

Research Article

Alcohol Consumption Patterns and Alcohol Related Harm in a Small Middle Income Country

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- CAGE

Abstract

Background: Alcohol consumption is a major contributor to morbidity and mortality and hence is an important and ongoing public health challenge. While alcohol abuse and dependence have historically received the greatest attention, the detection and treatment of less severe alcohol use disorders particularly in primary care settings where assessment and intervention can be initiated early is the new focus.

Objectives: The purpose of the study is to describe alcohol consumption patterns in a primary care setting and assess alcohol-related harm as the first steps to provide evidence for future interventions.

Design and methods: A prevalence study was used; the population consisted of all adults 18 years and older in a primary care setting. A multistage sampling technique was used. An original questionnaire was designed to accommodate local culture and vernacular but also included the 4-item CAGE, questionnaire.

Results: A total of 865 participants were entered into the study. The estimated prevalence of alcohol consumption was 60%, while the prevalence of lifetime abstainers was 6.5 one of the lowest in the hemisphere. Further, 381 (73%) participants were unaware that alcohol was a risk factor for breast cancer, the leading cause of cancer among women in Trinidad. A small percentage (51, 9.8%) of women consumed alcohol during pregnancy. Using the CAGE questionnaire 142 (16.4%) participants was found to be CAGE positive.

Conclusion: The estimated prevalence of alcohol consumption in Trinidad is 60%, of which approximately 18% met the criteria for hazardous drinking. At risk drinking was more prevalent in males than females, there was no significant ethnic disparity, and however the proportion of women drinking alcohol has doubled.

INTRODUCTION

Alcohol use disorders (AUDs) are a major public health challenge in the developing world. According to the World Health Organization (WHO) Global Status Report on alcohol and health in 2011 [1], the harmful use of alcohol results in 2.5 million deaths per year globally, and is ranked as the third leading cause of disability and death in the developed world. The Institute of Alcohol Studies has rated alcohol consumption problems as more important than elevated blood cholesterol levels and obesity, three (3) times more important than diabetes and five (5) times more important than asthma [2]. The 2013–20 World Health Organization (WHO) Global Action Plan for the Prevention and Control of Non-Communicable Diseases (NCDs), sets as one of its targets the harmful use of alcohol [3].

AUDs are a range of heterogeneous disorders, which include abuse or dependence, as well as less severe disorders often referred to as heavy, hazardous, or harmful drinking [4]. According to the Pan American Health Organization (PAHO), in the Americas 5.4% of all deaths recorded in 2002 were alcohol-related, which was higher than the global average of 3.7% [5]. In terms of volume, alcohol consumption in the Americas (8.7 l/capita) also exceeded the worldwide average (6.2L/capita) by a 2.5 L/capita [5]. PAHO concluded that alcohol consumption is the most important health risk factor in low and middle-income countries in the Americas. In particular, PAHO also reported increasing rates of alcohol consumption in Trinidad and Tobago (TTO) among the adult population (≥ 15 years). It has also been shown that deaths from cirrhosis of the liver increased from 3.9 per 100,000 in 2000 to 7.5 per 100,000 among females while in

males it increased from 12.8 per 100 000 to 19.5 per 100 000 in males, over the same time period [5]. Consequently at the start of the millennium alcohol was considered the leading risk factor for the burden of disease in the Americas greater than cigarette smoking and obesity [6]. In the Global Burden of Disease Report 2010 alcohol use was among the top 10 risk factors for the burden of disease in Trinidad [7]. Although alcohol abuse and dependence have historically received the greatest attention, increasing emphasis has been placed on the detection [8-10], and treatment of less severe AUDs [11], particularly in primary care settings [12]. This change in focus has occurred in part because of reports that heavy, hazardous, and harmful drinking are more common and may be more responsive to treatment than alcohol abuse or dependence.

TTO lacks a comprehensive policy that can serve as a model to other developing countries. However, restriction on hours and days of alcohol sales, drinking and driving, controlling advertising, increasing taxes and minimum age for the sale of alcohol have all been implemented. One area of neglect is a policy on interventions at the primary care level. There are no previous studies to provide evidence to guide this process. This study therefore lays the foundation towards understanding alcohol consumption at the primary care level to inform appropriate interventions. These include treatment and community based services based on scientific evidence.

The purpose of the study therefore is to measure in the first instance the proportion of individuals consuming alcohol and describe patterns of alcohol consumption, and secondly to determine the prevalence of hazardous drinking, at the primary care level.

METHODS

We used a prevalence study design. The population for the study was attendees of primary care facilities in Trinidad. The only criterion for entry into the study was adults' ≥ 18 years. Thus the only exclusion criterion was age < 18 years. We used a two stage sampling technique. Trinidad is divided into 4 regional Health Authorities (RHA), each responsible for the delivery of care within their boundaries. In order to attain a representative sample, all 4 regions were used to select participants. The first stage involved creating a database of all health facilities in each RHA from which we randomly selected health facilities for the study. In the second stage each randomly selected health facility was considered a cluster and hence all attendees at each cluster were invited to participate in the study. A sample size was estimated at 865 based on: a) a population proportion of 50%, b) confidence interval (CI) of 95% and) an absolute precision of 4 percentage points.

A structured questionnaire was designed and pretested with appropriate amendments before being administered. The questionnaire was designed to collect data on demographic variables, patterns of drinking and risk behaviors; it also included the CAGE questionnaire. We defined a risk behavior as a lifestyle activity that places a person at increased risk of suffering a particular condition, illness or injury. Numerous psychological, social, political, and cultural factors influence the construction of individual risk perceptions, which is an important measure as it

influences health risk communication. The CAGE questionnaire was selected to measure hazardous drinking because it has been extensively evaluated and is also considered the best-known valid screening instrument for alcoholism [13,14]. It is reported to have a sensitivity of 93% and a specificity of 76% for the identification of excessive or problem, drinking and a sensitivity of 91% and specificity of 77% for the identification of alcoholism [15]. This compares well with the measurement of gamma-glutamyl transpeptidase, which is abnormal in only a third of patients having more than 16 'drinks' per day [16]. Occupations were categorized using the International Labor Organization definitions [17].

Hazardous drinking is defined as a quantity or pattern of alcohol consumption that places individuals at risk for adverse health events [18], and is recognized by the World Health Organization (WHO) as a distinct disorder. The quantity or pattern of alcohol consumption that constitutes hazardous drinking is also typically specified by setting threshold values for an individual's average number of drinks consumed per week or per occasion. We used The National Institute of Alcohol Abuse and Alcoholism (NIAA) recommendation which sets this threshold at more than 14 drinks per week for men (or > 4 drinks per occasion); more than 7 drinks per week for women (or > 3 drinks per occasion); and more than 7 drinks per week for all adults 65 years and above [18]. The NIAA has supported research on alcohol use in Trinidad. Individuals whose drinking exceeds these guidelines are considered to be at increased risk for adverse health events [18-20], and therefore considered hazardous drinking. Therefore for the purposes of this study more than 14 drinks per week for men (or > 4 drinks per occasion); more than 7 drinks per week for women (or > 3 drinks per occasion) is defined as hazardous drinking. The term "current abstainer", often used in population surveys, is usually defined as a person who has not drunk an alcoholic beverage in the preceding 12 months [21].

Serum γ glutamyl transpeptidase (GGT) regarded as a biomarker of alcohol consumption was measured from samples taken at the time of the interview. We chose GGT because in our setting it was easy to obtain, readily testable, and relatively inexpensive. Elevated serum GGT level remains the most widely used marker of alcohol abuse [22]. GGT, was classified as normal (< 50 U/L) or elevated (≥ 50 U/L) based on laboratory specific reference ranges. Results obtained were compared to self-reported alcohol use to determine whether the degree of long-term alcohol consumption correlates with the concentration of the GGT concentration. GGT measurements were carried out with International Federation of Clinical Chemistry (IFCC) compatible measuring systems and standard clinical chemical methods. Data were analyzed using SPSS vs. 16, a p value of ≤ 0.05 was considered significant and 95% confidence intervals (CI) were calculated for proportion. Ethical Approval for the study was obtained from University of the West Indies Ethics Committee.

RESULTS

A total of 865 subjects in the four different regional health authorities in Trinidad who met the inclusion criteria were recruited for the study. All subjects were administered the questionnaire. No participant refused to participate resulting in a 100% response rate and therefore all (865) participants

were available for analysis. The mean age was 45 years with an inter-quartile range of 30. The sample consisted of more women, (519, 60%) than men, (346, 40%), giving a female: male ratio of 3:2, (Table 1). Approximately one half of the participants were married (379, 43.8%), and a quarter single (245, 28.3%), (Table 2). Of the 519 women interviewed, 46 (5.3%) were pregnant at the time of the interview. The majority of participants (682, 78.8%) were either a parent or guardian. In Trinidad, there are two major diaspora: South East Asians (SEA) and Africans, representing 35.4% and 34.2% of the population respectively. In our sample there were marginally more SEA (418, 48.3%) than Africans (307, 35.5%), (Table 1). Apart from being a multi-ethnic society, Trinidad is also multi-religious consisting of three major religions (Christianity, Hinduism and Islam). Christians represent more than half of the population hence it was not usual that our sample consisted of mainly Christians (563, 65%) (Table1).

Table 1: Characteristic of the sample.

Characteristics of Sample	Participants n(%)
<i>Age</i>	
≤20	34 (3.9%)
21-30	188 (21.7%)
31-40	145 (16.8%)
41-50	129 (14.9%)
51-60	164 (19%)
≥61	205 (23.7%)
Total	865 (100%)
<i>Ethnicity</i>	
African	307 (35.5%)
SEA	418 (48.3%)
Other	140 (16.2%)
Total	865 (100%)
<i>Occupation</i>	
Managers	15 (1.7%)
Professionals	65 (7.5%)
Technicians	40 (4.6%)
Clerical support workers	66 (7.6%)
Service and sales workers	72 (8.3%)
Skilled agricultural workers	18 (2.1%)
Craft and trade workers	56 (6.5%)
Plant/machine operators/assemblers	35 (4.0%)
Elementary occupations	64 (7.4%)
Armed forces occupations	23 (2.7%)
Student	33 (3.8%)
Unemployed	378 (43.7%)
Total	865(100%)
<i>Marital Status</i>	
Single	245 (28.3%)
Married	379 (43.8%)
Divorced	50 (5.8%)

Separated	10 (1.2%)
Widowed	28 (6.7%)
Common Law	123 (14.2%)
Total	865 (100%)
<i>Religion</i>	
Christianity	563 (65.1%)
Hinduism	190 (22.0%)
Islam	61 (7.1)
Other	51 (5.9%)
Total	865 (100%)
<i>Education Level</i>	
Primary	250 (28.9%)
Secondary	363 (42%)
Vocational	58 (6.7%)
Tertiary	182 (21%)
None	8 (0.9%)
Other	4 (0.5%)
Total	865(100%)

High school level graduates were higher among females (217, 25.1%) than males (146, 16.9%). Overall 50 % (685) of subjects reported an income of less than \$3000 per month, (Table 1). The number of participants who reported that they were unemployed was 378 (43.7%), (Table 1). Further analysis revealed that more women (267, 30.9%) were unemployed compared with men (111, 12.8%), (Table 3). Therefore women were more educated but experienced less employment.

Among all participants, 514 reported that they had drunk alcohol over the past year and currently continue to drink alcoholic beverages an estimated prevalence of 60% (95% CI, 56.1- 62.7).The estimated prevalence of hazardous drinking was 18% (95% CI, 26-34), 117 (13.5%) were men and 37 (4.3%) were women, (Table 3). On the other hand 351 (40%) participants reported they were current abstainers. Overall 56 participants were lifetime abstainers resulting in estimated lifetime abstention rate of 6.5%, (95% CI 4.9-8.3). The major reasons for discontinuing drinking alcohol were: 1) to improve quality of life (59, 6.8%), 2) because of an existing illness (33, 3.8%), 3) religious recommitment (20, 2.3%) and 4) currently on rehabilitative therapy for alcohol addiction (11, 1.3%). There was a plethora of reasons for not drinking alcohol in the remaining 172 current abstainers, (Table 3).

In addition we asked female participants their knowledge and behaviors in regard to alcohol use during pregnancy and its association with breast cancer, which is leading cause of cancer among women in Trinidad. Of the 519 women participating in this study, 427 (82.3%, 95% CI 79-86) were aware of the dangers of alcohol use during pregnancy while 381 (73%, 95% CI 69-77) participants were unaware that alcohol was a risk factor for breast cancer. A small percentage (51, 9.8%, 95% CI 7.4-12.7) of women consumed alcohol during current or a past pregnancy. Of the 51 participants, 42 reported that they consumed alcohol during pregnancy, although they were aware of the adverse

Table 2: Characteristics of responses to the CAGE questionnaire by CAGE (+) and (-), and age, gender, ethnicity, religion and marital status.

Characteristic		CAGE (+) n= 142 n(%)	CAGE (-) n=372 n(%)
Gender	Male	100 (70.4)	128 (34.4)
	Female	42 (29.6)	244 (65.6)
Total		142(100)	372(100)
Ethnicity	African	51 (35.9%)	144 (38.7)
	SEA	60 (42.3%)	164 (44.1)
	Chinese	0%	4 (1.1)
	Caucasian	2 (0.1)	2 (0.5)
	Mixed	29 (20.4)	58 (15.6)
Total		142(100)	372(100)
Religion	Christianity	99 (69.7)	240 (64.5)
	Islam	9 (6.3)	14 (3.76)
	Hinduism	28 (19.7)	86 (23.1)
	Other	6 (4.2)	32 (8.6)
Total		142(100)	372(100)
Marital Status	Single	50 (35.2)	117 (31.5)
	Married	47 (33.1)	152 (40.9)
	Divorced	13 (9.2)	17 (4.6)
	Separated	3 (2.1)	3 (0.8)
	Widowed	9 (6.3)	17 (4.6)
	Common Law	20 (14.1)	66 (17.7)
Total		142(100)	372(100)
Age	18 - 20	5 (3.5)	16 (4.3)
	21 - 30	35 (24.7)	101 (27.2)
	31 - 40	29 (20.4)	74 (19.9)
	41 - 50	23 (16.2)	59 (15.9)
	51 - 60	34 (23.9)	53 (14.3)
Total	61+	16 (11.3) 142(100)	69 (18.6) 371(100)
GGT(≥50 U/L)		95(66.9)	-

effects of alcohol during their pregnancy. We explored several other risk behaviors after consuming alcohol. The highest risk taking behavior among participants who consumed alcohol was driving a motor vehicle under the influence of alcohol (310, 60.3%, 95% CI 56-65). All participants were aware that they were violating the law as well as taking a risk. The majority of participants reported that they were not smokers (406, 79%), hence only 108 (21%, 95% CI 18-25) participants both drank alcohol and smoked cigarettes (Table 4).

The CAGE questionnaire was administered to the 514 participants who drank alcohol of which 142 (16.4%) was found to be CAGE positive (+), (Table 2). Further analysis revealed that more men (100, 11.5%) than women (42, 4.9%) were CAGE (+), with a male to female ratio of 2.4:1. We scored the CAGE questionnaire in the traditional manner with each "yes" response assigned 1 point. However, only 26 (3%) of participants responded positively to the question "Have you ever taken a

morning eye opener?", therefore using 2+ was a better indicator of CAGE positive than using the last single question.

Table (2) Characteristics of responses to the CAGE questionnaire by CAGE (+) and (-), and age, gender, ethnicity, religion and marital status.

Of the two major diaspora in Trinidad SEA and Africans, more South East Asians (86, 38.4%) were found to be CAGE positive than Africans (66, 33.8%) the difference however was insignificant (p = 0.33) In addition, more single individuals (50, 6.8%) than married individuals (47, 5.4%) were CAGE positive. Participants in the age groups 21-30 years and 51-60 years were the largest groups CAGE positive (35, 24.7 % and 34, 23.9%). Among the 142 CAGE (+) respondents 66.9 % (95) had elevated levels (≥ 50 U/L) of γ glutamyl transpeptidase (GGT).We report a Cronbach α score from 0.8 indicating a strong internal consistency in the scale [23].

DISCUSSION

Increasing emphasis has been placed on the detection and treatment of hazardous and harmful drinking disorders, particularly among patients who are seen in primary care settings. The proportion of individuals that actually consume alcohol that places them at risk of disease within the Caribbean has not been adequately researched. We measured alcohol consumption using CAGE and compared it against GGT.

The study found that the prevalence of alcohol consumption in a sample from an adult population in Trinidad was 59.4% (95% CI: 56.1- 62.7).This proportion is comparable with the proportion of current drinkers in the region of the Americas (61.5%) in 2014 [22], but higher than the 40.4% in the PAHO: Pan American Steps Report 2012, [24]. Possible explanations for

Table 3: Awareness of the dangers of alcohol use during pregnancy and other risk taking behaviours.

Awareness/Risk behaviour	Response		
	Yes	No	No Response
	n(%)	n(%)	n (%)
Alcohol use during pregnancy			
Are you pregnant?	44 (8.5)	475 (91.5)	-
Did you consume alcohol during this/other pregnancy?	51 (9.8)	441 (85.0)	27 (5.2)
Are you aware of the dangers of alcohol use in pregnancy?	427 (82.3)	92 (17.7)	-
Do you know that alcohol can cause breast cancer	138 (26.6)	381 (73.4)	-
Do you drive a vehicle?	310 (60.3)	204(39.7)	-
Would you drive intoxicated?	57 (18.4)	-	-
Does advertising of alcoholic beverages influence you?	117 (22.8)	396 (77)	0.20
Have you ever received professional counseling?	141 (27)	373 (72.6)	-
Does drinking meet your expectation?	221 (43)	293 (57)	-
Current Smokers	108 (21)	406 (79)	-

Table 4: Reported alcohol and non-alcohol consumption patterns.

Consumption pattern	Response		Other Responses
	Yes	No	
	n(%)	n(%)	n(%)
Alcohol consumers			
Do you currently drink alcoholic beverages?	514 (59.4%)	351 (40.6%)	-
Hazardous drinking	154 (17.8%)	658 (76.1%)	-
Non-alcohol consumers			
Underwent Rehabilitation			351 (40%)
Religion			11 (3.1%)
An illness caused a change in drinking habits			20 (5.7%)
To Improve Quality of Life			33 (9.4%)
Lifetime abstainers			59 (16.8%)
Other reasons			56 (16%)
			172 (49%)

such a higher rate may be attributed to several factors: 1) our study is more recent, 2) we had a 100% response rate whereas the PAHO study had a lower (90.2%) response rate, 3) the PAHO study had a larger sample and was more representative of the entire population whereas our study may be biased due to the smaller sample size which consisted of more East Indians than Africans and 4) we conducted a face to face interview which is likely to reduce misclassification bias. On the other hand we report a lifetime abstainer's rate of 6.5%, (95% CI 4.9-8.3). This value is well below the reported lifetime abstainer's rate for the Americas (18.9%) or the global average of 48%, [25]. Further, the prevalence of lifetime abstention in the Americas fell for both sexes between 2005 and 2010, meaning that more people are drinking in the region overall. Although there is no data for 2005 for TTO, lifetime abstainer's rate in 2010 was 38.9 among females and 16.7 among males. Further the 2012 Pan-American STEPS Report revealed a 29.7% lifetime abstainers rate [26]. Because of small numbers we combined both males and females, which may compromise the comparability of the changes over time.

Further analysis revealed that there was no significant ethnic disparity in alcohol consumption. Although, SEA (224, 25.9%) had a higher consumption rate than Africans (195, 22.5%) the difference was not significant ($p > 0.05$). In addition there were more SEA than Africans in the study. Hutchinson in 2012 [27], reported that there is some indication that alcohol use is more common among SEA than Africans, we provide evidence that alcohol consumption is more common among South East Asians than Africans however the difference is marginal. Moore et al in 2007 found that the presence of at least one copy of a variant in the gene encoding for cytosolic ALDH1A (i.e. ALDH1A1*2) was demonstrated to be associated with an increase in alcohol dependence in SEA [28]. Thus there may be a biological explanation for the difference in alcohol consumption between SEA and Africans.

Males had a significantly (χ^2 , $p < 0.05$) higher alcohol consumption rate (65%) than females (55%). The PAHO report

of 2012 [29], reported that 50.6% of males and 30.9% of females were consuming alcohol. While our findings are consistent with the PAHO 2012 Report [29], with regard to alcohol consumption among men, we report that alcohol consumption among females doubled between 2012 (21.9%) and 2016 (55%), and women are on track to catch with men. This can be attributed to recent changes in the cultural and social fabric of the society [30]. Alcohol plays an important social and cultural role in Trinidad and Tobago. Drinking is accepted as a part of the culture even among youth. Alcohol is also a central element of religious rituals as well as celebratory and transitional rituals. Alcohol also serves to facilitate social interaction, male bonding, social and business transactions, and an expression of commiseration. Drinking is expected as part of almost all social activities so much so that its absence may evoke queries of concern. Even in situations where alcohol is formally prohibited, for example certain religious ceremonies, it is not unusual to find alcoholic beverages available at a respectful distance. It is now acceptable for women to drink alcohol as well to gather together in bars or in the colloquial term 'rum shops', which hitherto was profane. This emerging phenomenon together with aggressive and deliberate marketing campaigns funded by the alcohol industry that target women may also contribute. In addition an increasing number of women are being employed and currently more women than men are seeking tertiary education.

Another gender related issue was the age of initiation of alcohol use. We found that most males started drinking at 16 years while females started at the age of 19 years. However more importantly as much 4.7% participants reported they initiated alcohol consumption at ≤ 10 years by relatives or parents. This finding is lower than expected, according to the National Alcohol and Drug Abuse Prevention Programme (NADAPP) in collaboration with the Inter-American Drug Abuse Control Commission (CICAD) [31], reported the first age of alcohol consumption was 11 years of age and 75% consumed alcohol at the age of 13 years.

We report a high rate of awareness (82.3%) of the dangers of alcohol use during pregnancy, notwithstanding 9.8% of female respondents consumed alcohol during their pregnancy. This emphasizes that female alcohol awareness alone is insufficient to prevent alcohol-related birth defects and its consequences. In addition, the study also demonstrated that 73% of female participants were unaware that alcohol was a risk factor for breast cancer. Thus we propose more effective alcohol prevention strategies for women, particularly during antenatal care. The International Agency for Research on Cancer has declared alcohol a group 1 carcinogen having at least 15 carcinogenic compounds. [32] As such, no quantity of alcohol can be considered cancer free. In breast cancer, alcohol can increase estrogen levels and the activity of insulin-like growth factor receptors, which can stimulate mammary cell proliferation [33].

TTO has one of the highest rates (~27%) of smoking tobacco products in the Caribbean. We report that among those who drink alcohol 108 (21%) were also smokers. This difference may be attributed to recent legislation (Tobacco Control Act 2009), which prohibits smoking in public places, which includes bars. Trinidad being a multi-religious society we explored the role of

religion and alcohol consumption among CAGE (+) participants. We found that 70% of Christians 20% of Hindus and 6% of Muslims in this study were CAGE (+). Muslims had the lowest proportion of CAGE (+) participants, a finding consistent with others [34]. Religion is an important context for development because it provides a means of socialization in areas such as moral behavior and offers emotional support to individuals from the cradle to the grave [35,36]. Thus religion can impact on reducing alcohol consumption.

We used two measures to identify hazardous drinking the CAGE and direct questioning (14 drinks per week for men, or > 4 drinks per occasion; more than 7 drinks per week for women or >3 drinks per occasion). We chose to use the CAGE questionnaire instead of the Alcohol Use Disorder Identification Test (AUDIT) because it is shorter (4 questions), easily administered in a primary care setting, and can identify alcohol problems over the lifetime. In fact we showed that approximately three-quarters of participants (373, 72.6%) were never asked about alcohol use by a health care professional. However we recognize that CAGE may fail to detect low but risky levels of drinking as well as it performs best in men but less in women [37]. The CAGE questionnaire was administered to 514 participants of whom 142 (16.5%) were found to be CAGE (+), i.e. (a score of ≥ 2). Of those who were CAGE (+) there were significantly ($p < 0.05$) more men (100, 11.6%) than women (42, 4.9%). The highest proportion of CAGE (+) respondents was in the age group 21- 30 years and 50-61 years. This finding has important implications for screening as it identifies the age groups at risk. Clinicians working with middle-aged and older adults should therefore screen this group for alcohol related disorders in addition to screening for chronic non communicable diseases such as diabetes and hypertension.

Compared to GGT which detected only 66.7% of CAGE (+) participants confirms that CAGE performed better. Research evidence has shown the usefulness of biological measures in the detection of alcohol use disorders when compared with patient self-report. A low correlation between self-reported consumption of alcohol and biological measures was demonstrated in a study which reported that 37% of patients underreported alcohol use as evaluated by carbohydrate-deficient transferrin CDT +GGT [38]. Consequently we were unable to replicate these findings in a primary care population, which would have provided evidence to show that biological measures aid the primary care clinician in detecting alcohol use disorders.

Using direct questioning the estimated prevalence of hazardous drinking was 18% (95% CI, 26-34), 117 (13.5%) were men and 37 (4.3%) were women. The results of both approaches are comparable. The implication of these findings includes an important role for the healthcare system to screen, identify and manage those at risk of AHD with appropriate interventions. WHO provides evidence that, screening and brief intervention for alcohol use and related problems in primary healthcare is effective [39].

One limitation of the study is the questionnaire administered consisted of two parts. One part consisted of questions of interest and the other the CAGE questionnaire. Hence a positive result in the questions of interest could lead the interviewer to seek traces confirming this result. In addition no gold standard was chosen

for defining alcohol dependence. Thus, our study may have detected a significant group of false positives. The strength of the study is the use of a common questionnaire across countries with different drinking patterns and relatively large, homogenous samples. In addition given the high response rate, selection bias is unlikely to affect the findings of the study, and the advantage of a face-to-face questionnaire is that it is unlikely to introduce a strong social-expectation bias in the responses of participants, however underreporting of socially undesirable behavior is likely. Notwithstanding both aspects support the internal validity of the study.

In conclusion we provide evidence that the prevalence of alcohol consumption is 59.4% in a primary care setting, and 16-18% consume alcohol at levels which put them at risk of developing alcohol related harm. We also recommend the CAGE questionnaire as an appropriate instrument for detecting harmful use. We identified women as having an increased risk that needs urgent interventions.

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