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# Alcohol Abuse in Developed and Developing Countries in the World Mental Health Surveys: Socially Defined Consequences or Psychiatric Disorder?

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**Background:** Previous single country research has raised concerns that: (1) the DSM-IV diagnosis of alcohol abuse (AA) is met primarily through the hazardous use criterion related to drinking and driving and (2) that the hazardous use and social consequences AA criteria primarily reflect varying socioeconomic and cultural factors rather than psychiatric disorder.

**Methods:** Using representative cross-national data from the 21 countries in the World Mental Health surveys, adults meeting DSM-

IV lifetime criteria for AA but not dependence from 10 developed ($n = 46{,}071$) and 11 developing ($n = 49{,}761$) countries were assessed as meeting AA with the hazardous use or the social consequences criteria.

**Results:** Between 29.3% (developed) and 16.2% (developing) of respondents with AA met only the hazardous use criterion. AA cases with and without hazardous use were similar in age-of-onset, course, predictors, and psychopathological consequences in both developed and developing countries.

**Discussion and Conclusions:** Despite some associations of the AA criteria with socioeconomic factors, the hazardous use and social consequences criteria were significantly associated with psychiatric predictors and sequelae. The findings indicate that these criteria reflect psychiatric disorder and are appropriate for inclusion as DSM-5 Alcohol Use Disorder criteria.

**Scientific Significance:** These findings support a psychiatric rather than a sociocultural view of the hazardous use and social consequences symptoms and provide evidence that they are appropriate diagnostic criteria cross-nationally with utility in a wide range of socioeconomic environments. This suggests consideration for their adoption by ICD-11. Further research is needed on the implications of these results for prevention and treatment. (Am J Addict 2014;23:145–155)

## BACKGROUND AND OBJECTIVES

The question of whether the DSM-IV alcohol use disorders (AUDs) categories of alcohol dependence and alcohol abuse (AA) should be maintained as distinct DSM disorder categories has been answered in DSM-5 with their combination into a single AUD category. However, important questions about the nature of the AUD symptoms remain. While there is relatively little dispute about the DSM-IV alcohol dependence criteria, the DSM-IV hazardous use and social consequences symptoms (the AA criteria) continue to be highly controversial particularly in regard to the question of their psychiatric significance.

DSM-IV[1] AA is defined as a maladaptive pattern of drinking leading to clinically significant impairment or distress as manifested and diagnosable by any one of four criteria. These criteria include hazardous use which is defined as recurrent alcohol use in situations in which it is physically hazardous even though actual harm might not have occurred, and three social consequences criteria which require identification of a pattern of behavior in which alcohol use has resulted in actual repeated harm. These are: recurrent use of alcohol resulting in a failure to fulfill major role obligations at work, school, or home; recurrent alcohol use related legal problems; and continued alcohol use despite having persistent or recurrent social or interpersonal problems caused or exacerbated by the effects of alcohol.

The concept, the content, the psychiatric significance, and the multi-sociocultural applicability of the type of criteria defining AA in DSM-IV are controversial. The issues are about the psychiatric significance of the criteria and they are highly important regardless of whether the AA symptoms are in a separate diagnostic category as in DSM-IV or are combined with dependence related symptoms into a single AUD category as in DSM-5.[2]

Rounsaville et al.[3] argued against the use of any consequences-defined diagnosis of AUD contending that diagnoses based on social consequences confound the distinction between the disorder itself and societal responses and they maintained that wide variability in the acceptability of alcohol and other drug use results in crucial limitations on the use of social and occupational impairment as criteria for alcohol use disorders. Many have expressed concerns that the AA criteria are so influenced by varying social and cultural environmental factors that they are not reliable and consistent diagnostic criteria.[4,5] For example, ICD-10 excludes alcohol use disorder criteria involving social consequences. This sociocultural perspective views the AA criteria as problematic behaviors and consequences but not as psychiatric symptoms in the sense of being direct manifestations of psychiatric disorder.

Issues regarding the diagnostic utility and psychiatric significance of the AA symptoms have been complicated and sometimes confused by questions about the psychometric characteristics of the criteria. Psychometric studies have faulted the legal criterion for having a low rate of endorsement,[6,7] and for poor performance in IRT analyses[6,8,9] providing evidence for its elimination in DSM-5. Hazardous use has been found to have high endorsement rates,[7,8,10] relatively low discrimination of problem severity,[9,11,12] to be variable between genders and across age groups,[13] and to potentially over-diagnose.[14] Interpreting these psychometric studies is complicated as the AA criteria are highly sensitive to small differences in the wording of the assessment items[14,15] and most of the analyses have been done with U.S. data.

Epidemiological studies have also raised concerns about the AA criteria. Keyes and Hasin[16] found in the U.S. National Epidemiological Survey on Alcohol and Related Conditions (NESARC) sample that 83.6% of those diagnosed with current DSM-IV AA met the diagnosis based on the hazardous use criterion and that 69.3% did so solely through repeated instances of drinking and driving. They also found that in contrast to most psychiatric disorders, hazardous use involving drinking and driving has a significant positive association with income. Replicating these analyses in several data sets, Babor and Caetano[17] concluded that the hazardous use criterion and diagnosis of DSM-IV alcohol abuse based on it are culturally and socially biased and sensitive to socioeconomic status,

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variations in the enforcement of drinking and driving laws, and access to cars. This sociocultural view posits that the hazardous use criterion is principally associated with drinking and driving and predicts that it would primarily be observed in the limited context of higher but not lower SES environments, and would therefore have limited utility as a widely applicable criterion of AUD.

Agrawal et al.[18] used NESARC data excluding subjects reporting co-occurring alcohol dependence to compare lifetime AA with and AA without hazardous use. They found that hazardous use was the most commonly reported AA criterion and that it was associated with a somewhat less severe form of AUD. Concurring with Keyes and Hasin[16] they questioned diagnosis of an AUD based on the symptom of hazardous use. Martin et al.[19] contend that the hazardous use criterion reflects only antisocial risky behavior and not a compulsive alcohol use mental disorder.

Alternatively, there is evidence that AA criteria may identify severe cases of AUD. Psychometric studies have reported that AA criteria may be more severe than dependence criteria.[8,15,20] The hazardous use criterion has been found to have intermediate severity in the NESARC[15] and both the legal and hazardous use criteria were found to have high severity in the Australian National Survey of Mental Health and Wellbeing.[21] The Collaborative Study on the Genetics of Alcoholism (COGA), found that while a high percentage of those with AA met criteria through hazardous use,[22] all AA criteria were similar in baseline substance use characteristics and problematic 5 year outcomes and performed well in the prediction of future problems.[7] These findings support a psychiatric rather than a sociocultural view of all of the AA symptoms.

Although different concerns have been raised regarding the hazardous use and the social consequences criteria, concerns have been raised about all of the AA criteria. Most criticisms have viewed the criteria primarily as socially determined potential or actual consequences.[23] An alternative psychiatric view is to place less emphasis on the particular nature or manifestation of the consequences and their social context and consider that the AA criteria are symptoms that primarily reflect psychiatric disorder manifested as persistent self-identified maladaptive behavior despite repeated significant hazard or harm in major areas of the individual's life. While the hazardous use criterion is often contrasted with the three social consequences criteria both conceptually[19] and in research[18] due to assumptions about differing social influences on the criteria, we view the hazardous use and social consequences criteria as true psychiatric symptoms and expect that diagnosis based on any of the these criteria generally reflect the same intrinsic, fundamental psychopathology even though social factors doubtlessly influence problematic alcohol use behavior and outcomes. As such, we expect that the hazardous use and social consequences criteria will be evident in a wide range of socioeconomic environments and will demonstrate characteristics associated with DSM psychiatric symptoms.

We present data from the WHO World Mental Health (WMH) Surveys[24] to examine: (1) the prevalence, course and sociodemographics of AA with hazardous use and AA without hazardous use but with at least one social consequence (2) whether either or both are associated with psychiatric predictors and sequelae, and (3) whether comparison of developed and developing countries and SES levels provides evidence of predominant socioeconomic determination of the hazardous use criterion and sociocultural influence on the social consequences criteria. Debate on the psychiatric versus the socioeconomic view of the AA criteria has been primarily informed by single country findings, particularly the US.[7,14,16–18] We are aware of no previous attempt to investigate the sociocultural and psychiatric views of non-dependence AUD symptoms with cross-national epidemiological data. We expect that cross-national analyses will show that both AA with and without hazardous use are similar in terms of psychiatrically characterizing factors despite some associations with sociocultural and socioeconomic factors.

## METHODS

### The Sample

Surveys in the 21 WMH countries were based on probability samples of the adult household population either nationally representative (the majority of countries), representative of urbanized areas (Colombia, Mexico), or representative of regions of the country (São Paulo in Brazil, Pondicherry in India, Japan, Nigeria, Beijing/Shanghai in the People's Republic of China). More details about sampling are described elsewhere.[25] The average response rate across surveys weighted (by sample size) was 72.0%. Data from ten developed (Belgium, France, Germany, Israel, Italy, Japan, Netherlands, New Zealand, Spain, and United States of America) and eleven developing countries (São Paulo in Brazil, Bulgaria, Colombia, Pondicherry in India, Lebanon, Mexico, Nigeria, Beijing/Shanghai in the People's Republic of China, Romania, South Africa, and Ukraine) as classified by the World Bank[26] were analyzed separately to provide perspective on the influence of cross-national variation in the socioeconomic factors associated with AA criteria. A total of 51,773 respondents were interviewed in developed countries and 49,761 in developing countries. Sample characteristics for the 21 countries are available upon request.

All WMH interviews were administered face-to-face by lay interviewers trained and supervised using standardized procedures described elsewhere.[27] WMH interviews were divided into two parts: Part 1 included the assessments of core mental disorders while Part 2 included assessments of the correlates of these disorders including income. All Part 1 respondents who met criteria for any core mental disorder plus a probability sub-sample of other Part 1 respondents were administered Part 2. The Part 2 data were weighted to adjust for under-sampling of Part 2 non-cases and for residual

discrepancies between sample and population distributions on sociodemographic/geographic variables.

## Diagnostic Assessment

Diagnoses in the WMH surveys were based on the WHO Composite International Diagnostic Interview (CIDI) Version 3.0,[28] a fully-structured diagnostic interview that assesses mental disorders according to DSM-IV definitions and criteria. We focus on AA criteria and associations of AA diagnoses with DSM-IV comorbid anxiety disorders (generalized anxiety disorder, panic disorder and/or agoraphobia, posttraumatic stress disorder, separation anxiety disorder, social phobia, specific phobia), mood disorders (bipolar disorder [I, II, or subthreshold], dysthymia, and major depressive disorder), impulse-control disorders (conduct disorder, oppositional-defiant disorder, intermittent explosive disorder, attention deficit/hyperactivity disorder), and drug use disorders (abuse with or without dependence). CIDI items assessing AA were scored according to the standard CIDI endorsement criteria and are available upon request. CIDI organic diagnostic exclusion rules were applied. As detailed elsewhere,[29] blinded clinical re-interviews using the Structured Clinical Interview for DSM-IV (SCID) with a probability sub-sample of respondents in several WMH surveys found generally good concordance between DSM-IV diagnoses based on the CIDI and those based on the SCID.

Our analyses focused on respondents who met DSM-IV lifetime criteria for AA but never met criteria for alcohol dependence. We distinguish DSM-IV AA-without-dependence respondents who either met the hazardous use criterion (with or without meeting one or more of the other AA criteria) or who did not meet the hazardous use criterion but met criteria for AA by endorsing at least one of the three social consequences criteria. All abusers were asked retrospective questions about their age of first onset of the first symptom of AA and about the number of years in their life when they had any of these symptoms. Annual persistence was defined as the percentage of years with AA between the age of first onset and age at interview.

## Predictors

If the AA criteria are more psychiatric than sociocultural in nature then they should be associated with important predictors and sequelae typical of psychopathology. We looked at several predictors that have been shown to be associated with both psychopathology and substance abuse as well as patterns of course and concomitance.

### *Sociodemographics*

Sociodemographic predictors included respondent age, sex, education, marital status, employment status, and family income.

### *Childhood Adversities (CAs)*

CAs have been shown to be important predictors of psychopathology as well as substance abuse in earlier studies.[30–35] CAs were assessed with 10 dichotomously scored known predictive measures assessing interpersonal loss, abuse-neglect, parental violence and criminality, and life-threatening respondent childhood physical illness and childhood family economic adversity.[36]

### *Parental Psychopathology*

Parental psychopathology when the subject was a child has been found to be predictive of psychopathology as well as substance abuse.[37–40] The Family History Research Diagnostic Criteria (FHRDC) Interview[41] and its extensions[42] were used to generate measures of maternal and/or paternal major depression, generalized anxiety disorder, panic disorder, antisocial personality disorder, and substance use disorder.

### *AA and Subsequent Onset of DSM–IV Disorder*

To assess the psychiatric sequelae associated with the AA criteria we considered the predictive association between AA and subsequent first onset of any DSM-IV/CIDI anxiety, mood, impulse-control, and drug use disorders. These other disorders were assessed with the CIDI and retrospective age-of-onset reports to make assumptions about temporal priorities between AA and these disorders.

## Analysis Methods

Cross-tabulations were used to compare the prevalence of AA with and without hazardous use. Actuarial method[43] was used to generate and compare AA age-of-onset (AOO) distributions. Associations of childhood predictors with subsequent onset of AA were examined using discrete-time survival analysis with person-years as the unit of analysis,[44] controlling for respondent age at interview, gender, and country. Person-years were coded "0" on the dependent variables (AA with and without hazardous use) until the age of onset and "1" at the year of onset and were censored after the year of onset. Discrete-time survival analysis was also used to study predictive associations between temporally primary AA and the subsequent first onset of other DSM-IV/CIDI disorders, with a primary focus on differences in the predictive strength of AAs with and without hazardous use. Statistical significance was consistently evaluated using .05-level two-sided tests. As the WMH data are clustered and weighted, the design-based Taylor series method[45] implemented in the SUDAAN software system[46] was used to estimate standard errors.

# RESULTS

## Sociodemographic Correlates

The sociodemographic correlates of AA with and without hazardous use are very similar. Both are significantly more prevalent among men than women, inversely related to age, and unrelated to household income in both developed and developing countries. In developed countries, both are significantly more prevalent among the never married than the ever married although this pattern is significant only for AA without hazardous

use in developing countries. The associations of AA with education are generally nonlinear, with highest ORs in the middle education groups, but without a significant difference depending on the presence-absence of hazardous use ($\chi^2_4 = 4.8$–$5.2$, $p = .26$–$31$). These correlates differ significantly in only 2 of 12 comparisons: a stronger association between male gender and AA with hazardous use than without in developed ($\chi^2_1 = 4.1$ $p = .042$) but not developing ($\chi^2_1 = 1.3$, $p = .25$) countries; and a stronger association between high family income and AA with hazardous use than without in developing ($\chi^2_1 = 9.9$, $p = .020$) but not developed $\chi^2_1 = 2.2$, $p = .53$) countries (Table 1).

### Prevalence

The lifetime prevalence of DSM-IV/CIDI AA was 5.5% in developed countries and 4.6% in developing countries (Table 2). Roughly one-third (30.6%) of AA cases did not have hazardous use in developed countries (3.8% with vs. 1.7% without hazardous use) and roughly half (47.6%) in developing countries (2.4% with vs. 2.2% without hazardous use). Of respondents meeting the AA criteria in developed countries, 29.3% met only the hazardous use criterion, 30.6% met only one of the social consequences criteria, and 40% met both hazardous use and at least one of the social consequences criteria. In developing countries, 16.2% met only the hazardous use criterion, 47.6% only one of the social consequences criteria, and 36.3% both. The proportions of abusers with hazardous use are similar for 30-day and 12-month recall periods: 25.7% and 24.1% for developed countries; 49.4% and 53.2% for developing countries. There are no comparable cross-national epidemiological studies for comparison of these findings but to provide some relative context, the US NESARC[47] study using the AUDADIS-IV reported a 17.8% lifetime prevalence of DSM-IV AA while the US component of the WMH surveys, the National Comorbidity Survey Replication,[48] reported a 13.2% lifetime prevalence of DSM-IV AA.

### Age-of-Onset and Persistence

In developed countries, mean age of onset (AOO) was significantly younger for AA with (22.1) than without (24.3) hazardous use ($\chi^2_1 = 20.8$, $p < .001$), although the complete AOO distributions appear very similar on visual inspection (distributions not presented are available on request). Mean duration (in years) of AA with hazardous use was also significantly longer than AA without hazardous use (5.8 vs. 3.8; $\chi^2_1 = 43.2$, $p < .001$) and persisted for a significantly higher percentage of years once abuse began (34.6% vs. 28.4%; $\chi^2_1 = 14.8$, $p < .001$), although the complete speed-of-recovery distributions appear very similar on visual inspection. In developing countries, in comparison, presence versus absence of hazardous use was not significantly related either to mean AOO of abuse (24.8 vs. 24.7; $\chi^2_1 = 1.5$, $p = .22$), mean duration (in years) of abuse (4.6 vs. 4.8; $\chi^2_1 = 1.0, p = .32$), or percentage of years since onset of abuse (38.7% vs. 39%; $\chi^2_1 = .7$, $p = .40$).

### Childhood Predictors of AA

Retrospectively reported childhood adversities (CAs) were consistently associated with elevated risk of subsequent onset of AA both with and without hazardous use in both developed and developing countries (Table 3). Three-fourths of the ORs are statistically significant, with a range of 1.3–5.0. None of the ORs in developed countries and five in developing countries differ significantly based on the presence versus absence of hazardous use. In all five cases of significant differences, the OR is higher in the presence of hazardous use ($\chi^2_1 = 4.9$–$14.2$, $p = .001$ to $<.001$).

Respondent reports of parental psychopathology were also consistently associated with elevated risk of subsequent AA both with and without hazardous use in both developed and developing countries (data are available upon request). Seventy percent of the ORs are statistically significant with a range of 1.5–3.2. None of the ORs in developed countries and two in developing countries differ significantly based on the presence versus absence of hazardous use. In both cases of significant difference, which involve parental depression and generalized anxiety disorder, the OR is higher in the prevalence of hazardous use ($\chi^2_1 = 6.9$–$10.5$, $p = .001$–$.009$).

### Predictive Association Between AA and Later DSM–IV/CIDI Disorders

Risks of subsequent first onset of any DSM-IV/CIDI anxiety, mood, impulse-control, and drug use disorders are significantly elevated among respondents with lifetime AA with and without hazardous use in both developed and developing countries (Table 4). A trend exists for these predictive associations (ORs) to be somewhat higher for AA with than without hazardous use, but this difference is statistically significant in only 1 of 10 comparisons: drug use disorders in developed countries, where the OR (95% CI) is 7.6 (6.2–9.5) for AA with hazardous use and 3.9 (2.4–6.3) for AA without hazardous use ($\chi^2_1 = 6.9$, $p = .008$).

## DISCUSSION AND CONCLUSION

The results provide useful information about the prevalence and psychiatric significance of the hazardous use and social consequences criteria and support the view that they reflect psychiatric disorder. In contrast to previous US reports that AA diagnoses are primarily met solely by the hazardous use criterion,[16,18] we found that AA based exclusively on the social consequences criteria accounted for nearly one-third of all AA in developed countries and nearly half in developing countries. Notably, hazardous alcohol use is common in developing countries despite lower access to cars and the possibility of driving-related hazardous use.

There was some evidence of the association of socioeconomic factors and the AA criteria. There was a higher prevalence of lifetime DSM-IV/CIDI AA in developed countries compared to developing countries (5.5% vs. 4.6%), a greater percentage of AA met with the hazardous

**TABLE 1.** Twelve-month sociodemographic correlates of DSM-IV/CIDI alcohol abuse (AA) with and without hazardous use (HU) in developed and developing countries)*

| | Developed countries | | | | | Developing countries | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | AA with HU | | AA without HU | | | AA with HU | | AA without HU | | |
| | OR | (95% CI) | OR | (95% CI) | $\chi^{2\dagger}$ | OR | (95% CI) | OR | (95% CI) | $\chi^{2\dagger}$ |
| Sex | | | | | | | | | | |
| Male | 4.3 | (3.1–6.1) | 2.3 | (1.4–3.8) | 4.1‡ | 8.3 | (5.1–13.3) | 5.5 | (3.6–8.5) | 1.3 |
| Female | 1.0 | — | 1.0 | — | | 1.0 | — | 1.0 | — | |
| $\chi^2_1$ | | 70.9‡ | | 9.7‡ | | | 76.6‡ | | 61.2‡ | |
| Age (years) | | | | | | | | | | |
| 18–34 | 84.6 | (17.9–400.4) | 24.9 | (4.2–147.0) | 3.1 | 7.2 | (2.1–24.8) | 9.0 | (3.6–22.7) | 2.9 |
| 35–49 | 32.4 | (6.8–155.1) | 7.0 | (1.2–41.3) | | 7.3 | (2.2–24.6) | 6.8 | (2.5–18.4) | |
| 50–64 | 10.0 | (1.9–51.7) | 3.9 | (.6–24.8) | | 3.4 | (.9–12.9) | 6.0 | (2.2–16.0) | |
| 65+ | 1.0 | — | 1.0 | — | | 1.0 | — | 1.0 | — | |
| $\chi^2_3$ | | 101.7‡ | | 40.6‡ | | | 15.4‡ | | 23.8‡ | |
| Marital status | | | | | | | | | | |
| Never married | 5.0 | (3.7–6.7) | 4.6 | (2.2–9.5) | | 1.2 | (.8–1.8) | 1.6 | (1.1–2.5) | |
| Previously married | 1.0 | (.6–1.6) | 1.2 | (.5–2.8) | | .7 | (.4–1.4) | .6 | (.3–1.1) | |
| Married | 1.0 | — | 1.0 | — | .6 | 1.0 | — | 1.0 | — | .3 |
| $\chi^2_2$ | | 129.7‡ | | 24.6‡ | | | 2.4 | | 8.9‡ | |
| Education cross-national | | | | | | | | | | |
| Primary or less | .7 | (.3–2.0) | 1.2 | (.3–4.1) | 5.2 | .4 | (.2–.8) | 1.3 | (.5–3.1) | 4.8 |
| Some secondary | 2.1 | (1.3–3.3) | 1.5 | (.6–3.7) | | .6 | (.3–1.1) | 1.9 | (.9–4.3) | |
| Completed secondary | 2.3 | (1.4–3.5) | 2.1 | (.9–4.7) | | .5 | (.3–1.0) | 1.7 | (.7–4.2) | |
| Some post-secondary | 2.1 | (1.3–3.5) | .9 | (.3–2.3) | | .8 | (.4–1.5) | .9 | (.3–2.2) | |
| College graduate or higher | 1.0 | — | 1.0 | — | | 1.0 | — | 1.0 | — | |
| $\chi^2_4$ | | 20.2‡ | | 5.3 | | | 10.7‡ | | 9.5‡ | |
| Employment status | | | | | | | | | | |
| Working | 1.0 | — | 1.0 | — | 4.0 | 1.0 | — | 1.0 | — | 2.1 |
| Student | 1.7 | (1.0–2.8) | .5 | (.1–1.9) | | .8 | (.4–1.6) | .3 | (.1–1.0) | |
| Homemaker | .2 | (.1–.5) | .3 | (.1–.8) | | .2 | (.1–.3) | .1 | (.0–.2) | |
| Retired | .1 | (.0–.2) | .1 | (.0–.5) | | .2 | (.1–.4) | .1 | (.0–.3) | |
| Other | 1.2 | (.8–1.9) | 1.5 | (.7–3.3) | | 1.0 | (.6–1.5) | 1.1 | (.7–1.7) | |
| $\chi^2_4$ | | 39.4‡ | | 15.8‡ | | | 51.7‡ | | 61.6‡ | |
| Household income$ | | | | | | | | | | |
| Low | .7 | (.4–1.1) | .7 | (.3–1.5) | 2.2 | .6 | (.4–1.0) | 1.0 | (.6–1.6) | 9.9‡ |
| Low-average | .6 | (.4–1.0) | .5 | (.2–1.0) | | .6 | (.3–.9) | 1.0 | (.6–1.5) | |
| High-average | .8 | (.5–1.2) | 1.1 | (.5–2.4) | | .7 | (.4–1.3) | 1.1 | (.6–2.0) | |
| High | 1.0 | — | 1.0 | — | | 1.0 | — | 1.0 | — | |
| $\chi^2_3$ | | 5.1 | | 6.8 | | | 6.9 | | .1 | |
| (n)¶ | | (26,634) | | (26,451) | | | (23,394) | | (23,381) | |

*Results are based on logistic regression analysis in which first 12-month prevalence of either AA with HU or AA without HU was the outcome variable excluding in both instances responses with alcohol dependence. Respondents who had AA with HU were also excluded in the analysis to predict AA without HU and vice versa. The logistic regression coefficients and their standard errors were exponentiated and are reported as odds-ratios (ORs) and their 95% confidence intervals (CIs); †Significant difference in the association for AA with and without HU at the .05 level, two-sided test; ‡Significant association of the sociodemographic variable with 12-month AA at the .05 level, two-sided test; $Low income is defined in relation to each country's median household income per capita. Low income is defined as less than or equal to .5 times the median, low-average as .5+ to 1 times the median, high-average as 1+ to 2 times the median, high as greater than two times the median; ¶The results in this table are based on the same samples as in Table 2 Part 2 respondents excluding those with lifetime alcohol dependence. The total remaining Part 2 sample sizes are 26,736 in developed countries and 23,618 in developing countries. Sample sizes used in the models, however, are larger than in Table 3 because each model includes respondents without 12-month AA (26,349 in developed and 23,157 in developing countries) rather than without *lifetime* AA in Table 2, plus respondents with and without 12-month HU (285 and 102 for developed, 237 and 224 for developing countries, respectively).

**TABLE 2.** Prevalence of DSM-IV/CIDI alcohol abuse (AA) with and without hazardous use (HU) in developed and developing countries

| | Developed countries | | Developing countries | |
|---|---|---|---|---|
| | % | (se) | % | (se) |
| I. Lifetime | | | | |
| AA with HU | 3.8 | (.1) | 2.4 | (.1) |
| AA without HU | 1.7 | (.1) | 2.2 | (.1) |
| All AA | 5.5 | (.1) | 4.6 | (.1) |
| AA without HU/All AA | 30.6 | (1.0) | 47.6 | (1.3) |
| II. Twelve-month | | | | |
| AA with HU | .8 | (.1) | .8 | (.1) |
| AA without HU | .3 | (.0) | .7 | (.1) |
| All AA | 1.1 | (.1) | 1.5 | (.1) |
| AA without HU/All AA | 25.7 | (1.6) | 49.4 | (1.6) |
| III. Thirty-day | | | | |
| AA with HU | .3 | (.0) | .2 | (.0) |
| AA without HU | .1 | (.0) | .3 | (.0) |
| All AA | .4 | (.0) | .5 | (.0) |
| AA without HU/All AA | 24.1 | (1.9) | 53.2 | (1.9) |
| (n)* | (46,071) | | (49,761) | |

*AA was assessed in the Part 2 interviews in metropolitan Japan and the US and in Part 1 in all other surveys, leading to the 46,071 sample size for developed countries in the current table being lower than the 51,773 Part 1 total reported in the Methods section. AA was assessed in the Part 1 interviews in all developing countries. Respondents with alcohol dependence (1,366 in developed countries and 916 in developing countries) are included in the denominator.

use criterion in developed countries compared to developing countries (69.4% vs. 52.4%) and a stronger association between high family income and AA with than without hazardous use in developing but not developed countries. In developed countries, 29.3% met the hazardous use criterion alone while 16.2% met only the hazardous use criterion in developing countries. Our interpretation is that these associations reflect the influence of cultural and socioeconomic factors on the development and manifestation of AA but do not contradict the psychiatric character or significance of the AA symptoms.

Consistent with the psychiatric view of AA symptoms, we found that childhood adversities and reports of parental psychopathology are consistently associated with elevated risk of subsequent onset of AA both with and without hazardous use in both developed and developing countries. Childhood predictors, age-of-onset, course, associations with the subsequent onset of secondary DSM-IV/CIDI disorders, and sociodemographic correlates are all very similar for AA with and without hazardous use in both developed and developing countries, albeit with a general tendency for associations to be somewhat higher for AA with than without hazardous use. Risks of subsequent first onset of any DSM-IV/CIDI anxiety, mood, impulse-control, and drug use disorders are significantly elevated among all AA respondents in both developed and developing countries although a trend exists for these predictive associations (ORs) to be somewhat higher for hazardous alcohol use. Inconsistent with the sociocultural view of the AA criteria and particularly hazardous alcohol use being primarily determined by socioeconomic factors, we found that both AA with and without hazardous use in both developed and developing countries was unrelated to household income and had no significant association with education.

These results have to be interpreted in the context of the limitation that analyses were aggregated across countries by development status even though there are heterogeneous countries with diverse cultures and patterns of drinking within each of the two broad groupings of developed and developing countries. However, the similarity of results in developed and developing countries shows that the general patterns found here are broadly generalizable. Another limitation is that the analyses were conducted at the level of diagnosis and not individual symptoms focusing only on the distinction between AA with and without hazardous use. Additionally, we followed the DSM-IV alcohol dependence hierarchical diagnostic algorithm and excluded individuals who met any alcohol dependence criteria in addition to AA criteria, making it impossible to determine in our results whether individuals diagnosed with AA with or without hazardous use were diagnosed preemptively with DSM-IV alcohol dependence.

## SIGNIFICANCE

Our findings support the assertion that both the criterion of hazardous use and the social consequences criteria reflect psychiatric disorder and meet the DSM-IV/5 requirements of being symptoms of a maladaptive pattern of drinking leading to clinically significant impairment or distress and support the inclusion of hazardous use and social consequences criteria in

**TABLE 3.** Time-lagged associations (odds-ratios) of retrospectively reported childhood adversities with subsequent onset of DSM-IV/CIDI alcohol abuse (AA) with and without hazardous use (HU) in developed and developing countries*

| | Developed | | | | | Developing | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | With HU | | Without HU | | | With HU | | Without HU | | |
| | OR | (95% CI) | OR | (95% CI) | $\chi^2_1$ | OR | (95% CI) | OR | (95% CI) | $\chi^2_1$ |
| I. Neglect and abuse | | | | | | | | | | |
| Neglect | 1.9† | (1.3–2.9) | 2.4† | (1.2–4.8) | .0 | 2.4† | (1.7–3.4) | 1.4 | (.9–2.1) | 14.2‡ |
| Physical abuse | 2.7† | (2.2–3.3) | 3.1† | (2.2–4.3) | .0 | 2.0† | (1.6–2.4) | 1.7† | (1.3–2.3) | 3.7 |
| Sexual abuse | 2.2† | (1.7–3.0) | 2.3† | (1.5–3.5) | .1 | 4.5† | (2.5–8.1) | 5.0† | (1.7–15.0) | .0 |
| Any | 2.6† | (2.2–3.2) | 3.0† | (2.2–3.9) | .1 | 2.1† | (1.7–2.6) | 1.7† | (1.3–2.2) | 7.5‡ |
| II. Loss | | | | | | | | | | |
| Parental death | 1.2 | (.9–1.6) | 1.2 | (.8–1.8) | .1 | 1.1 | (.8–1.5) | 1.0 | (.8–1.3) | .4 |
| Parental divorce | 1.4 | (1.0–1.8) | 1.6† | (1.1–2.4) | 1.9 | 1.6† | (1.2–2.3) | 1.5† | (1.0–2.2) | .8 |
| Other major loss | 2.1† | (1.5–2.8) | 2.0† | (1.1–3.5) | .6 | 1.7† | (1.2–2.6) | 1.9† | (1.3–2.7) | .0 |
| Any | 1.5† | (1.2–1.8) | 1.3† | (1.0–1.8) | 3.8 | 1.4† | (1.1–1.7) | 1.4† | (1.1–1.7) | .5 |
| III. Parental maladjustment | | | | | | | | | | |
| Violence | 2.1† | (1.8–2.5) | 2.5† | (1.8–3.6) | .1 | 2.4† | (1.9–3.2) | 2.1† | (1.5–2.9) | 9.1‡ |
| Criminal behavior | 2.6† | (1.9–3.5) | 2.7† | (1.5–5.1) | 1.8 | 1.1 | (.7–1.7) | 1.4 | (.9–2.2) | .5 |
| Any | 2.2† | (1.9–2.6) | 2.5† | (1.8–3.5) | .5 | 2.1† | (1.6–2.7) | 1.7† | (1.3–2.2) | 8.8‡ |
| IV. Other adversity | | | | | | | | | | |
| Economic | 1.2 | (1.0–1.6) | 1.8† | (1.1–3.0) | .0 | .9 | (.6–1.5) | 1.2 | (.7–2.0) | .0 |
| Physical illness | 1.7† | (1.3–2.2) | 1.3 | (.8–2.1) | 1.8 | 1.6† | (1.1–2.3) | 1.8† | (1.2–2.8) | .2 |
| Any | 1.5† | (1.2–1.8) | 1.6† | (1.1–2.2) | .5 | 1.2 | (.9–1.6) | 1.5† | (1.1–2.1) | .4 |
| V. Any childhood adversity | | | | | | | | | | |
| Any | 2.1† | (1.8–2.4) | 2.0† | (1.6–2.5) | 3.3 | 1.7† | (1.4–2.1) | 1.5† | (1.2–1.8) | 4.9‡ |
| (n) | (26,131)$ | | (25,301)$ | | | (22,913)$ | | (22,893)$ | | |

*Results are based on discrete-time survival analysis in which CAs were used to predict first lifetime onset of AA with and without HU controlling for age, sex, and country. The discrete-time survival coefficients and their standard errors were exponentiated and are reported as odds-ratios (ORs) and their 95% confidence intervals (CIs); †Significant association between the CA and subsequent onset of AA; ‡Significant difference in the association of the CA with AA depending on the presence-absence of HU; $The results in this table are based on a restricted Part 2 sample in respondents with lifetime alcohol dependence were excluded. The total Part 2 sample includes 26,736 respondents from developed and 23,618 respondents from developing countries. But not all of these respondents were included in each model. Respondents without AA (24,696 in developed and 22,188 in developing countries) were included in both models along with either respondents with HU (in the equations predicting AA with HU; 1,435 in developed countries and 725 in developing countries) or respondents with AA in the absence of HU (605 in developed countries and 705 in developing countries).

DSM-5. Our view is that by endorsing any of the hazardous use and social consequences criteria the individual is reporting that they have repeatedly engaged in dangerous behavior or behavior resulting in self-identified major problems in primary areas of their life, that they recognize that these problems are related to their recurrent alcohol use, and that they continue the behavior despite the highly problematic consequences. The psychiatric pathology intrinsic to alcohol abuse is not inherent in the specific nature of the consequences but rather in the individual's repeated failure or inability to control the recurrent behavior that is the self-ascribed cause. We would not, for example, consider risky single occasion drinking to be a symptom of AUD even in the event of a fatal outcome.[49] The issues of the psychiatric versus the sociocultural view of the hazardous use and social consequences symptoms are not merely about semantic or technical concerns. The importance of recognizing the psychiatric nature of these symptoms goes even beyond accurate diagnosis and has major implications for effective prevention, early identification and appropriate referral, and treatment of AUDs.

Certainly there are significant cultural and socioeconomic influences on the hazardous use and social consequences criteria that vary over time, across social contexts and for different individuals. This is true of the criteria for many psychiatric disorders and we would have been concerned if we had found no evidence of sociocultural influence. Some environments may facilitate while others impede the development of particular psychiatric symptoms or disorders[17] but this does not negate the psychiatric nature of the dysfunction when it does develop. Regarding cultural variability in the sanctioning or punishment of particular behaviors, we maintain that persistently engaging in a psychiatrically symptomatic behavior in a context where the consequences are more severe is indicative of a greater psychiatric dysfunction.

AUD criteria involving social consequences are explicitly excluded from ICD-10[50] in part due to concerns that they are

**TABLE 4.** Time-lagged associations of temporally primary DSM-IV/CIDI Alcohol Abuse (AA) with and without hazardous use (HU) predicting the subsequent first lifetime onset of other DSM-IV/CIDI disorders in developed and developing countries)*

| | AA with HU | | AA without HU | | |
|---|---|---|---|---|---|
| | OR | (95% CI) | OR | (95% CI) | $\chi^2_1$ |
| I. Developed countries | | | | | |
| Any anxiety disorder | 1.6† | (1.4–1.9) | 1.8† | (1.3–2.4) | .3 |
| Any mood disorder | 1.4† | (1.2–1.7) | 1.6† | (1.2–2.1) | .5 |
| Any drug use disorder | 7.6† | (6.2–9.5) | 3.9† | (2.4–6.3) | 6.9‡ |
| Any impulse-control disorder | 1.7 | (.7–4.0) | 1.3 | (.2–9.2) | .0 |
| Any disorder | 2.8† | (2.2–3.4) | 2.2† | (1.5–3.2) | 1.2 |
| (n)$ | | (44,705) | | | |
| II. Developing countries | | | | | |
| Any anxiety disorder | 2.2† | (1.6–3.1) | 1.5† | (1.0–2.2) | 2.7 |
| Any mood disorder | 1.9† | 1.4–2.5 | 1.6† | 1.1–2.2 | .6 |
| Any drug use disorder | 3.8† | 2.5–5.9 | 2.7† | 1.4–5.1 | .9 |
| Any impulse-control disorder | 2.4† | 1.5–3.8 | 2.2 | .8–5.9 | .1 |
| Any disorder | 2.4† | 1.7–3.3 | 2.2† | 1.6–3.0 | .2 |
| (n)$ | | (48,845) | | | |

*Results are based on discrete-time survival analysis in which first onset of each outcome disorder is predicted by prior lifetime history of AA with and without HU (treated as two time-varying covariates in the same prediction equation) controlling for age, sex, and country. The discrete-time survival coefficients and their standard errors were exponentiated and are reported as odds-ratios (ORs) and their 95% confidence intervals (CIs).; †Significant association of temporally primary lifetime AA with subsequent first lifetime onset of the outcome disorder at the .05 level, two-sided test.; ‡Significant difference in the association for AA with and without HU at the .05 level, two-sided test.; $The results in this table are based on a restricted Part 1 sample (Part 2 in metropolitan Japan and the US) in which we excluded respondents with lifetime alcohol dependence (1,366 in developed countries and 916 in developing countries). Unlike previous tables, the sample size is reported only once for each set of countries because HU and AA without HU were both included as predictor variables in the same equations.

too culturally variable, especially for a worldwide diagnostic system.[5] This is an important concern.[51,52] However, our findings suggest that despite cultural variability these criteria identify prevalent and psychiatrically significant cases supporting consideration for their inclusion in the planned revision of the ICD.

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### Declaration of Interest

Dr. Haro has been a consultant for AstraZeneca, Eli Lilly and Co., and Lunbeck. Dr. Lépine has given lectures for Servier, Pfizer-Wyeth, Sanofi Aventis, and Pierre Fabre. Dr. Stein has received research grants and/or consultancy honoraria from Abbott, Astrazeneca, Eli-Lilly, GlaxoSmithKline, Jazz Pharmaceuticals, Johnson & Johnson, Lundbeck, Orion, Pfizer, Pharmacia, Roche, Servier, Solvay, Sumitomo, Takeda, Tikvah, and Wyeth. Dr. Kessler has been a consultant for AstraZeneca, Analysis Group, Bristol-Myers Squibb, Cerner-Galt Associates, Eli Lilly & Company, GlaxoSmithKline, Inc., HealthCore, Inc., Health Dialog, Hoffman-LaRoche, Inc., Integrated Benefits Institute, John Snow, Inc., Kaiser Permanente, Matria, Inc., Mensante, Merck & Co, Inc., Ortho-McNeil Janssen Scientific Affairs, Pfizer, Inc., Primary Care Network, Research Triangle Institute, Sanofi-Aventis Groupe, Shire US, Inc., SRA International, Inc., Takeda Global Research & Development, Transcept Pharmaceuticals, Inc., and Wyeth-Ayerst.

Dr. Kessler has served on advisory boards for Appliance Computing II, Eli Lilly & Company, Mindsite, Ortho-McNeil Janssen Scientific Affairs, Johnson & Johnson, Plus One Health Management and Wyeth-Ayerst.

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Dr. Kessler owns 25% share in DataStat, Inc.

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