

Alcohol Use Among Immigrant Latino Farmworkers in North Carolina

Joseph G. Grzywacz, PhD,^{1*} Sara A. Quandt, PhD,² Scott Isom, MS,²
and Thomas A. Arcury, PhD¹

Background Heavy alcohol use among Latino farmworkers is believed to be common, but it remains poorly documented.

Methods Interviewer-administered survey questionnaires were administered to 151 Latino male farmworkers in Eastern North Carolina; topics included frequency of alcohol consumption, amount of alcohol typically consumed, frequency of consuming five or more drinks in a single setting, and signs of alcohol abuse/dependence.

Results Over one-quarter (26%) completely abstain from alcohol, but 27% report frequent heavy drinking, or drinking five or more alcoholic beverages two or more times per month. Over one-third of farmworkers (39%) may be alcohol-dependent. Frequent heavy drinking is more common among single farmworkers and among those who do not follow the crops, and dependence is more common among farmworkers living in camps comprised of both H2A and non-contract workers.

Conclusions There is substantial variation in alcohol use among Latino farmworkers. Although a substantial proportion of farmworkers abstain from alcohol, an equally substantial proportion report alcohol use that poses significant risk for injury on and off the job. More research is needed to document the potential threat to Latino farmworkers by their alcohol use. Interventions targeting alcohol are needed to minimize the risk of injury in an already dangerous occupation. *Am. J. Ind. Med.* 50:617–625, 2007.

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KEY WORDS: Latinos; farmworkers; alcohol use; alcohol dependence

INTRODUCTION

Alcohol use among immigrant Latino Farmworkers is an issue with several implications. Farmwork is among the

most dangerous occupations [Frank et al., 2004], with injury rates among immigrant farmworkers ranging from 6.0 to 12.5 per 100 fulltime equivalent employees [McCurdy et al., 2003; Cooper et al., 2006]. Foremost, greater alcohol use on or off the job is associated with greater risk of work related accidents and injury [Crandall et al., 1997; Lyman et al., 1999; Wells and Macdonald, 1999; Stallones and Xiang, 2003]. Stallones and Xiang [2003], for example noted a 45% increased risk for injury among farm owners who drank even moderate levels of alcohol relative to those who abstained from alcohol. Alcohol use, particularly heavy use, also has substantial public health and social implications. Heavy drinking increases the risk of several chronic conditions such as liver disease and cancer [Meyerhoff et al., 2005], and such social problems as driving while impaired and violence [Cherpitel, 1994; Chermack and Giancola, 1997].

¹Department of Family and Community Medicine, Wake Forest University School of Medicine, Winston-Salem, North Carolina

²Department of Public Health Sciences, Wake Forest University School of Medicine, Winston-Salem, North Carolina

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*Correspondence to: Joseph G. Grzywacz, Department of Family and Community Medicine, Wake Forest University School of Medicine, Medical Center Boulevard, Winston-Salem, NC 27157-1084. E-mail: grzywacz@wfubmc.edu

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Anecdotal evidence suggests that alcohol use among immigrant Latino farmworkers is problematic; yet actual use remains poorly documented [García and Gondolf, 2004]. Few studies report descriptions of alcohol use behavior like how frequently Latino farmworkers consume alcohol or how much alcohol is typically consumed per episode. In early research Trotter [1985] suggested that heavy recreational drinking was common among immigrant Latino farmworker men, but provided no concrete description for defining this characterization. A decade later Alaniz [1994], drawing on second-hand information from farmworker women, reported that farmworker men consumed an average of 10 beers per drinking episode on weekends. More recent evidence from migrant farmworkers in California suggests that 75% of farmworkers abstain or rarely consume alcohol, approximately 15% report consuming fewer than 10 drinks per week, and the remainder report more than 10 drinks per week [McCurdy et al., 2003]. Alderete et al. [2000] noted that 1% of farmworkers participating in the Mexican American Prevalence and Services Survey (MAPPS) abuse alcohol and 6.6% met caseness for alcohol dependence.

Evidence from non-farmworker samples suggests that heavy drinking is common among Latinos, particularly among men. Estimates obtained from a national probability sample in 1995 indicated that 18% of Latino men reported frequent heavy drinking [Caetano and Clark, 1998]. Among whites and blacks the estimates were 12% and 15%, respectively. However, these same data indicate that a greater proportion of Latinos than whites completely abstained from alcohol (35% vs. 26%). Among Latinos, those of Mexican descent in particular report frequent heavy drinking, defined as reporting four or more drinking occasions in the past month and consuming five or more drinks during four or more of those drinking occasions [Nielsen, 2000]. Whereas 17% of men of Mexican origin reported frequent heavy drinking, rates among Puerto Rican and Cuban men were 12.8% and 5.3%, respectively.

Given the absence of descriptive studies of alcohol behavior, little is known about the personal or situational factors associated with variation in alcohol use among Latino farmworkers. Trotter [1985] suggested that farmworkers who are accompanied by wives and children exhibited more restrained alcohol use patterns. He further suggested that heavy drinking was more common among immigrants in the East Coast Migrant Stream in contrast to the Midwest and West Coast Streams because unaccompanied migration is more common for the East Coast. Evidence suggests that work stress contributes to increased alcohol use among farmworkers [see García and Gondolf, 2004]. In non-farmworker Latino samples, acculturation has been linked to greater alcohol consumption and drunkenness, particularly among women [Polednak, 1997; Zeng, 2005]. Additionally younger age, low education, unemployment, and job insecurity are associated with greater risk of alcohol abuse or

dependence [Caetano and Clark, 1998; Finch et al., 2003; Wallisch and Spence, 2006].

In summary, very little is known about alcohol use among immigrant Latino farmworkers. The absence of recent evidence is at odds with widespread beliefs that immigrant Latino farmworkers are heavy alcohol users, and that this heavy use poses significant threats to farmworkers themselves and their hosting communities. The goal of this study was to document alcohol use patterns among immigrant farmworkers in North Carolina, a region of the country with a substantial farmworker population and a part of a migrant stream where heavy alcohol use is believed to be common [Trotter, 1985]. More specifically, in this paper we: (1) characterize the drinking habits of immigrant Latino farmworkers, including descriptions of abstinence from alcohol, most common type of alcohol consumed, frequency of consumption, and indicators of problematic use of alcohol; and (2) identify personal and situational factors associated with consumption frequency and heavy drinking.

MATERIALS AND METHODS

The data for this study were part of the *Casa y Campo* project, a community-based health education project based on a collaboration among environmental health researchers, health care providers and community advocates. An important element of this collaboration was regular collection and analysis of data focused on specific environmental or occupational health issues among immigrant Latino farmworkers. In 2005, data collection focused on farmworker alcohol use, oral health [Quandt et al., 2007] and farmworkers' job characteristics. Data focused on these issues were collected from a sample of 151 male farmworkers employed in Harnett, Johnston, and Sampson Counties, North Carolina.

Sampling and Data Collection

Participants were selected using a site-based sampling plan [Arcury and Quandt, 1998], which is a method for recruiting a representative sample in a population which is difficult to enumerate [Faugier and Sargeant, 1997; Muhib et al., 2001; Parrado et al., 2005]. A list of greater than 60 farmworker camps in the study area was compiled with the assistance of the North Carolina Farmworkers Project (NCFP), a non-profit service organization. Investigators purposefully selected camps from the list to ensure variability in camp size and incorporation of both H2A and non-contract camps. Trained interviewers visited the camps with members of the NCFP to explain the project and to inform camp residents that interviewers would return to the camp to collect data during the subsequent weeks. Upon later returning to the camps, interviewers recruited farmworkers. The goal for interviewers was to recruit 1–10 workers per

camp, depending upon total camp size. Farmworkers were approached on a first-come, first-serve basis. All farmworkers in small camps were allowed to participate. Informed consent was obtained from all participants. Farmworkers were first informed of the purpose of the study and that, if they participated, they would complete an interviewer-administered survey that would take approximately 20 min to complete. Farmworkers were also informed that individuals who completed the survey would receive a non-monetary incentive. All farmworkers who were asked agreed to participate in the study.

Data were collected via interviewer-administered survey questionnaires conducted during June and July, 2005. All interviewers were native Spanish speakers and former farmworkers. Interviewers participated in a 6 hr training session, and each completed practice interviews before being approved to conduct study interviews. Upon completion of the interview, participants were given a non-monetary incentive (tooth brush, tooth paste, cap with study logo) valued at less than \$10. No names or other identifiers were recorded. Procedures for recruitment and data collection were approved by the Institutional Review Board of Wake Forest University School of Medicine.

Measures

Alcohol use was measured using items tapping both frequency and quantity of alcohol consumption in the previous 3 months. Participants were first asked if they ever drank alcohol. Individuals who responded “no” were not asked any additional questions. Separate questions then asked how often participants consumed beer, wine, and liquor (e.g., tequila, rum, whiskey) in the past 3 months. Response options for each question were “everyday or nearly everyday,” “3–4 times a week,” “1–2 times a week,” “2–3 times a month,” “about once a month,” “less than once a month” and “Did not drink liquor in the last 3 months”, coded 1 to 7, respectively. Participants were then given the meaning of “1 drink” and asked how many alcoholic drinks they consumed on a typical drinking occasion in the last 3 months. Response options followed a declining graduated quantity format with response options reflecting greater consumption being offered first (e.g., “12 or more drinks”) and subsequent response options reflecting less consumption. The final response option was “I did not drink in the past 3 months.” Individuals reporting “did not drink in the past 3 months” were not asked any additional questions. The last question asked how frequently participants drank five or more drinks of beer, wine or liquor on a single drinking occasion. Response options again used a declining graduated format with more frequent options introduced early (i.e., 1 = “everyday or nearly everyday” to 8 = “did not drink 5 or more drinks on a single occasion in the past year”). Finally, the four item CAGE was used to screen for alcohol abuse and

dependence as defined by the DSM-IV [Cherpitel, 1999; Saitz et al., 1999].

The alcohol questions were used to create four primary outcome variables. *Frequency* is a categorical variable describing how frequently participants consumed alcohol in the past 3 months (abstains, “less than monthly” or “not at all,” “monthly,” and “weekly”). *Typical consumption* was then created for non-abstainers to differentiate “moderate/light” drinkers (i.e., 2–4 drinks/occasion or fewer) from “heavy” drinkers (i.e., five or more drinks/occasion). *Frequent Heavy Drinking* was constructed from self-reported frequency of consuming five or more drinks/occasion in the past 3 months. Individuals reporting “about once a month” or more frequently (i.e., “2–3 times per month,” “1–2 times per week,” “3–4 times per week,” or “everyday or nearly everyday”) were coded one, zero otherwise. *Alcohol abuse/dependence* was coded one if a respondent answered “yes” to two or more CAGE items, zero otherwise.

Independent variables were personal characteristics, including age (<25, 25–40, and >40), years in the U.S. (<1 year, 1–5 years, >5 years), educational attainment (primary or less, secondary or more). Family characteristics included marital status, parental status, and whether participants had family in North Carolina. Finally, work-related characteristics included residence (lived in “H2A camp [or a camp wherein all occupants had a visa that allowed them temporary permission to perform agricultural work in the U.S.],” “non-contract camp” and “mixed H2A & non-contract camp”), whether or not participants follow the crops, and hours worked/week in farmwork (<40, 40–50, >50).

Data Analysis

Univariate statistics were first computed to describe the sample and participants’ alcohol-related behavior. Bivariate associations of personal, family, and work characteristics with alcohol outcomes were examined using chi-square tests. All factors associated with alcohol outcomes at a *P*-value of 0.2 or less were included in multivariate logistic regression models predicting *frequent heavy drinking* and *alcohol abuse/dependence*. In the logistic regression models backward selection was used with a Wald chi-square significance level of 0.1 for an effect to remain in the model. Odds ratios and corresponding 95% Wald confidence intervals were calculated for the final predictors in each model. All analyses used the FREQ procedure and LOGISTIC procedure of SAS v9.1.3 (SAS Institute, Cary, NC).

RESULTS

Workers ranged in age from 18 to 64 years, with a median age of 32 years (Table I). About a quarter of the sample was less than 25 years of age, and 17%, over 40 years.

TABLE I. Description of Sample; Farmworkers in North Carolina, 2005 (N = 151)

	N	%
Age (years)		
<25	36	23.8
25–40	89	58.9
>40	26	17.2
Marital status		
Not currently married	33	21.9
Married or living as married	118	78.1
Education		
Primary	77	51.0
Secondary	56	37.1
Greater than secondary	18	11.9
Length of time in US (years)		
<1	71	47.0
1–5	44	29.1
>5	36	23.8
Years worked in agriculture		
≤1	24	15.9
2–5	65	43.0
>5	62	41.1
Location of permanent home		
United States	11	7.3
Mexico	139	92.7

Over 78% were married or living as married. Over half the sample had only a primary education. All participants were born in Mexico, except for one person born in Puerto Rico. The sample is comprised primarily of relatively new immigrants: 47% of study participants reported that this was their first year in the US; about one quarter had been in the US more than 5 years. About 16% reported that this was their first year working in agriculture. Over 41% had worked more than 5 years in agriculture. This sample represented a migrant worker population, as 92.7% reported that Mexico was their permanent home.

There was substantial variation in the frequency that farmworkers consumed alcohol (Table II). Greater than one in four farmworkers (26%) reported completely abstaining from alcohol and 14% drank less than monthly or not at all in the past 3 months. Approximately one-third of workers (34.67%) drank “monthly,” and one-quarter (25.33%) drank “weekly.” Among individuals who drank, 83.9% consumed beer in the past 3 months. The few who did consume wine (2.7%) and liquor (3.6%) also consumed beer at least monthly. Only two factors were associated with frequency of alcohol consumption. Participants with a secondary education or more reported more frequent alcohol use than those with a primary education or less. Individuals who follow the crops reported drinking less frequently than those who do not follow crops.

Typical consumption tended to be heavy among farmworkers who drink alcohol (Table III). Greater than half of those who drank reported that they typically consumed more than five drinks per drinking occasion. Heavy consumption was more common among individuals with a secondary education or higher, those living in H2A camps, and those who did not follow the crops. Greater than one-third (37.4%) of farmworkers who did not abstain from alcohol, or 27% of study participants, were frequent heavy drinkers. Frequent heavy drinking was more common among individuals with secondary education or higher, individuals who were not married, those who did not follow the crops, and those who worked 40–50 hr per week.

Over half (52.7%) of the farmworkers who consumed alcohol, or 39% of study participants, met potential criteria for alcohol dependence/abuse (i.e., affirmation of two or more CAGE items). Twenty-three participants said “yes” to two CAGE items, 27 responded affirmatively to three items, and nine farmworkers responded “yes” to all four CAGE items. Alcohol dependence/abuse was greater among farmworkers with children, those residing in H2A camps and mixed H2A and non-contract camps, and those who do not follow the crops.

Logistic regression models verified what the bivariate analysis had revealed with regard to associations of alcohol use with individual and work-related characteristics.

TABLE II. Frequency of Alcohol use Among North Carolina Latino Farmworkers by Personal and Occupational Characteristics

	Abstains	Less than monthly or not at all	Monthly	Weekly
	% (n)	% (n)	% (n)	% (n)
Total	26.0 (39)	14.0 (21)	34.7 (52)	25.3 (38)
Age				
<25	25.0 (9)	11.1 (4)	30.6 (11)	33.3 (12)
25–40	27.3 (24)	15.9 (14)	38.6 (34)	18.2 (16)
>40	23.1 (6)	11.5 (3)	26.9 (7)	38.5 (10)
Years in the US				
<1	26.8 (19)	11.3 (8)	45.1 (32)	16.9 (12)
1–5 years	25.0 (11)	20.5 (9)	25.0 (11)	29.6 (13)
>5 years	25.7 (9)	11.4 (4)	25.7 (9)	37.1 (13)
Education**				
Primary or less	25.0 (19)	21.1 (16)	32.9 (25)	21.1 (16)
Secondary or more	27.0 (20)	6.8 (5)	36.5 (27)	29.7 (22)
Marital status				
Not married	24.2 (8)	9.1 (3)	33.3 (11)	33.3 (11)
Married or living as married	26.5 (31)	15.4 (18)	35.0 (41)	23.1 (27)
Parental status				
No children	25.0 (11)	11.4 (5)	34.1 (15)	29.6 (13)
1 or more children	26.4 (28)	15.1 (16)	34.9 (37)	23.6 (25)
Family in North Carolina				
No	26.6 (21)	16.5 (13)	35.4 (28)	21.5 (17)
Yes	25.4 (18)	11.3 (8)	33.8 (24)	29.6 (21)
Camp type				
H2A camp	20.3 (14)	13.0 (9)	43.5 (30)	23.2 (16)
Non-contract camp	25.0 (8)	15.6 (5)	34.4 (11)	25.0 (8)
Mixed H2A and non-contract	34.7 (17)	14.3 (7)	22.5 (11)	28.6 (14)
Follows Crops**				
No	27.5 (28)	8.8 (9)	37.3 (38)	26.5 (27)
Yes	22.9 (11)	25.0 (12)	29.2 (14)	22.9 (11)
Hours/week in farmwork				
<40	44.4 (8)	16.7 (3)	27.8 (5)	11.1 (2)
40–50	22.7 (25)	14.6 (16)	37.3 (41)	25.5 (28)
>50	27.3 (6)	9.1 (2)	27.3 (6)	36.4 (8)

**P-value of Chi-square test <0.1.

Frequent heavy drinking was significantly associated with marital status and whether or not the individual follows the crops. More specifically, the odds of being a frequent heavy drinker were 3.3 times greater (95% CI = 1.21–9.01) for non-married farmworkers than those who were married or living as married. Farmworkers who had settled in North Carolina had higher odds of frequent heavy drinking than those who follow the crops (OR = 2.74; 95% CI = 1.04–7.22). Alcohol abuse/dependence was associated with participants' residence. When compared to those living in camps comprised of non-contract workers, the odds of alcohol abuse/dependence were 3.8 times greater (95%

CI = 1.25–11.69) among those living in camps comprised of both H2A and non-contract workers. There was no observed difference between the H2A camps and the non-contract camps with respect to their association with alcohol abuse/dependence.

DISCUSSION

The results of this study illustrate substantial variation in Latino farmworkers use of alcohol. More than one-quarter of farmworkers (26%) abstain from alcohol use completely. This abstention rate is comparable to those previously

TABLE III. Intensity of Alcohol use Among North Carolina Latino Farmworkers who Self-Report Having Ever Drank Alcohol by Personal and Occupational Characteristics

	Drinks/session ^a		Frequent heavy ^b (n = 110)	CAGE ^c (n = 112)
	Moderate/light	Heavy		
	% (n)	% (n)	% (n)	% (n)
Total	46.4 (52)	53.6 (60)	37.3 (41)	52.7 (59)
Age				
<25	33.3 (9)	66.7 (18)	53.8 (14)	48.2 (13)
25–40	49.2 (32)	50.8 (33)	32.8 (21)	60.0 (39)
>40	55.0 (11)	45.0 (9)	30.0 (6)	35.0 (7)
Years in the US				
<1	46.2 (24)	53.9 (28)	35.3 (18)	48.1 (25)
1–5 years	42.4 (14)	57.6 (19)	43.8 (14)	60.6 (20)
>5 years	51.9 (14)	48.2 (13)	33.3 (9)	51.9 (14)
Education				
Primary or less	56.9 (33)	43.1 (25)	28.6 (16)	50.0 (29)
Secondary or more	35.2 (19)	64.8 (35)*	46.3 (25)**	55.6 (30)
Marital status				
Not married	40.0 (42)	60.0 (45)	58.3 (14)*	48.0 (12)
Married or living as married	48.3 (10)	51.7 (15)	31.4 (27)	54.0 (47)
Parental status				
No children	48.8 (16)	51.5 (17)	46.9 (15)	39.4 (13)
1 or more children	45.6 (36)	54.4 (43)	33.3 (26)	58.2 (46)**
Family in North Carolina				
Yes	44.4 (24)	55.6 (30)	37.7 (21)	53.7 (30)
No	48.3 (28)	51.7 (30)	36.8 (20)	51.7 (29)
Camp type				
H2A camp	39.39 (22)	60.7 (34)**	33.9 (19)	53.6 (30)**
Non-contract camp	66.7 (16)	33.3 (8)	29.2 (7)	33.3 (8)
Mixed H2A and non-contract	43.8 (14)	56.3 (18)	50.0 (15)	65.6 (21)**
Follows crops				
No	38.7 (29)	61.3 (46)*	44.0 (33)*	58.7 (44)**
Yes	62.2 (23)	37.8 (14)	22.9 (8)	40.5 (15)
Hours/week in farmwork				
<40	50.0 (4)	50.0 (4)	11.1 (1)	60.0 (6)
40–50	45.4 (39)	54.7 (47)	35.3 (30)**	51.2 (44)
>50	50.0 (8)	50.0 (8)	62.5 (10)	56.3 (9)

^aModerate/light drinking is defined as consuming 2–4 alcoholic beverages or fewer during a typical drinking episode, heavy drinking is defined as consuming five or more.

^bFrequent heavy drinking is defined as having consumed five or more alcoholic beverages during a single episode on more than one occasion in the past month.

^cAffirmative responses to two or more CAGE questions.

Overall N = 151, 39 reported having never drank alcohol, leaving 112 who have drank alcohol.

There were two participants who reported drinking alcohol, but gave no response to the frequent heavy drinking question (n = 110).

*P-value of chi-square test <0.05.

**P-value of chi-square test <0.1.

reported for Mexican American non-farmworker samples [Nielsen, 2000], as well as non-Hispanic whites [Galvan and Caetano, 2003] and the general population [Adams and Schoenborn, 2006]. Among farmworkers who consume

alcohol, the majority consume alcohol a few times a month or less frequently, and nearly half (46%) usually drink four or fewer beverages (typically beer) in a single setting. These findings are inconsistent with the widespread belief that

Latino farmworkers are frequent and heavy alcohol users, a belief that has been fueled by the absence of documented use patterns.

However, in the past 3 months over one-quarter (27%) of the farmworkers we interviewed reported consuming five or more alcoholic beverages in a single setting about once a month or more frequently (e.g., multiple times per month or multiple times per week). Good comparative data are not available; however, this estimate is consistent with those from the 1993 National Household Survey on Drug Abuse indicating that 26.1% of Mexican American men reported similar drinking patterns [Nielsen, 2000]. Results from another national probability sample indicated that approximately 21% of comparably aged Hispanic men (i.e., 30–39) engaged in frequent heavy drinking, whereas 15% and 17% of similar aged white and Black men, respectively, engaged in this behavior. Although comparisons must be interpreted with caution given the time lag between our data collection and these previous surveys, our results suggest that frequent heavy drinking may be more common Latino farmworker men than other Hispanic men, and men of other ethnic groups. The large proportion of farmworkers who engage in frequent heavy drinking is concerning because it increases the risk of injury in an already risky occupation [Crandall et al., 1997; Lyman et al., 1999; Wells and Macdonald, 1999; Stallones and Xiang, 2003].

The results of this analysis help to identify segments of the farmworker population most engaged in frequent heavy drinking. The odds of reporting frequent heavy drinking were significantly greater for single farmworkers in contrast to those who were married or living as married. This observation is consistent with previous research by Trotter [1985] who suggested that farmworkers with accompanying wives have more restrained drinking habits. However, the vast majority (95%) of married farmworkers in this sample were unaccompanied suggesting that it is marriage rather than wives or partners per se that curbs drinking behavior [Umberson, 1987]. This association could also reflect selection effects wherein heavy drinking men may be less likely to become married than men who drink less heavily. Our results also indicated that farmworkers who do not follow the crops, or those who have “settled out” and are likely non-contract workers, are more involved in frequent heavy drinking. This finding, which has not been documented in the literature, is interesting because it contradicts the common image that “migrant” farmworkers are most likely to engage in risky alcohol behavior. There are several possible explanations for elevated rates of frequent heavy drinking among farmworkers who have settled in the area in contrast to those following the crops, including: greater acculturation, heightened opportunity because of knowledge of the area and access to transportation, or relatively greater discretionary income. Recognizing that farmworkers who have settled in North Carolina

are non-contract workers, these same factors may also explain why alcohol dependence is more common among individuals living in camps containing both contract and non-contract workers. Another explanation is possible selection effects, assuming that heavy drinking men may have greater difficulty obtaining and maintaining a work permit enabling them to follow the crops. Although additional research is needed to replicate and explain these findings, our results suggest that single farmworkers and non-contract workers who have settled out are important targets for alcohol-related interventions.

Unfortunately, few alcohol-related interventions have been designed for immigrant farmworkers. Evidence suggests that brief interventions by health-care providers that express concern over an individual’s drinking behavior and encourage more modest consumption reduces overall consumption as well as indicators of problematic drinking [World Health Organization Brief Intervention Study Group, 1996]. Similarly, results from a sample of Mexican Americans suggest that a brief intervention and psycho-educational approaches may reduce harmful drinking patterns [Burge et al., 1997]. These results suggest that outreach workers from migrant health clinics could be invaluable in reducing problem drinking among farmworkers. Research in other behavioral domains suggests that direct involvement of the farmworker community in the design and delivery of the intervention, such as the use of lay health promoters [Quandt et al., 2001; Rhodes et al., 2006] may be useful in reducing heavy drinking among immigrant farmworkers. Regardless of the approach taken, cultural sensitivity in the design and implementation of the intervention will play a vital role in success.

The results of this study need to be considered in light of its limitations. Participants were recruited only from eastern North Carolina. Although good comparative data on alcohol use across migrant streams has not been published, Trotter [1985] suggested that alcohol use may be particularly heavy in the East Coast Migrant Stream relative to the Midwest and West Coast Streams. Potentially heavier alcohol use in the East Coast Stream coupled with the lack of a random sampling procedure undermines the generalizability of our findings. Although the generalizability of this study population cannot be confirmed, it is similar to national data [Carroll et al., 2005] with respect to ethnicity, language, and low educational status. Our study is also limited by its focus on farmworker men. Finally, the inherently descriptive nature of the study is a limitation. We collected no data that would allow us to explore explanations for the substantial variation in alcohol use among farmworkers.

The limitations of this study point to important areas for future research, particularly in light of the virtual absence of alcohol research among immigrant farmworkers. Epidemiologic research documenting alcohol use across the migrant streams is needed to create a coherent description of alcohol

use among farmworkers and to determine if there is meaningful variation across the migrant streams in alcohol use. This could be accomplished efficiently and in a cost-effective manner by adding an alcohol use supplement to the National Agricultural Workers' Survey, an annual survey undertaken by the Department of Labor. Research that identifies the social and situational factors that contribute to variation in alcohol use among farmworkers, including how alcohol use changes over time, is also needed. This type of research would be invaluable for better identifying segments of the farmworker population particularly at risk for dangerous alcohol use, but also to inform the design and implementation of culturally sensitive interventions.

In conclusion, this study is one of the first to document the substantial variation in alcohol use among Latino farmworkers. Although over one-quarter of farmworkers abstain completely from alcohol, another one-quarter of farmworkers report frequent heavy drinking or consuming five or more drinks in a single setting multiple times per month. Further, over one-third of farmworkers may be dependent on alcohol. Given the substantial health risks associated with heavy alcohol consumption, including increased risk for occupational injury and death, more research attention and intervention focused on farmworkers' alcohol use is needed.

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