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Children Exposed to Alcohol-Related Problems and DSM-5 Alcohol Use Disorder in San Juan, Puerto Rico

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Abstract

This paper estimates the proportion of children (17 and younger) exposed to an adult with an alcohol problem or alcohol use disorder (AUD) in San Juan, Puerto Rico. Data are from a household random sample of 1,510 individuals 18–64 years of age. A total of 20.9% of children in sample households were exposed to an adult with an alcohol problem, and 5.7% were exposed to an adult with DSM-5 AUD. These considerable proportions suggest that alcohol treatment and family support programs should include help for adults in the family, and special support for exposed children in the household.

Introduction

There is an extensive literature on the consequences during childhood and later adulthood of being raised in a household in which one or both parents have an alcohol use disorder (AUD) (Harter, 2000; Kearns-Bodking & Leonard, 2008; Lieberman, 2000; Schuckit et al., 2003). Some of these consequences include a greater risk of developing an AUD, a higher rate of externalizing behavior and internalizing symptoms, decreased response to alcohol's intoxicating effects, and difficulties in adult romantic relationships (Finn & Justus, 1997; Harter, 2000; Kearns-Bodking & Leonard, 2008; Lieberman, 2000).

Fewer efforts have been directed at estimating the number of children exposed to alcohol problems in U.S. households. Unfortunately, however, the existing estimates vary considerably. Russell et al. (1985) estimated that there were approximately 6.6 million children of alcoholics under the age of 18, and that one out of every eight Americans (12.5%) were the children of problem drinkers. Eigen and Rowden(1995) provided a larger estimate: 17.5 million children of alcoholics under the age of 18 lived in the United States. In a more recent study, Grant (2000) estimated that 15% of all U.S. children under the age of

18 (9.7 million children) were exposed to alcohol abuse and/or dependence in the family. Based on the 1995 National Alcohol Survey, Ramisetty-Mikler and Caetano (2004) estimated that the number of children in U.S. households exposed to an adult with an alcohol problem or to someone who was alcohol dependent was 11.5 million and 2 million, respectively. The Center of Behavioral Studies and Quality (2012) estimated that 7.5 million children, 10.5% of all children in the U.S., lived with parent with an alcohol problem. Finally, Kaplan et al. (2017), reported that 7.4% of individuals with parental responsibilities over children in a 2015 U.S. household sample reported that alcohol harmed a child they cared for in the past year.

No previous papers have focused on estimating the proportion of children that could be affected by an adult with an alcohol problem or an AUD in San Juan, Puerto Rico. Yet, this is an important part of assessing the harm done to others by those who drink excessively. An overall conceptual framework for assessment of alcohol's harm to others besides the drinker, which includes the family and the household has been described by Room et al. (2010). This assessment is particularly important for children because they are a highly vulnerable population, who have no or little means to avoid such a harm. In San Juan the proportion of children affected could be considerably high given that 16% of the men and 9% of the women reported a drinking-related social or health problem in the past 12 months (Caetano, Vaeth, & Canino, 2016b), and 38% of men and 16% of women were affected by AUD on a lifetime base (Caetano, Gruenewald, Vaeth, & Canino, 2017). This paper therefore estimates the number of children 17 years of age and younger living in a household in San Juan, Puerto Rico, with at least one adult with an alcohol problem or a DSM-5 defined AUD (American Psychiatric Association, 2013). The U.S. Census Bureau provides detailed information by age for the population in Puerto Rico. It is possible therefore to apply prevalence rates from representative household surveys to the population and estimate the number of individuals affected by any kind of health problem, including AUD.

This paper also examines levels of family cohesion/pride and the sociodemographic characteristics of families with children in which an adult has alcohol problems or a DSM-5 AUD. Family cohesion/pride is an important focus because in Latin cultures families provide considerable emotional support to relatives during both normal and stressful times (Ayón, Marsiglia, & Bermudez-Parsai, 2010; Coohy, 2001; Gallo, Penedo, Monteros, & Arguelles, 2009; Sabogal, Marín, Otero-Sabogal, Marín, & Perez-Stable, 1987). The decrease or loss of a close family life and accompanying loss of emotional support has been considered a risk factor for use of alcohol and illicit drugs among US-born Hispanics (M. Alegria et al., 2007; Marsiglia, Kulis, Parsai, & Garcia, 2009; Rivera et al., 2008). In Puerto Rico, high family cohesion/pride has been identified as a factor that shields individuals against drinking problems (Canino, Anthony, Freeman, Shrout, & Rubio-Stipec, 1993; Canino, Burnam, & Caetano, 1992; Warner, Canino, & Colon, 2001) and disruptive behavior associated with illicit drug use (Warner et al., 2001), and is protective against DSM-5 AUD. (Caetano, Vaeth, & Canino, 2016a).

Based on previous findings, we expect that households with children and with an adult with an alcohol problem or a DSM-5 AUD will have a lower level of family cohesion/pride (Caetano, Vaeth, et al., 2016a). Given that the identification of an alcohol problem is less

stringent than that of DSM-5 AUD, we also expect that the rate of children exposed to a parent with alcohol problems will be higher than that for children exposed to an adult with a AUD.

Methods

Sample and data collection

Interviews were conducted with 1,510 residents of the metropolitan area of San Juan between May 2013 and October 2014. Respondent selection followed a multistage cluster sampling procedure, with 220 Primary Sampling Units represented by Census Block Groups. Each selected Block was divided into segments of ten households, with a segment then randomly selected in each Block. Interviews were then carried out with a household member randomly selected using a Kish table (Kish, 1949). Information about AUD in the household was self-reported by the interviewee for her/ himself only. Eligibility was based on age (18–64 years), ability to speak Spanish, no incapacitating cognitive impairment, and self-identification as Puerto Rican. The response rate for the survey was 83%. Trained interviewers conducted Computer Assisted Personal Interviews at the respondents' home that lasted about 1 hour. Respondents received a \$25 incentive for participation and provided written informed consent. The survey was approved by the Committee for the Protection of Human Subjects of the University of Texas Houston Health Science Center and the University of Puerto Rico.

Measurements

Alcohol problems.—Respondents were asked about 12 alcohol-related problems that they might have experienced in the 12 months prior to the interview. This is a classical list of problems that has been used in alcohol epidemiology research for the past 30 years (see, e.g., (Clark & Hilton, 1991). The list is independent from the DSM-5 AUD criteria described below, and is constituted by a series of statements to which the respondent agrees or disagrees. The list of problems included salience of drinking, craving, impairment of control over drinking, withdrawal syndrome, belligerence, problems with police (drinking and driving, drinking-related arrest), health problems, problems with spouse, problems with other people, loss of a job because of drinking, prolonged intoxication, and drinking related accidents. Households in which a respondent reported one or more problem were identified as having an adult with an alcohol problem. The problems scale reliability as measured by Cronbach's alpha coefficient was 0.77.

Alcohol use disorder: Based on DSM-5 criteria for AUD (American Psychiatric Association, 2013) and implemented with the Spanish version of the World Health Organization's Composite Diagnostic Interview (CIDI). The instrument was translated from English and adapted for use in Spanish speaking populations following a cultural adaptation model described by Alegria et al. (2004) The Spanish version of the instrument has adequate concordance in clinical reappraisal studies with the Structured Clinical Interview for Axis I Disorders (SCID) (kappa=.51; specificity=.82 for lifetime substance use disorders) (Alegria et al., 2009). According to DSM-5 criteria, respondents reporting the presence of two or

more indicators during the 12 months prior to the interview were identified as positive for DSM-5 AUD.

The measures of alcohol problems and DSM-5 AUD are not totally independent. Given that some of the alcohol problems under consideration (e.g., withdrawal) are related to alcohol dependence and as such are also part of the DSM-5 criteria, most of the households identified as positive for DSM-5 AUD (14 out of 20) were also positive for an alcohol problem. However, unexpectedly, 6 households with a respondent positive for AUD were not positive for alcohol problems.

Family cohesion/ pride: This concept was measured with a 10-item scale: seven from Olson's (1986) Family Environment Scale and three from Olson's (1986) Family Cohesion Scale (see also(Canino, Vega, Sribney, Warner, & Alegria, 2008; Rivera et al., 2008)). Cronbach's alpha for the scale is .93. Scores vary from 10 to 40, with higher scores indicating higher cohesion. The mean score for the sample was 36.1 (95CI=35.8–36.4). For ease of interpretation, this variable was divided into three categories: high, medium and low cohesion. A total of 41% of the sample had the highest possible score in the scale and were categorized as high cohesion. Scores for the rest of the sample were then evenly split and represented those with low and medium cohesion.

Sociodemographic variables: *Employment status:* Respondents were categorized into four employment categories: a) Employed part-time; b) Employed full-time (35 or more hours of work per week; reference); c) Unemployed (but looking for work); d) Not in the workforce (retired, homemaker, never worked, unemployed and not looking for work, students). Very few respondents were under-employed (employed part-time but wants to work more) to form a separate category and were therefore classified as part-time. *Level of education:* Respondents were categorized into four categories: a) less than high school; b) completed high school or GED; c) some college, technical, or vocational school; d) completed 4-year college or higher (reference group). *Religion:* This variable had four categories: Protestant, no religious preference, Catholic (reference), other religion. *Income:* This is a continuous variable. Respondents were asked to report their monthly family household income, which was then multiplied by 12 to provide the household annual family income. For the logistic analysis, respondents' income was grouped into <\$4,000, \$4,001 to \$18,000, \$18,001 to \$36,000, \$36,001. *Supplementary Income:* This dichotomous variable was coded as "1" if anyone in the selected household received assistance from the following programs: Supplemental Nutrition Assistance Program, Special Supplemental Assistance Program for Women, Infants and Children, Temporary Assistance for Needy Families, Low Income Home Energy Assistance Program. *Marital status:* Respondents were categorized as: a) married; b) separated or divorced, c) single, d) widowed. *Number of Children in the Household:* Respondents were asked about the number of children 17 years of age and younger who lived "at home permanently."

Statistical analyses—All analyses were conducted using Stata 14.2 "svy" prefix (Stata, 2015). Analyses were conducted on data weighted to correct for unequal probabilities of selection into the sample. In addition, a post-stratification weight was applied, which corrects for nonresponse and adjusts the sample to known population distributions on certain

demographic variables (age and gender). Bivariate analyses (Tables 1 and 2) included chi-square tests to detect statistically significant associations between dependent and independent variables. Multivariate logistic analysis (Table 3) was used to assess associations between selected sociodemographic factors and family characteristics (family cohesion/ pride, employment status, family income, education level, marital status, religion and receipt of supplemental income) and a dichotomous outcome variable coded as follows: “0” for households with children in which the survey respondent did not have an alcohol problem or AUD; “1” for households with children in which the survey respondent had an alcohol problem or AUD. In this particular analysis, all households with an adult with an alcohol problem or AUD were therefore combined in a single category (coded as 1) because the number of households with AUD only was too small for a separate analysis. Also, as the coding implies, households without any children were not part of this analysis.

The following formulae were used in the construction of table 2: (1) Proportion of sample households (HHs) with alcohol problems or AUD = HHs with alcohol problems or AUD/ total number of HHs $\times$ 100. (2) Proportion of sample HHs with alcohol problems or AUD that have children = HHs with alcohol problems or AUD that have children/ number of HHs with alcohol problems or AUD $\times$ 100. (3) Proportion of sample children exposed = number of children in HHs with alcohol problems or AUD/ total number of children in the sample $\times$ 100. The total number of children under 18 years of age (79,541) estimated from the 2009–2013 American Community Survey for the urban population of San Juan (United States Census Bureau, 2017) was used to calculate the estimates of children exposed to alcohol problems and AUD. The formula applied to calculate the population estimate of children exposed to alcohol problems or AUD was: Proportion of children exposed to alcohol problems or AUD in the sample $\times$ total number of children under 18 years of age from the 2009–2013 5-year estimate from the American Community Survey (United States Census Bureau, 2017).

Results

Household sociodemographic characteristics

The sample had 1,510 households of which 24.3% had at least one child 17 years of age and younger. Because some households had more than one child, the total number of children in all sample households was 570. Most of the households with children had one (58%) or two children (32%). The largest number of children per household was five, but these households represented only 0.1% of all households with children in the sample. Not surprisingly, given that some alcohol problems are indicators of DM-5 AUD, there was an overlap between households with problems and households with AUD. Among households with at least one child, 4% had both AUD and one or more alcohol problem. Among households with no children the percentage was 9%.

The percentage of households with at least one child receiving supplemental income was two times that of households with no children ($p < .001$) (Table 1). This is partially because some sources of supplemental income require the presence of children in the household. Households with at least one child also had a higher mean annual family income than households without children ($p < .05$). High family cohesion was less frequent in households

with one or more child in which an adult had DSM-5 AUD compared to households with one or more child in which an adult had one or more alcohol problems and households with neither alcohol problems nor DSM-5 AUD ($p < .05$).

Proportion and number of children exposed to alcohol problems or DSM-5 AUD

The proportion of households in the sample with alcohol problems and DSM-5 AUD was about a quarter and a tenth, respectively (Table 2). About a fifth of the households with an adult with an alcohol problem had at least one child. A little over a tenth of the households with an adult with AUD had at least one child. About a fifth of the children in sample households was exposed to an adult with alcohol problems. About 6% of the children in sample households was exposed to an adult with AUD. The number of children represented by these percentages in the urban population of San Juan in 2013 was 16,624 and 4,534, respectively.

Family cohesion/ pride and sociodemographic correlates of children's exposure to alcohol problems or DSM-5 AUD

There are two variables in Table 3 with statistically significant associations with households with an adult with alcohol problems or DSM-5 AUD: Households in which the respondent reported a medium level of family cohesion/ pride were almost three times more likely to have a child exposed to an adult with alcohol problems or AUD compared to households with families with high cohesion/ pride. Households in which the respondent reported an annual household income between \$18,001 and \$36,000 or above \$36,000 were about four times more likely to have a child exposed to alcohol problems or AUD compared to households with an annual income below \$4,000.

Discussion

First, and as expected, the results show a higher estimate for the proportion of households affected by an alcohol problem compared to DSM-5 AUD. As stated above, this is probably because the cut-off for positive identification of an AUD in DSM-5, which requires the presence of at least two DSM-5 criteria in the past 12 months, is more stringent than that for positive identification of a problem. There are almost four times more children exposed to an adult with an alcohol problem than to an adult with AUD. However, even though the presence of an adult with AUD may indicate a more severe level of problematic involvement with alcohol in the household, the presence of a single alcohol problem can be a source of conflict and stress, and a potential damaging factor for a child. Recognizing the importance of this issue, the American Academy of Pediatrics has issued repeated reports with guidance (1993) for pediatricians on how to identify and respond to substance abuse in families with children (Fraser Jr & McAbee, 2004; Kulig & Committee on Substance Abuse, 2005; Smith & Wilson, 2016).

Second, two different types of comparisons can be made between the results in this paper and those in the more recent literature. First, there is a comparison of the proportion of households with an adult with an alcohol problem or AUD among all households, irrespective of whether they have children or not. These proportions for an alcohol problem

(24.3%) or DSM-5 AUD (10.2%) are higher in San Juan than on the U.S. mainland (15.6% and 3.2%, as reported by Ramisetty-Mikler and Caetano(2004). However, when considering only households with children, the situation reverses: San Juan has a lower proportion of households with children exposed to an adult with alcohol problems (21.5%) or DSM-5 AUD (13.7%) than the U.S. mainland (problems: 41.4%; DSM-IV alcohol dependence: 33.9%)(Ramisetty-Mikler & Caetano, 2004). This difference may exist in part because the proportion of households with children was lower in San Juan (32% versus 40% on the mainland), as was the mean number of children per household (1.5 versus 1.9).

The second comparison between the results reported here and those of others is on the proportion of children, not households, exposed to an alcohol problem or AUD. This is because some households have more than one child, and thus the proportion of children affected is not equal to the proportion of households with an adult with alcohol problems or AUD. In this case the situation is inversed to that described above. For instance, comparing results in this paper with those of Ramisetty-Mikler and Caetano (2004), shows that the proportion of children exposed to alcohol problems or DSM-5 AUD in San Juan, is slightly higher than on the U.S. mainland (alcohol problems, 20.9% versus 16%, and AUD, 5.7% versus 2.9%).

Grant (2000) reported a higher estimate of 15% for the proportion of children on the U.S. mainland affected by AUD. As in the comparison between DSM-5 AUD and alcohol problems, differences in the definitions employed to determine exposure explain the discrepancies in percentages. Thus, the slightly higher estimate for the proportion of children exposed to DSM-5 AUD in San Juan compared to those mentioned above from Ramisetty-Mikler and Caetano for alcohol dependence on the U.S. mainland may be because DSM-5 has a less stringent requirement for identifying AUD compared to DSM-IV, which was used by those authors. DSM-5 requires the presence of two criteria compared to three for alcohol dependence in DSM-IV. DSM-5 also considers indicators of what was alcohol abuse in DSM-IV for a total of 11 versus seven indicators for alcohol dependence in DSM-IV.

Because Grant estimated the proportion of children exposed by considering both exposure to alcohol abuse and dependence as defined by DSM-IV, her measure approximates that in DSM-5 more so than the measure utilized by Ramisetty-Mikler and Caetano. However, Grant's estimate of 15% is 2.6 times higher than that reported here and three times higher than that reported by Ramisetty-Mikler and Caetano. The difference between Grant's estimate and that in this paper for San Juan is most probably associated with methodological differences in the measurement of alcohol dependence, different household sampling procedures, and cultural differences between the U.S. mainland and San Juan. Yet it is important to note that the 12-month rate of DSM-5 AUD is only slightly higher on the U.S. mainland than in San Juan (mainland and San Juan men, 17.6% and 14%, respectively; mainland and San Juan women, 10.4% and 7%, respectively) (Caetano, Vaeth, Mills, & Canino, 2016; Grant et al., 2015).

There were not many sociodemographic differences between households with and without children, although those with one or more child had a higher mean annual family income

and a higher proportion reporting receipt of supplemental income. There also were not many sociodemographic differences across households with children and problems or AUD and households with children but without alcohol problems or AUD. The hypothesis that households with children and with an adult with alcohol problems or AUD would have lower cohesion/pride was confirmed. This result is present in the cross-tabulation in Table 1 and is confirmed in the logistic analysis in Table 3. It is in accordance with several papers in the literature with Hispanics on the U.S. mainland and in Puerto Rico (Margarita Alegria et al., 2007; Ayón et al., 2010; Cooney, 2001; Warner et al., 2001). High family cohesion/pride may be a protective factor against alcohol problems and AUD because it may be associated with the availability of resources (e.g., housing, financial help, emotional support) that if absent could lead to heavier drinking and increased chances of AUD affecting an adult in the family (Caetano, Vaeth, et al., 2016a).

The multivariate analysis also showed that a higher mean annual family income was associated with households where children were exposed to alcohol problems or AUD. This is an interesting result because mean family income was not associated with being a current drinker, binge drinking, drinking and driving, or DSM-5 AUD in previous analyses of these data (Caetano, Vaeth, et al., 2016b; Caetano, Vaeth, Mills, et al., 2016). But a mean family income of \$30,001 to \$40,000 was protective against drinking related social/health problems (Caetano, Vaeth, et al., 2016b). This may be because in this latter analysis the grouping of respondents in income categories was different and the reference group in the analysis was also different (\$0-\$4,000 here in, 0-\$10,000 in the previous analysis).

Strengths and Limitations

The study has many strengths. It is based on analyses of a random sample of the adult population of San Juan, which was interviewed face-to-face in a survey with a particularly high response rate of 83%. Data collection covered several drinking outcomes in detail and used state of the art interviewing techniques and questions.

The study also has limitations. Data collection was based on self-reports, which may lead to under-reporting of alcohol problems and DSM-5 AUD indicators. The proportion of households with a child exposed to an adult with alcohol problems or AUD may underrepresent the true proportion of these households in the community. This is because the identification was based on the interview with one adult selected at random from all adults in the household. If the adult interviewed did not report problems or AUD but another adult in the household had such problems, the household would have been misidentified as free of problems and AUD. It is also possible that the proportion of children exposed to an alcohol problem or AUD is underestimated if children who were living at a dormitory in school or spent time with a divorced parent were not reported by the respondent.

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Table 1:

Sociodemographic Characteristics of Sample Households

	All Households No Children	All Households with Children	Household with Children no Alcohol Problem or DSM-5 AUD***	Household with Children and Alcohol Problem	Household with Children and DSM -5 AUD
	(1143)	(367)	(271)	(53)	(20)
% College Degree	43	41	39	35	55
% Catholic	51	50	49	49	45
% Separated, Divorced	21	19	57	51	59
% Supplemental Income	21	43**	43	41	42
% High Family Cohesion	42	45	50	42	16*
Mean Annual Income	21,295	27,686**	27,243	28,733	33,773
Mean Number of children	-	1.50	1.56	1.50	1.48

* p<.05 for distribution across households with children;

** p<.01, households with versus households without children;

*** Alcohol Use Disorder

Table 2.**Puerto Rican Children Exposed to 12-Month Alcohol Problems and DSM-5 Alcohol Use Disorder**

	One or More Alcohol Problems	DSM-5 Alcohol Use Disorder
All Sample Households with Alcohol Problems or Alcohol Use Disorder ¹	24.3 (366/1501)	10.2 (145/1416)
Sample Households with Alcohol Problems or Alcohol Use Disorder that have Children ²	21.5 (79/366)	13.7 (20/145)
Proportion of Sample Children Exposed ³	20.9 (119/569)	5.7 (30/523)
Population Estimate of Children Exposed	16,624 ^a	4,534 ^b

¹Proportion of Sample Households with AP or AUD = HHs with AP or AUD / No. of Total HHs x 100.

²Proportion of Sample HHs with AP or AUD that have children = HHs with AP or AUD that have children / No. of HHs with AP or AUD x 100.

³Proportion of Children Exposed = No. of children in the HHs with AP or AUD/Total no. of children in the sample x 100.

^a79,541 (Children <18 years, 2009–2013 American Community Survey 5-Year Estimate) x .217 = 16, 624

^b79,541(Children <18 years in 2009–2013 American Community Survey 5-Year Estimate) x .058 = 4,534

Table 3:

Multiple Logistic Regression of Households with Children and with Alcohol Problems or DSM-5 AUD on sociodemographic characteristics

	OR	95% CI
Family Cohesion/Support (Ref: High)		
Low	1.94	.92–4.1
Medium **	2.66	1.20–5.89
Religion (Ref: Catholic)		
Protestant	.75	.36–1.59
Other religious preference	.55	.10–2.89
No religious preference	1.32	.52–3.30
Employment Status (Ref: Employed full-time)		
Unemployed	1.22	.36–4.11
Employed Part-time	.86	.30–2.44
Not in workforce	.62	.19–1.95
Education (Ref: Less than high school)		
High School Diploma	.89	.25–3.12
Some college/ technical	.74	.21–2.52
College degree	.75	.21–2.60
Marital Status (Ref: Married)		
Separated/ Divorced	1.13	.46–2.81
Widowed	1.22	.09–16.31
Never married	1.01	.43–2.32
Income (Ref: Less than \$4,001)		
\$4,001–\$18,000	2.79	.91–8.49
\$18,001–\$36,000 *	4.38	1.25–15.29
\$36,001+ *	3.98	1.01–15.77
Received Income Supplement (Ref: No Supplement)	1.18	.61–2.30

*
< 0.05;

**
p < 0.01.