

## PREVALENCE OF PROBLEM DRINKING IN A VENEZUELAN NATIVE AMERICAN POPULATION

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**Abstract** — This is the first study of alcohol-related problems among a Latin American indigenous population using the Alcohol Use Disorders Identification Test (AUDIT). A randomly selected community sample consisting of 3% of the adult population of the tribe completed oral interviews ( $n = 105$  adults, completion rate 86%). The majority of both men (98%) and women (53%) had drunk alcohol at some time in their lives, with 94 and 26% respectively having consumed alcohol within the past 12 months. Using a cut-off score of 8 for the AUDIT, 86.5% of all men and 7.5% of all women were found to be problem drinkers. Focus group discussions revealed that traditional patterns of binge drinking of corn liquor had gradually been replaced by consumption of commercial beer and rum at more frequent intervals and with more negative social consequences. This male population demonstrates one of the highest prevalence rates for problem drinking reported in the world literature. Both the magnitude of problems detected and participants' concerns about them suggest that broad-scale interventions are warranted at the community level.

### INTRODUCTION

Alcohol misuse has been described as 'the most widespread, severe and all-encompassing health and social problem among American Indians' (Andre, 1979). Research regarding alcohol problems among Native Americans in the USA has been limited, in part because of concerns about the effect of cultural differences on the reliability of methods typically used to assess and diagnose alcohol problems (Manson *et al.*, 1992). Although there are no comprehensive community-based epidemiological studies documenting the extent of alcohol misuse and dependence among Native Americans, three recent studies have documented alcohol misuse and dependence rates of 75–83% among men and 39–51% among women (Manson *et al.*, 1992; Leung *et al.*, 1993; Robin *et al.*, 1998). Many North American Indians engage in abrupt and intense bouts of episodic or binge drinking over a period of several days (Levy and Kunitz, 1974; Hill, 1980; Weisner *et al.*, 1984; Westermeyer and Baker, 1986; Robin *et al.*, 1998), with episodes often ending only after money runs out or unconsciousness prevails (Curley, 1967; Rozytko and Ferguson, 1978; Westermeyer, 1979). Some anthropological and ethnographic analyses have depicted binge drinking as a recreational, normative, traditional, and often positive behaviour. More detailed quantitative studies have found high correlations between binge drinking and multiple negative consequences. These include social, work, physical and legal problems, as well as violence, alcohol dependence, and other psychiatric disorders (Westermeyer, 1976; Robin *et al.*, 1998). Medical complications of alcohol consumption among Native Americans are well documented. Alcohol-related mortality is more than four times higher than that of the general USA population (Indian Health Service, 1990). Five of the top ten causes of death in Native American adults (accidents, cirrhosis, alcoholism, suicide, and homicide) are strongly related to alcohol misuse and dependence, with these disorders accounting for more than one-third of all adult deaths (Institute of Medicine, 1990).

South American indigenous groups are thought to be ethnically related to North American Native Americans, with anthropologists postulating that all Native American groups entered the Americas through territory that now makes up Alaska (Jennings, 1983; Garbarino and Sasso, 1994). Little formal alcohol research has been done among South American native groups. Careful scientific study of the characteristics of alcohol problems and their socio-cultural origins among native populations outside the USA has thus far been extremely limited (Heath, 1989). Literature searches conducted in March, 2001 using both *Medline* and *Lilacs*, a database which indexes the Latin American medical literature, found only five studies that examined alcohol use among indigenous Latin American groups, and none which included quantitative evaluation of alcohol use and its consequences.

Venezuela provides some unique opportunities for exploring alcohol problems in indigenous populations. In contrast to Native Americans in North America, indigenous people from this area produced alcoholic beverages prior to European colonization (Carrizales *et al.*, 1986). A number of indigenous groups have retained many of their historical linguistic and cultural patterns. Although occasional contact with Western civilization dates to the 1490s, large-scale daily cultural contact did not occur in some areas until the 1940s, when permanent Catholic missions were built in remote areas (Coppens and Escalante, 1983). Among several Venezuelan Native American groups, alcohol misuse is reported to be a major problem. The current study was designed to obtain both quantitative and qualitative information on alcohol use patterns and alcohol-related problems in one of these groups.

### SUBJECTS AND METHODS

A community development team employed by a church-sponsored Venezuelan non-profit foundation, most of whose personnel are Venezuelan, encountered numerous reports of alcohol problems in an indigenous tribe of Carib origin from 1993 to 1995. The tribe is composed of eight subtribes with a total population of less than 10 000 persons (Coppens and Escalante, 1983; Oficina Central de Estadística e Informática,

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1992). In December 1995 a pilot screening questionnaire was developed to explore the nature and extent of these problems. The questionnaire included the Alcohol Use Disorders Identification Test (Saunders *et al.*, 1993), the CAGE screening exam (Ewing, 1984), the age at which alcoholic beverages were first consumed, and a question regarding type of beverage consumed.

The CAGE screening exam is a four-question alcohol screening instrument designed to elicit signs of alcohol-related problems, including loss of control, annoyance at others' expressed concerns about one's drinking, guilt associated with drinking, and use of alcohol in the morning as an eye-opener. Studies have revealed variability in its sensitivity and specificity, depending on the population surveyed, with sensitivity ranging from 60 to 95% and specificity ranging from 40 to 95% (Beresford *et al.*, 1990). In most studies, patients giving two or more positive answers are considered to have alcohol problems.

The AUDIT is a 10-question alcohol screening instrument developed by the World Health Organization and validated in a six-country sample, from four industrialized and two developing countries (Saunders *et al.*, 1993). Questions included in the instrument showed reliability across a wide range of cultural settings. The AUDIT differs from earlier screening instruments in that its purpose is to identify the early signs of harmful and hazardous drinking as well as dependence. The AUDIT has been shown to be a highly sensitive (80%) and specific (89%) screening instrument in populations containing both daily drinkers and individuals who consume large quantities of alcohol infrequently (Medina-Mora *et al.*, 1998). The AUDIT has been widely used in alcohol screening in the USA (Fleming *et al.*, 1991; Isaacson *et al.*, 1994; Luckie *et al.*, 1995; Mar *et al.*, 1995; Rigmaiden *et al.*, 1995; Schmidt *et al.*, 1995; Morton *et al.*, 1996; Matthews, 1997), Scandinavia (Holmila, 1995; Seppa *et al.*, 1995; Gudmundsdottir and Tomasson, 1996), Western Europe (Sharkey *et al.*, 1996; Piccinelli *et al.*, 1997), Australia (Fleming, 1996) and New Zealand (Poon *et al.*, 1994; Quarrie *et al.*, 1996). Application of the AUDIT in developing countries has been more limited (Schoeman *et al.*, 1994; Guevara-Arnal *et al.*, 1995).

The first three questions of the AUDIT explore quantity and frequency of alcohol consumption, while the last seven questions explore alcohol-related problems and signs of alcohol dependency. Each question is given a response from 0 to 4 and responses are summed up, giving an 'alcohol score', for each person, with 40 being the maximum and most severe score. Subjects scoring  $\geq 8$  on the AUDIT are generally agreed to have significant alcohol-related problems (Conigrave *et al.*, 1995; Medina-Mora *et al.*, 1998).

A useful but not vigorously validated application of the AUDIT developed by Fleming (1996) allows the classification of problem drinkers into more specific subgroups defined as hazardous, harmful, and dependent drinkers. These three categories are determined as follows. Questions 1–3 assess the quantity and frequency of drinking, and are used to detect 'at risk' alcohol consumption. A combined score of  $\geq 4$  classifies drinking as 'hazardous'. Questions 4–6 screen for signs and symptoms of alcohol dependence, and a combined score of  $\geq 4$  indicates the existence or emergence of alcohol dependence. Questions 7–10 enquire about problems caused by alcohol consumption and adverse consequences of drinking. A combined score of  $\geq 4$  indicates the existence of 'harmful drinking'.

The pilot study involved a convenience sample of 32 adults presenting for clinical attention in primary care outreach clinics conducted by the Zumaque Foundation in three mountain villages of a single sub-tribe. Physicians were asked to interview as many adult patients as possible during a busy outpatient clinic. Patients were selected at the discretion of the physicians, who were likely to select patients in whom alcohol problems were suspected. Episodic binge drinking and alcohol-related problems were reported by both men and women. Alcohol-related problems were significantly more common among men than among women, with men also reporting earlier onset of drinking (mean age 17.5 vs 19.2 years). These findings led to the decision to conduct a prospective population-based household survey.

Because little was known about ideas regarding alcohol use in this indigenous culture, we sought to collect both quantitative and qualitative information regarding alcohol use, its historical and cultural origins, its consequences, and perceptions of individuals regarding the presence or absence of alcohol-related problems. Quantitative data were collected using a revised questionnaire, which included the AUDIT plus the question, 'Who in your family drinks a lot?' The questionnaire was translated into the tribal language, and two villages accessible by vehicle and to which the non-profit foundation's medical team was well known, were selected for inclusion in the household survey. Permission was obtained from the village chiefs for conducting the study. Inhabitants of these two villages represent two different subtribes. A random sample of half the families in each village was selected by numbering the households and drawing numbers from a hat. House-to-house interviews of all household members 15 years or older were performed by an experienced alcohol investigator (J.P.S.) and two trained high school seniors during April and May of 1997. Investigators worked with local elementary school teachers or nurses, who were fluent in both the tribal language and Spanish. Patients were first questioned in Spanish, and questions were repeated in the tribal language for those who could not understand the Spanish questions. Individuals of other ethnic backgrounds and individuals of mestizo origin (one non-tribal parent or two or more non-tribal grandparents) were excluded from the study. Many individuals who were not a part of the random sample also volunteered to complete the questionnaire, thus information was gathered on additional subjects as well. Results were analysed with  $\chi^2$ -tests using SPSS software.

Qualitative data were collected by means of focus groups, which were conducted according to the method described by Varkevisser (1991). In each village, after AUDIT information was obtained, two focus group discussions were held, one involving women and the other involving men. Each group included 10–15 participants, who had completed the AUDIT. Based on their answers to the AUDIT, participants were carefully selected to include both the youngest and oldest participants in the study and participants with a wide range of AUDIT scores. One investigator (J.P.S.) directed the discussion in Spanish with the assistance of a community participant fluent in both Spanish and the local language. The oldest participants in each focus group were asked to describe drinking patterns in their villages prior to significant interaction with Venezuelan Creole culture. All participants were asked how their drinking patterns had changed as a result of increasing

cultural contact, and whether they perceived that alcohol was causing problems in their communities. Focus groups were tape-recorded. The tapes of all four discussion groups were reviewed by three investigators to determine common answers to the questions asked.

## RESULTS

### *Findings in the total sample*

The prospective household survey obtained information on 105 of 122 potential subjects from the two villages (54 and 51 subjects, respectively). Nine subjects (7.3%) were excluded from the study because of non-tribal ethnic origin (seven from a neighbouring tribe and two mestizos). Seven subjects (6.2%) belonging to selected households were unavailable on interview days, and one subject (0.9%) refused, resulting in a completion rate of 86%. Among those interviewed, 50.5% were females. Abstinence during the previous year was reported by 5.8% of males and 73.6% of females (ratio 1:12.7). Additionally, 26.4% of women and 3.9% of men commented during the course of the interview that, though they had abstained during

the previous year, they had consumed alcohol at some time in the past. Beer was the most frequently consumed beverage among both men (98.1%) and women (41.5%). Over half of the men (57.7%), but only 7.5% of the women, also reported drinking rum. Consumption of traditional fermented corn liquor, was reported by 36.5% of men and 26.4% of women. When compared to the whole population of drinkers, corn liquor drinkers were more likely to be older (mean age 39.9 vs 29.4 years for non-corn liquor drinkers,  $P = 0.001$ ) and to show evidence of problem drinking (AUDIT score of  $\geq 8$ ,  $P = 0.03$ ). Corn liquor consumption was also more frequent among residents of the village which is more remote from the nearest Creole town, has no regularly scheduled commercial transportation into town, and has a corn liquor trough in the centre of the village. The majority of all men surveyed (69.5%) drank at least two different kinds of alcoholic beverages, while only 20.8% of the women did so.

Answers to the AUDIT questions are presented in Table 1. The overall mean AUDIT score was 2.2 for females and 16.2 for males. Using a cut-off score of 8, 7.5% of females and 86.5% of males met overall criteria for problem drinking, resulting in a male:female ratio of 11.5:1 ( $P < 0.0001$ ).

Table 1. Item frequencies in the Alcohol Use Disorders Identification Test

		Score <sup>a</sup>				
		0	1	2	3	4
		Never	Monthly or less	2-4 times a month	2-3 times per week	$\geq 4$ times per week
1. How often do you have a drink containing alcohol?	Male (%)	5.8	67.3	25	1.9	0
	Female (%)	73.6	26.4	0	0	0
		1 or 2	3 or 4	5 or 6	7 to 9	$\geq 10$
2. How many drinks containing alcohol do you have on a typical day when you are drinking?	Male (%)	5.8	0	1.9	7.7	84.6
	Female (%)	71.7	5.7	5.7	5.7	11.3
		Never	Less than monthly	Monthly	Weekly	Daily or almost daily
3. How often do you have six or more drinks on one occasion?	Male (%)	7.7	36.5	40.4	15.3	0
	Female (%)	75.4	24.5	0	0	0
4. How often during the last year have you found that you were not able to stop drinking once you had started?	Male (%)	36.5	19.2	34.6	7.7	1.9
	Female (%)	94.3	5.7	0	0	0
5. How often during the last year have you failed to do what was normally expected from you because of drinking?	Male (%)	51.9	23.1	23.1	1.9	0
	Female (%)	98.1	1.9	0	0	0
6. How often during the last year have you needed a first drink in the morning to get yourself going after a heavy drinking session?	Male (%)	59.6	15.4	19.2	5.8	0
	Female (%)	94.3	5.7	0	0	0
7. How often during the last year have you had a feeling of guilt or remorse after drinking?	Male (%)	34.6	40.4	23.1	1.9	0
	Female (%)	92.5	7.5	0	0	0
8. How often during the last year have you been unable to remember what happened the night before because you had been drinking?	Male (%)	28.8	40.4	30.8	0	0
	Female (%)	94.3	5.7	0	0	0
		No		Yes <sup>b</sup>		Yes <sup>c</sup>
9. Have you or someone else been injured as a result of your drinking?	Male (%)	42.3		15.4		42.3
	Female (%)	88.7		7.5		3.8
10. Has a relative or friend or a doctor or other health worker been concerned about your drinking or suggested you cut down?	Male (%)	17.3		13.5		69.2
	Female (%)	86.8		11.3		1.9

$n = 52$  males and 53 females.

<sup>a</sup>Scoring: each response is weighted from 0-4. Note that questions 9 and 10 are scored 0, 2 and 4. A score of  $\geq 8$  over all 10 questions indicates that problem drinking is likely.

<sup>b</sup>Yes, but not in the last year.

<sup>c</sup>Yes, during the last year.

Analysis of AUDIT questions 1–3 revealed that 22.6% of women and 94.2% of men exhibited hazardous drinking patterns. Levels of binge drinking were extremely high among both men and women. Although no female participant reported drinking more often than once a month, 24.5% of all women interviewed, and 92.9% of all female drinkers reported drinking six or more drinks on occasion when drinking. Ten or more drinks per occasion were typically consumed by 11.3% of all women and by 42.9% of all female drinkers. Among men, these numbers were significantly higher, with 92.3% of men reporting consumption of six or more drinks at least occasionally (usually monthly), and 84.6% of men typically consuming 10 or more drinks per session.

Analysis of AUDIT questions 7–10 revealed that 7.5% of women and 80.8% of men had experienced sufficient consequences from their drinking to be classified as ‘harmful drinkers’. At least one alcohol-associated problem was reported by 75% of past and current female drinkers, and by 100% of male drinkers. Among women, the most frequently reported problems included being advised to cut-down on their drinking (14% of all women) or injury to themselves or others as a result of their drinking (12%). Eighty-three per cent of the males had been advised to cut back on their alcohol consumption, 71% had experienced blackouts, and 65% had felt guilty about their drinking within the past year.

Signs of alcohol dependence (questions 4–6) were rare among women. Six per cent reported loss of control when drinking, 6% reported needing a first drink in the morning, and 2% reported failing to meet responsibilities because of drinking. No women met AUDIT subscale criteria for alcohol dependence. Among the men, however, 63% were unable to stop drinking once they started, 42% had failed to meet normal obligations due to drinking, and 40% sometimes needed a first drink in the morning. Overall, 36.5% of men met subscale criteria for alcohol dependence. Among subjects actively drinking at the time of the survey, 28.6% of current female drinkers and 79.6% of current male drinkers reported one or more signs of dependence within the past year.

Only 9.4% of women and 15.4% of men denied having any family members who were heavy drinkers. Females reported a mean of 2.1 family members, and males reported a mean of 1.8 family members, who drank heavily or had drunk heavily in the past. Although not all participants described their relationship to drinking members mentioned, 70 (66.7%) listed relatives whom they identified as first degree relatives.

#### *Focus group findings*

Participants in all four focus groups described significant alcohol consumption in their villages prior to significant contact with Venezuelan Creole culture. Several times each year, especially during the corn harvest season, the trunk of a large tree would be hollowed out and filled with corn mash by an individual specially chosen by the community. The corn mash would be allowed to ferment to create an alcoholic beverage, with a high enough alcoholic content to cause intoxication after consumption of only two glasses or gourdfuls. When the corn liquor was ready, a village festival would be held in which all adults would drink to the point of falling down. Men would typically bring their bows and arrows and fight to settle grudges. Festivals would end after 2 or 3 days, when the corn liquor ran out. None of the participants could recall

individuals who consumed alcoholic beverages at times other than festival celebrations.

With increasing contact with Creole culture, several changes occurred which resulted in changes in drinking patterns. Cash incomes were generated through the sale of cash crops, timber, and through day labour on nearby cattle ranches. Men from the villages began to frequent the bars of nearby towns and consume beer and rum. Drinking to the point of intoxication in town, at times accompanied by fighting, became a frequent pattern for men during harvest times or on payday for those working in ranches. Participants in all four focus groups reported alcohol-related problems, which had developed with these changes in drinking patterns. These included lack of food, medicine, or school supplies for their children after spending all or most of their cash incomes on alcohol, individual cases of trauma from falls, fights, or vehicular accidents (usually bicycles or motorcycles), medical illnesses and family problems (most commonly arguments or fights). Disorderly conduct or fighting would frequently result in individuals being put in village jails, especially on holidays, e.g. the period from 24 December to early January. In each community, both men and women expressed their desire for help in decreasing alcohol-related problems in the community.

#### DISCUSSION

To our knowledge, this study is the first to attempt a quantitative assessment of alcohol problems in a South American indigenous group using a validated evaluation instrument. The 87% prevalence of problem drinking among this male population is the highest rate thus far reported among any population screened using the AUDIT. It is consistent with prevalence rates found in three North American Indian studies which used other instruments (Manson *et al.*, 1992; Leung *et al.*, 1993; Robin *et al.*, 1998). Abstinence was infrequent (5.8%), and binge drinking was the predominant consumption pattern. Eighty-five per cent of men reported consuming 10 or more drinks per occasion, usually on a monthly basis. Although no daily drinkers were found in either community, symptoms of alcohol dependence were present in significant numbers of men (36.5%). Negative consequences of drinking were reported in all areas surveyed, including alcoholic blackouts, alcohol-related injuries, feelings of guilt or remorse, neglect of their day-to-day responsibilities, and inability to stop drinking once they started.

Alcohol consumption patterns among women differed dramatically from those in men in almost every area. Women reported markedly higher levels of abstinence and markedly lower levels of problem drinking. The prevalence of problem drinking is significantly lower than that of North American Indian women, but slightly higher than rates reported in Mexico (Medina-Mora *et al.*, 1998) and in epidemiological studies of Blacks, Whites and Hispanics in the USA (Helzer *et al.*, 1991). Nonetheless, binge drinking patterns were evident among women drinkers, with 25% of women typically consuming six or more drinks per occasion and 11% of women typically consuming 10 or more drinks per occasion. This consumption was infrequent, however, with most only consuming alcohol once or twice a year. Though women reported negative consequences of drinking in all areas surveyed, their numbers



were small. There was no evidence of alcohol dependence in women, who have infrequent access to alcohol, except during cultural celebrations. This is of interest, in the light of recent studies in both Panama and the USA which indicate that lack of access to psychoactive substances may be a key reason for lower levels of substance misuse problems in women (Delva *et al.*, 1999).

The focus groups provided information regarding cultural attitudes toward alcohol-related consequences and historical origins of the drinking patterns observed. Awareness of alcohol-related problems was high. Both men and women clearly acknowledged problems in their communities caused by alcohol, including economic, legal, and medical problems, as well as violence. Heavy alcohol use is characteristic of both past and present tribal life. Current alcohol-related problems appear to have their roots in both earlier cultural patterns of alcohol use (i.e. binge drinking when alcohol was available) and in changes that occurred as a result of contact with Western society. Focus group participants described a long-standing cultural pattern of episodic heavy drinking, followed by fighting, during festival celebrations. This pattern has also been observed by anthropologists who have studied tribal groups of Carib origin (Coppens and Escalante, 1983). Alcohol consumption has apparently escalated as a result of greater contact with Western society. Whereas previously availability was limited to certain occasions and to the amount which could be produced in one tree trunk, it is now available in virtually unlimited quantities in Venezuelan towns and cities. It is of interest that those who report having drunk traditional corn liquor are more likely to manifest alcohol-related problems. Changes appear to parallel those described by Natera (1987) in rural areas of Mexico, in which commercial beverages gradually replaced autochthonous ones, and more frequent consumption replaced occasional ritual or festival use. The result has been a progressive increase in alcohol misuse which has paralleled increases in cash incomes. One interesting area for future study would be to examine in a more systematic way whether increasing levels of acculturation correlate with more advanced alcohol problems.

Another interesting finding of this study is the similarity between the drinking patterns in this South American Indian culture and drinking patterns observed among Native American populations in the USA. Both groups demonstrate periodic, 'explosive' episodes of group drinking marked by drinking to intoxication, and displays of aggression, with alcohol rapidly consumed until the supply is exhausted or drinkers pass out (Weibel-Orlando, 1989). These similarities are present, despite the marked differences in historical exposure to alcohol in these widely separated regions. Most Native Americans in the USA and Canada, for example, had no exposure to alcoholic beverages prior to the arrival of Europeans (Heath, 1989). In South America, on the other hand, fermented beverages have been consumed for centuries, with Christopher Columbus reporting sampling of fermented beverages made by the indigenous peoples upon arrival to the coast of Venezuela in the 1490s (Carrizales *et al.*, 1986). It would be intriguing to study genetic markers, such as those recently described by Long *et al.* (1998), among Native Americans in both the USA and Venezuela to ascertain whether these similarities in drinking patterns might be associated with genetic factors common to both groups. Further exploration

of problem drinking in this tribe could test the hypothesis that individuals who had greater contact with Western society, or came from families with more Western contact, were more likely to have problems. Another area warranting further study involves analysis of factors which may account for differences between this tribal group and a neighbouring tribe, which has remained even more isolated from Western society, has no corn liquor tradition, and has a very low prevalence of alcohol problems.

There are several limitations of this study. One is the small sample size. Though overall numbers are small, our random sample represents ~5% of the adult population of the entire tribe and our combined adult sample (the random sample plus 72 additional adult subjects who completed the questionnaire) represents some 9%. We believe, however, that this percentage is large enough to draw meaningful conclusions. Another limitation is the fact that the study villages could have exaggerated levels of alcohol problems due to greater access to Venezuelan towns than other villages in more remote mountain areas. In an attempt to address this limitation, we analysed non-random data collected during the course of this study from the 72 additional subjects from five other more remote villages. We found the prevalence of alcohol problems in more remote villages to be even higher than that of our population-based sample, although the non-random sample selection may have influenced these results. A third limitation of the study is the possible misinterpretation of focus group findings, due to mistranslation or differences in cultural understanding. We believe this to be unlikely, since translation was performed by educated tribal individuals with a solid understanding of both their tribal culture and the larger Venezuelan society. Another limitation is the possibility of incomplete information because of participants' reluctance to disclose or freely discuss alcohol problems with outsiders. Both the high level of alcohol problems reported and the low refusal rate would seem to indicate that this was not the case.

In conclusion, the use of the AUDIT questionnaire, followed by focus group discussions, revealed a high prevalence of alcohol-related problems in this South American indigenous group, especially among men. Patterns of alcohol consumption, including heavy occasional binge drinking, drinking to intoxication, and frequent fighting while intoxicated, parallel patterns seen among many North American groups, to whom they are believed to be ethnically related. Women showed higher rates of abstinence and lower rates of problem drinking, perhaps due in part to lesser access to alcohol. Focus groups revealed apparent contributing factors in both cultural patterns of alcohol use and the consequences of contact with Western civilization. The high level of awareness of alcohol-related problems and an interest in finding solutions indicate the need to mobilize resources to assist community leaders in promoting local norms to help limit alcohol misuse and in offering assistance to problem-drinkers who wish to reduce their consumption.

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## REFERENCES

- Andre, J. M. (1979) *The Epidemiology of Alcoholism Among American Indians and Natives*. Indian Health Service, Albuquerque, NM.
- Beresford, T. P., Blow, F. C., Hill, E., Singer, K. and Lucey, M. R. (1990) Comparison of CAGE questionnaire and computer-assisted laboratory profiles in screening for covert alcoholism. *Lancet* **336**, 482–485.
- Carrizales, V., Barrios, O. and González, J. (1986) Mejoramiento tecnológico de la producción de cachirí: Bebida fermentada de yuca (*Manihot esculenta Crantz*) de origen indígena. [Technological improvement of cachiri production: indigenous fermented drink from cassava (*Manihot esculenta Crantz*).] *Acta Científica Venezolana* **37**, 318–324.
- Conigrave, K. M., Hall, W. D. and Saunders, J. B. (1995) AUDIT Questionnaire: choosing a cut-off score. *Addiction* **90**, 1349–1356.
- Coppens, W. and Escalante, B. eds (1983) *Los aborígenes de Venezuela, Etnología*, Vol. II [The aborigenes of Venezuela, Contemporary Ethnology, Vol. II], Monograph No. 29, pp. 33–124. Fundación La Salle de Ciencias Naturales, Instituto Caribe de Antropología y Sociología, Caracas.
- Curley, R. T. (1967) Drinking patterns of the Mescalero Apache. *Quarterly Journal of Studies on Alcohol* **28**, 116–131.
- Delva, J., Van Etten, M. L., Gonzalez, G. B., Cedeno, M. A., Penna, M., Caris, L. H. and Anthony, J. C. (1999) First opportunities to try drugs and the transition to first drug use: evidence from a national school survey in Panama. *Substance Use and Misuse* **34**, 1451–1467.
- Ewing, J. A. (1984) Detecting alcoholism: the CAGE questionnaire. *Journal of the American Medical Association* **252**, 1905–1907.
- Fleming, J. (1996) Epidemiology of alcohol use in Australian women: findings from a national survey of women's drinking. *Addiction* **91**, 1325–1334.
- Fleming, M. F., Barry, K. L. and MacDonald, R. (1991) The Alcohol Use Disorders Identification Test (AUDIT) in a college sample. *International Journal of the Addictions* **26**, 1173–1185.
- Garbarino, M. S. and Sasso, R. F. (1994) *Native American Heritage*. Waveland Press, Prospect Heights, IL.
- Gudmundsdottir, E. and Tomasson, K. (1996) Alcohol abuse and mental distress of psychiatric and neurologic patients. *Nordic Journal of Psychiatry* **50**, 153–159.
- Guevara-Arnal, L., Zapata, L., Kaplan, M., Vargas-Vorackova, F., Marquez, M., Galindo, R., de la Fuente, J. and Kershenovich, D. (1995) Hazardous alcohol consumption among Mexican inpatients: a multicenter study. *American Journal on Addictions* **4**, 170–176.
- Heath, D. B. (1989) American Indians and alcohol: epidemiological and sociocultural relevance. In *Alcohol Use among U.S. Ethnic Minorities*, DHHS Publication No. ADM 89-1435, Research Monograph No. 18, Spiegler, D., Tate, D., Aitken, A. and Christian, C. eds, pp. 207–222. National Institute on Alcohol Abuse and Alcoholism, Rockville, MD.
- Helzer, J. E., Burnam, A. and McEvory, L. T. (1991) Alcohol abuse and dependence. In *Psychiatric Disorders in America*, Robins, L. N. and Regier, D. A. eds, pp. 81–115. Free Press, New York.
- Hill, T. W. (1980) Life styles and drinking patterns of urban Indians. *Journal of Drug Issues* **10**, 257–272.
- Holmila, M. (1995) Intoxication and hazardous use of alcohol: results from the 1992 Finnish Drinking Habits Study. *Addiction* **90**, 785–792.
- Indian Health Service (1990) *Trends in Indian Health 1990*. Rockville Office of Planning, Evaluation, and Legislation, Division of Program Statistics, US Indian Health Service.
- Institute of Medicine (1990) *Broadening the Base of Treatment for Alcohol Problems*. National Academy Press, Washington, DC.
- Isaacson, J., Butler, R., Zacharek, M. and Tzelepis, A. (1994) Screening with the Alcohol Use Disorders Identification Test (AUDIT) in an inner-city population. *Journal of General Internal Medicine* **9**, 550–553.
- Jennings, J. D. (1983) *Ancient North Americans*. W. H. Freeman, New York.
- Leung, P. K., Kinzie, J. D., Boehlein, J. K. and Shore, J. H. (1993) A prospective study of the natural course of alcoholism in a Native American village. *Journal of Studies on Alcohol* **54**, 733–738.
- Levy, J. E. and Kunitz, S. (1974) *Indian Drinking*. Wiley Interscience, New York.
- Long, J. C., Knowler, W. C., Hanson, R. L., Robin, R. W., Urbanek, M., Moore, E., Bennett, P. H., and Goodman, D. (1998) Evidence for genetic linkage to alcohol dependence on chromosomes 4 and 11 from an autosome-wide scan in an American Indian population. *American Journal of Medical Genetics* **81**, 216–221.
- Luckie, L., White, R., Miller, W., Icenogle, M. and Lasoski, M. (1995) Prevalence estimates of alcohol problems in a Veterans Administration outpatient population: AUDIT vs MAST. *Journal of Clinical Psychology* **51**, 422–425.
- Manson, S. M., Shore, J. H., Baron, A. E., Ackerson, L. and Neligh, G. (1992) Alcohol abuse and dependence among American Indians. In *Alcoholism in North America, Europe, and Asia*, Helzer, J. E. and Canino, G. J. eds, pp. 113–130. Oxford University Press, New York.
- Mar, D., Johnson, J., Pistorello, J., Rigmaiden, R. and Veach, T. (1995) Prevalence of substance abuse and smoking in a university family practice setting. *Substance Abuse* **16**, 107–114.
- Matthews, C. (1997) Examining the relationship between problem drinking and eating disorders in college women. PhD dissertation, Pennsylvania State University in State College, PA, USA. *Dissertation Abstracts International* **57**, 5335-B.
- Medina-Mora, E., Carreño, S., and de la Fuente, J. R. (1998) Experience with the Alcohol Use Disorders Identification Test (AUDIT) in Mexico. In *Recent Developments in Alcoholism*, Galanter, M. ed., Vol. 14. Plenum Press, New York.
- Morton, J., Jones, T. and Manganaro, M. (1996) Performance of alcoholism screening questionnaires in elderly veterans. *American Journal of Medicine* **101**, 153–159.
- Natera, G. (1987) El consumo de alcohol en zonas rurales de México. [Alcohol consumption in rural areas of Mexico.] *Salud Mental* **10**, 59–66.
- Oficina Central de Estadística e Informática (1992) *Censo Indígena de Venezuela 1992*. [Indigenous Census of Venezuela 1992.] República de Venezuela, Presidencia de la República, Caracas.
- Piccinelli, M., Tessari, E., Bortolomasi, M., Piasere, O., Semenzin, M., Garzotto, N. and Tansella, M. (1997) Efficacy of the Alcohol Use Disorders Identification Test as a screening tool for hazardous alcohol intake and related disorders in primary care: a validity study. *British Medical Journal* **314**, 420–424.
- Poon, A., Owen, J. and Gijsbers, A. (1994) Identification of at-risk drinkers in an orthopaedic inpatient population. *Australian and New Zealand Journal of Surgery* **64**, 775–779.
- Quarrie, K., Feehan, M., Waller, A., Cooke, K., Williams, S. and McGee, R. (1996) New Zealand rugby injury and performance project: alcohol use patterns within a cohort of rugby players. *Addiction* **91**, 1865–1868.
- Rigmaiden, R., Pistorello, J., Johnson, J., Mar, D. and Veach, T. (1995) Addiction medicine in ambulatory care: prevalence patterns in internal medicine. *Substance Abuse: Journal of the Association for Medical Education and Research in Substance Abuse* **16**, 49–57.
- Robin, R., Long, J., Rasmussen, J., Albaugh, B. and Goldman, D. (1998) Relationship of binge drinking to alcohol dependence, other psychiatric disorders, and behavioral problems in an American Indian tribe. *Alcoholism: Clinical and Experimental Research* **22**, 518–523.
- Rozyrko, V. and Ferguson, L. C. (1978) Admission characteristics of Indian and White alcoholic patients in a rural mental hospital. *International Journal of the Addictions* **13**, 591–604.
- Saunders, J. B., Aasland, O. G., Babor, T. F., de la Fuente, J. R. and Grant, M. (1993) Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption — II. *Addiction* **88**, 791–804.
- Schmidt, A., Barry, K. and Fleming, M. (1995) Detection of problem drinkers: The Alcohol Use Disorders Identification Test (AUDIT). *Southern Medical Journal* **88**, 52–59.
- Schoeman, J. H., Parry, C. D., Lombard, C. J. and Klopper, H. J. (1994) Assessment of alcohol-screening instruments in tuberculosis patients. *Tubercle and Lung Disease* **75**, 371–376.
- Seppa, K., Makela, R. and Sillanaukee, P. (1995) Effectiveness of the Alcohol Use Disorders Identification Test in occupational health screenings. *Alcoholism: Clinical and Experimental Research* **19**, 999–1003.

- Sharkey, J., Brennan, D. and Curran, P. (1996) Pattern of alcohol consumption of a general hospital population in north Belfast. *Alcohol and Alcoholism* **31**, 279–285.
- Varkevisser, C. M. (1991) Module 10C: Focus Group Discussion. In *Designing and Conducting Health System Research Projects, Part I: Proposal, Development and Fieldwork*, Varkevisser, C. M., Pathmanathan, I. and Brownlee, A. eds, pp. 171–184. International Development Research Center, Ottawa, Ontario.
- Weibel-Orlando, J. C. (1989) Pass the bottle, Bro!: a comparison of urban and rural Indian drinking patterns. In *Alcohol Use Among U.S. Ethnic Minorities: Proceedings of a Conference on the Epidemiology of Alcohol Use and Abuse Among Ethnic Minority Groups, September 1985*, Spiegler, D., Tate, D., Aitken, S. and Christian, C. eds. NIAAA Research Monograph No. 18, pp. 269–289. National Institute on Alcohol Abuse and Alcoholism, Rockville, MD.
- Weisner, T. S., Weibel-Orlando, J. C. and Long, J. (1984) ‘Serious drinking,’ ‘White man’s drinking,’ and ‘teetotaling’: drinking levels and styles in an urban American Indian population. *Journal of Studies on Alcohol* **45**, 237–250.
- Westermeyer, J. (1976) Use of a social indicator system to assess alcoholism among Indian people in Minnesota. *American Journal of Drug and Alcohol Abuse* **3**, 447–456.
- Westermeyer, J. (1979) The drunken Indian: myths and realities. In *Beliefs, Behaviors, and Alcoholic Beverages: A Cross-Cultural Survey*, Marshall, M. ed., pp. 110–116. University of Michigan Press, Ann Arbor.
- Westermeyer, J. J. and Baker, J. M. (1986) Alcoholism and the American Indian. In *Alcoholism: Development, Consequences and Interventions*, 3rd edn, Estes, N. J. and Heinemann, M. E. eds, pp. 173–282. Mosby, St Louis, MO.