8 ± 2.1	F (2,96) = 0.29	NS
Births	1.2 ± 1.6	1.8 ± 2.2	1.6 ± 1.3	F (2,96) = 0.91	NS
Terminated pregnancy	1.7 ± 2.3*	1.0 ± 1.5	0.6 ± 0.8*	F (2,96) = 4.02	.05
Miscarriages	0.3 ± 0.5	0.4 ± 0.7	0.6 ± 1.1	F (2,96) = 0.96	NS
Stillbirths	0.04 ± 0.2	0.09 ± 0.3	0.02 ± 0.2	F (2,96) = 0.87	NS

Values expressed in means and standard deviations unless noted. F = F test, X² = Chi Square, NS = not significant. * Indicates significant differences between groups at p < .05.

Multivariate Model Predicting Effect of Terrorist Attacks Drinker type: After controlling for confounding variables, drinker type and a history of alcohol dependence interacted to predict the level of perceived social support following the attacks, $F(1, 82) = 4.71, p = .03$, accounting for 5.4% of the variance in social support. Current drinkers with a history of alcohol dependence perceived less support following the attacks (2.10 ± 1.1) compared to ex-drinkers, with (3.86 ± 2.82) or without (3.55 ± 1.85) a history of dependence, or compared to lifetime abstainers (4.16 ± 0.01). Drug use: Illegal drug use prior to pregnancy recognition predicted the effect of the terrorist event on the maternal-fetal bond, $F(1, 83) = 6.80, p = .01$, and accounted for 7.6% of the variance in the strength of the maternal-fetal bond. Women who used illegal drugs prior to pregnancy recognition reported that the disaster had a greater effect on their maternal bond and were less bonded than women who did not use drugs prior to pregnancy recognition. Exposure: Exposure to trauma had a main effect on the woman's subjective experience of the disaster, $F(1, 83) = 18.98, p < .001$, and accounted for 18.6% of the woman's subjective experience of the attacks. There was also a main effect of exposure to the attacks on current depressive symptoms, $F(1, 83) = 3.88, p = .05$.

DISCUSSION An important finding of this study is that pregnant women who were classified as current drinkers and had a history of alcohol dependence were more likely to perceive their social support to be inadequate following the disaster. These data are consistent with other findings that alcohol use predicts fewer social contacts and less social support over time (Peirce, Frone, Russell, Cooper, & Mudar, 2000). Our data support Benitzhak and Verny's (2004) suggestion that some pregnant women may be at heightened risk from terrorism-induced stress if they lack social support. As weak social support is correlated with binge drinking, among pregnant women (Pascoe, Kokotailo, & Broekhuizen, 1995) a woman who perceives her social support is inadequate may put her fetus at risk for poor developmental outcomes related to alcohol exposure (NIAAA, 1997) compared to women who judge their social support is adequate. In normal samples of pregnant women social support especially from the baby's father is related to the strength of the maternal-fetal bond (Weaver & Cranley, 1983). Clinicians working with a pregnant woman may find that assessing social support from the baby's father is particularly important after a large-scale disaster.

Table 2
Relationship of Drinker Type and Psychosocial Variables

Characteristics	Current Drinker (N = 25)	Ex-Drinker (N = 33)	Lifetime Abstainer (N = 41)	F value	p ≤
Subjective effect of 9/11	2.84 ± 1.03	2.88 ± 1.05	2.84 ± 1.07	F (2,96) = 0.04	NS
Felt less bonded to fetus after 9/11	4.38 ± 0.78	4.09 ± 0.11	4.15 ± 0.06	F (2,96) = 1.75	NS
Current depressive symptoms	18.32 ± 10.97	15.79 ± 10.14	12.54 ± 7.90	F (2,96) = 3.01	NS
Perceived social support after 9/11	2.98 ± 1.53**	3.41 ± 1.28	4.09 ± 1.46**	F (2,96) = 5.04	.01

Values expressed in means and standard deviations. Post hoc analyses = Tukey HSD. ** Indicates significant differences between groups at p < .01; NS = Not significant.

Illegal drug use prior to pregnancy recognition predicted a greater impact of the terrorist attacks on the strength of the maternal-fetal bond. As maternal-fetal bonding is correlated with reduced substance use during pregnancy (Reading, Campbell, Cox, & Sledmere, 1982), terrorism may interfere with normal bonding and result in resumption of drug use prior to delivery. Increased social support may strengthen the bond (Weaver & Cranley, 1983) and subsequent mothering. Increased exposure to the terrorist event predicted elevated CES-D scores and corroborates other studies in non-pregnant samples (Ahern, Galea, Resnick, Kilpatrick, Bucuvalas, Gold, & Vlahov, 2002; Galea, Ahern, Resnick, Kilpatrick, Bucuvalas, Gold, & Vlahov, 2002). Overall, 49.5% met CES-D criteria for depressive symptoms. This proportion of pregnant women with depressed symptoms is elevated compared to a recent epidemiologic sample of pregnant women attending prenatal care (Marcus, Flynn, & Barry, 2003) but is similar to rates of 41.7% (Hobfoll, Ritter, Lavin, Hulsizer, & Cameron, 1995) and 44.4% (Lundy, Jones, Field, Nearing, Davalos, Pietro, Schanberg, & Kühn, 1999) found in samples of impoverished, inner-city, pregnant women. Reducing prenatal depression is important for improved reproductive outcomes as depression is associated with elevated cortisol and norepinephrine and reduced dopamine levels in the mother and neonate (Lundy et al., 1999). Our finding that exposure to a terrorist-related community disaster predicted a greater negative subjective experience of the attacks is corroborated by other research of the Oklahoma City bombing (Pfefferbaum & Doughty, 2001) as well as the September 11th attacks in New York City (DeLisi et al., 2003; Simeon, Greenberg, Knutelska, Schmeidler, & Hollander, 2003). As pregnant women who experience greater subjective distress may be more at risk for resumed drinking (Pfefferbaum & Doughty, 2001) women who live in closer proximity to the epicenter of a disaster may be more at risk for resuming drinking during pregnancy. In summary, our hypotheses were partially supported. Compared to ex-drinkers and lifetime abstainers, current drinkers were more impacted by the terrorist attacks in terms of their perception of social support if they had a lifetime history of alcohol dependence. Illegal drug use prior to pregnancy

recognition predicted the impact of the disaster on the maternal-fetal bond but Drinker type did not. Degree of exposure to the terrorist-related trauma predicted the presence of depressive symptoms and greater subjective effects of the attacks, but Drinker type did not. These findings must be considered in the context of the study design. Reliance upon self-report of alcohol and drug use may limit internal validity, but questions about alcohol and drug use were embedded (Daeppen, Yersin, Landry, Pecoud, &Decrey, 2000) within the context of ways the woman's life had changed since becoming pregnant, and about the effects of the terrorist attacks. To avoid discrepancies related to poor recall, calendar memory cues were used (Babor, Steinberg, Anton, &delBoca, 2000). For questions about illegal drug use, answers were self-administered, placed in an envelope and sealed by the subject (Harrison, 1997) increasing the level of anonymity which has produced high reports of drug use (Tourangeau, Jobe, Pratt, &Rasinski, 1997). These limitations notwithstanding, this is the first study we know of to investigate psychosocial characteristics of pregnant women exposed to a catastrophic terrorist event. Standardized measures were used and a substantial number of women were successfully interviewed. The study was conducted with a sample composed largely of minority participants whose disadvantaged social status places them at increased risk for poor pregnancy outcomes (Kramer, Seguin, Lydon, &Goulet, 2000; Alexander &Kogan, 1998). REFERENCES Ahern, J., Galea, S., Resnick, H., Kilpatrick, D., Bucuvalas, M., Gold, J., &Vlahov, D. (2002). Television images and psychological symptoms after the September 11 terrorist attacks. *Psychiatry*, 65(4), 289-300. Alexander, G.R., &Kogan, M.D. (1998). Ethnic differences in birth outcomes: The search for answers continues. *Birth*, 25, 787-793. American Psychiatric Association (APA). (1994). *Diagnostic and Statistical Manual of Mental Disorders*, 4th ed. D.O.: Washington, D.C. p. 181. Babor, T.F., Steinberg, K., Anton, R., &del Boca, F. (2000). Talk is cheap: Measuring drinking outcomes in clinical trials. *Journal of Studies on Alcohol*, 61, 55-63. Benitzhak, Y. &Verny, T.R. (2004). The nature of stress due to terrorism on pregnant women and their offspring. *Journal of Prenatal and Perinatal Psychology and Health*, 19(1), 65-74. Canino, G.J., Bravo, M., Ramirez, R., Febo, V.E., Rubio-Stipec, M., Fernandez, R.L., &Hasin, D. (1999). Spanish Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): Reliability and concordance with clinical diagnoses in a Hispanic population. *Journal of Studies on Alcohol*, 60, 790-799. Center for Disease Control and Prevention (CDC). (2002). Psychological and emotional effects of the September 11 attacks on the World Trade Center-Connecticut, New Jersey, and New York, 2001. *Morbidity and Mortality Weekly Report*, 51, 784-786. Daeppen, J.B., Yersin, B., Landry, U., Pecoud, A., &Decrey, H. (2000). Reliability and validity of the Alcohol Use Disorders Identification Test (AUDIT) imbedded within a general health-risk screening questionnaire: Results of a survey in 332 primary care patients. *Alcohol: Clinical &Experimental Research*, 24(5), 659-665. DeLisi, L.E., Maurizio, A., Yost, M., Papparozi, C.F., Fulchino, C., Katz, C.L., Altesman, J., Biel, M., Lee, J., &Stevens, P. (2003). A survey of New Yorkers after the Sept. 11, 2001, terrorist attacks. *American Journal of Psychiatry*, 160, 780-783. Galea, S., Ahern, J., Resnick, H., Kilpatrick, D., Bucuvalas, M., Gold, J., &Vlahov, D. (2002). Psychological sequelae of the September 11 terrorist attacks in New York City. *New England Journal of Medicine*, 346(13), 982-987. Grant, B.F., Dawson, D.A., Stinson, F.S., Chou, P.S., Kay, W., &Pickering, R. (2003). The Alcohol Use Disorder and Associated Disabilities Interview Schedule-IV (AUDADIS-IV): Reliability of alcohol consumption, tobacco use, family history of depression and psychiatric diagnostic modules in a general population sample. *Drug and Alcohol Dependence*, 71, 7-16. Grant, B.F., Hartford, T.C., Dawson, D.A., Chou, P.S., &Pickering, R. (1995). The Alcohol Use Disorder and Associated Disabilities Interview Schedule (AUDADIS): reliability of alcohol and drug modules in a general population sample. *Drug &Alcohol Dependence*, 39, 37-44. Grant, B.F., &Hasin, D.S. (1992). *Alcohol Use Disorders and Associated Disabilities Interview Schedule (AUDADIS)*. Bethesda, M.D.: National Institute on Alcohol Abuse and Alcoholism. Harrison, L. (1997). The validity of self-reported drug use in survey research: An overview and critique of research methods. In: L. Harrison &A. Hughes (Eds.). *The validity of self-reported drug use: Improving the accuracy of survey estimates*. National Institute on Drug Abuse (NIDA) Research Monograph, 167, D.C.: DHHS, NIH, NIDA; pp. 17-36. Hasin, D., Carpenter, K.M., McCloud, S., Smith,

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