

Diferencias de género en la prevalencia de los trastornos por uso de alcohol del DSM-IV en adolescentes

Gender differences in the prevalence of DSM-IV alcohol use disorders in adolescents

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recibido: Abril 2013
aceptado: Mayo 2013

Resumen

Las encuestas sobre el uso de alcohol en los adolescentes en Europa no suelen proporcionar información sobre los criterios para el diagnóstico de trastornos por uso alcohol (TUA) o la prevalencia de dichos trastornos. En este estudio se valora la prevalencia de TUA en una muestra de adolescentes españoles, y se identifican los síntomas más prevalentes, así como las diferencias de género en TUA en esta población. La muestra estuvo compuesta por 504 participantes de entre 15 y 18 años. Se realizó un muestreo al azar de todas las escuelas del Principado de Asturias (España). La presencia de abuso de alcohol (AA) y la dependencia del alcohol (DA) fue evaluada según el DSM-IV-TR. Los resultados mostraron que el 12,5% de la muestra cumplía criterios para el diagnóstico de TUA (6,7% AA y 5,8% DA). Los síntomas más frecuentes fueron tener problemas sociales para el diagnóstico de AA (9% de los participantes que habían bebido en el último año) y tolerancia para el diagnóstico de DA (45,8% de los participantes que habían bebido en el último año). Los varones mostraron una puntuación significativamente más alta que las mujeres en TUA, AA y dos criterios de AA (consumo imprudente y problemas legales). La prevalencia de TUA en los adolescentes españoles es muy alta. Los varones son más propensos que las mujeres a cumplir criterios de TUA y AA, aunque no de DA. Estos hallazgos revelan un problema de salud grave y ponen de relieve la necesidad de desarrollar esfuerzos coordinados de prevención e intervenciones tempranas de los problemas de uso de alcohol.

Palabras claves: adolescentes, trastornos por uso de alcohol, abuso de alcohol, dependencia de alcohol, diferencias de género.

Abstract

Despite the availability of data about drinking frequency and patterns, the surveys on alcohol use among adolescents carried out in Europe tend not to provide information about diagnostic criteria for alcohol use disorders (AUD) or estimation of their prevalence. This study assesses the prevalence of AUD among a sample of Spanish adolescents, to identify the most prevalent symptoms, and explore gender differences in AUD in this population. The final sample consisted of 504 participants aged 15 to 18, obtained by means of random sampling from all the schools in the region of Asturias (Spain). The presence of alcohol abuse (AA) and alcohol dependence (AD) disorders was evaluated according to DSM-IV-TR criteria. The results showed that 12.5% of the sample met the criteria for the diagnosis of AUD (6.7% for alcohol abuse, AA, and 5.8% for alcohol dependence, AD). The most prevalent symptoms were having social problems for AA diagnosis (9% of students who reported alcohol use in the past year) and tolerance for AD diagnosis (45.8% of students who reported alcohol use in the past year). Males showed a significantly higher score than females in AUD, AA and two AA diagnosis criteria (hazardous use and legal problems). The prevalence of AUD among Spanish adolescents is very high, males being more likely than females to endorse criteria for AUD and AA, though not for AD. These findings reveal a serious health issue and highlight the need to develop preventive efforts and provide coordinated alcohol-abuse interventions.

Key words: adolescents, alcohol use disorders, alcohol abuse, alcohol dependence, gender differences.

Among European students aged 15–16, 87% have used alcohol during their lifetime, 79% have done so in the last 12 months, and 57% have done so in the past 30 days. An average of 47% of the students have been drunk at least once in their lifetime, 37% reported drunkenness in the last 12 months, and 17% reported drunkenness in the last 30 days (Hibell et al., 2012). The figures for Spain are above the European mean. Mean age at onset of alcohol use in Spaniards is 13.7 years. Seventy-five percent of young people in this age range report having drunk alcohol at some time in their lives, 73.6% in the past year and 63% in the last 30 days (National Plan on Drugs, 2012a). The percentage of young people who report having been drunk in the last month has increased in recent years. In 2010, 35.6% of Spanish 14 to 18-year-olds reported drunkenness in the last 30 days (National Plan on Drugs, 2012a).

This situation gives considerable cause for concern, given the evidence that early abusive alcohol use can give rise to a wide range of social, physical and mental health problems (Chartier, Hesselbrock, & Hesselbrock, 2011; Espada, Morales, Orgilés, Piqueras, & Carballo, 2013; Fernández Artamendi, Secades Villa, Fernández Hermida, García Fernández, & García Rodríguez, 2013; Inglés et al., 2013; Sanhuesa, Garcia-Moreno, & Exposito, 2011; Zeigler et al., 2005).

Despite the availability of data about drinking frequency and patterns, surveys on alcohol use among young people in European countries tend not provide information about diagnostic criteria for alcohol use disorders (AUD) or estimation of their prevalence. This information is essential for increasing our understanding of their natural history, and would be extremely helpful in the planning of assessment, prevention and intervention initiatives for addressing alcohol-related consequences in adolescence (Harford, Grant, Yi, & Chen, 2005). Furthermore, individuals who develop serious problems with substance use in adolescence are more likely to have these problems persist into adulthood (McKay, Percy, & Cole, 2013; Merikangas & McClair, 2012). Therefore, a better understanding of the factors associated with this early use may help us to identify groups who require prevention strategies for reducing use and related harm (Newton, Havard, & Teesson, 2012; Swendsen et al., 2012).

Previous studies, mostly carried out in the United States, have found considerable variability in rates of AUD. In some of the most recent studies, prevalence estimates for adolescents who drink regularly are between 1.3% and 15.1% for alcohol abuse (AA) and between 1.6% and 6.7% for alcohol dependence (AD) (Bonomo, Bowes, Coffey, Carlin, & Patton, 2004; Harford, et al., 2005; Harford, Yi, Faden, & Chen, 2009; Swendsen, et al., 2012). Prevalence of adolescent AUDs increases with age, and is generally higher among males than among females (Harford, et al., 2005; Martin & Winters, 1998; Wagner, Lloyd, & Gil, 2002). Variability in the estimated prevalence of AUDs across surveys may be explained, in part, by differences in factors such as sampling strategy (e.g., household vs. school-based survey), sample age range, and other methodological factors. However, the relative prevalence of abuse and dependence diagnoses, that is, the ratio of abuse to dependence diagnoses, should be relatively consistent across community-based surveys.

Results from several surveys and reports, including those from Spain, has documented gender differences in drinking

prevalence and patterns among adolescents (National Plan on Drugs, 2009). These differences can lead to differential endorsement of AUD (Lee, Rose, Engel-Rebitzer, Selya, & Dierker, 2011), so that we can expect the prevalence of AUD and AA, and of AD symptoms, to differ in boys and girls. However, whereas gender differences in drinking patterns have been well documented, data on gender differences in AUD is scarce. Investigating gender differences among adolescents in relation to AUD is important, since identifying those aspects of AUD that are most similar across gender can increase our understanding of the core features of AUD. Furthermore, isolating the aspects of AUD that differ across gender among adolescents might help to guide the identification of gender-specific risk factors and target behaviors for preventive and therapeutic interventions.

We sought to address these knowledge gaps by drawing on data from a large sample of adolescents in the Principality of Asturias (a region in northern Spain). The specific goals of this study were to: 1) estimate the prevalence of AUD, AA and AD among Spanish adolescents; 2) identify the most prevalent AA and AD symptoms; and 3) explore gender differences in AUD among this population.

Method

Design and participants

The initial study sample was made up of 793 students from five public and private schools in the Principality of Asturias (Spain). The sample was obtained by means of random sampling from the schools in the region. After screening by means of the Oviedo Infrequency Scale (INF-OV) (Fonseca-Pedrero, Paino-Pineiro, Lemos-Giraldez, Villazon-Garcia, & Muniz, 2009), 289 questionnaires were discarded because they were incomplete or had been filled in without sufficient attention or erratically. The final sample was made up 504 participants (50.9% boys and 49.1% girls) aged 15 to 18 ($M = 16.61$, $SD = 0.91$). Data on the presence of AA or AD criteria were analyzed including only the 419 participants (83.1% of the sample) who reported alcohol use in the past year (counted from the time of their assessment).

Students filled out an anonymous self-report questionnaire in their classrooms and during school time. The authors had previously obtained consent from the schools themselves and from the Education Department of the Principality of Asturias. The procedures followed were in accordance with the ethical standards of the University of Oviedo. Application of the questionnaire was supervised by trained personnel, and anonymity and data confidentiality were guaranteed at all times.

Variables and Instruments

Alcohol use

We used the items from the European School Survey Project on Alcohol and Other Drugs (ESPAD) (Hibell et al., 2009) for the assessment of alcohol use: age at first use and prevalence of use (lifetime, last year and last month).

Table 1
Alcohol abuse and dependence item content

DSM-IV Diagnosis	Criteria	Item
Abuse	Impaired role	Sometimes people who drink have serious problems at home or at school, for example, truancy, doing a poor work at school or work, or dropping out of school. During the past 12 months, did drinking alcohol cause you to have serious problems like these?
	Hazardous use	During the past 12 months, did you regularly drink alcohol and then do something where being drunk might have put you in physical danger?
	Legal problems	During the past 12 months, did drinking alcohol cause you to do things that repeatedly got you in to trouble with the law?
	Social problems	During the past 12 months, did you have any problems with family or friends that were probably caused by your drinking?
Dependence	Tolerance	During the past 12 months, did you need to drink more alcohol than you used to in order to get the effect you wanted? If no, during the past 12 months, did you noticed that drinking the same amount of alcohol has less effect on you than it used to?
	Withdrawal	During the past 12 months, did you have two or more of these symptoms after you cut back or stopped drinking alcohol?: sweating or feeling that your heart was beating fast; having your hands tremble; having trouble sleeping; vomiting or feeling nauseous; seeing, hearing or feeling things that weren't really there; feeling that you couldn't sit still; feeling anxious; having seizures or fits.
	Drinking larger/longer	During the past 12 months, did you try to set limits on how often or how much alcohol you would drink?
	Impaired control	During the past 12 months, did you want to or try to cut down or stop drinking alcohol?
	Time spent	During the past 12 months, was there a month or more when you spent a lot of your time getting or drinking alcohol? ... or getting over the effects of the alcohol you drunk?
	Reduced activities	During the past 12 months, did drinking alcohol cause you give up or spend less time doing important activities such as going to school, working, doing fun things such as hobbies and sports, and spending time with friends and family?
	Physical or psychological problems	During the past 12 months, did you have any physical health problems or any psychological problems (problems with your emotions, nerves or mental health) that were probably caused or made worse by drinking alcohol?

AA and AD

Presence of alcohol abuse and dependence disorders was assessed according to the DSM-IV-TR criteria (American Psychiatric Association, 2000). The content of specific DSM-IV symptoms is shown in Table 1. The two disorders are defined by non-overlapping criterion sets. A DSM-IV abuse diagnosis requires endorsement of at least one of four abuse symptoms; a dependence diagnosis supersedes a diagnosis of abuse and requires endorsement of three or more of seven dependence symptoms (clustered within a year). Although not specifically stated in the DSM, this diagnostic system might imply that abuse is less severe than dependence (Gelhorn et al., 2008).

INF-OV

The goal of this 12-item self-report (Fonseca-Pedrero, et al., 2009) is to detect participants who respond randomly or dishonestly. Students with more than 3 incorrect responses in this test were removed from the sample.

Data analysis

Descriptive analyses were carried out on the main sociodemographic characteristics and pattern of alcohol use. In order to analyze whether there were differences between boys and girls in the presence of AUD as well as whether there were statistically significant differences between the scores for each criterion of abuse and dependence, we used Chi-square test for independence (χ^2) for comparison of frequencies (with Yates' Continuity Correction and Fisher's exact test where necessary). Confidence level was 0.95%, and the statistical package used was the SPSS Version 15.0.

Results

Alcohol use

Prevalence and frequency of alcohol use is shown in Table 2. Prevalence of alcohol use for lifetime, the last 12 months and the last 30 days was 94.4% (94.9% of the boys and 94.3% of the girls), 89.5% (89.8% of the boys and 89.4% of the girls) and 73.4% (75.7% of the boys and 71.5% of the girls), respectively. These data are comparable with those from the latest national survey by the Spanish National Plan on Drugs (National Plan on Drugs, 2012b) in the subsample from the Principality of Asturias.

Table 2
Prevalence and frequency of alcohol use (N= 504)

		N	%
Prevalence of alcohol use	Lifetime	476	94.4
	Last year	451	89.5
	Last 30 days	370	73.4
Alcohol use per week (days)	< 1	137	27.2
	1-2	268	53.2
	3-4	12	2.4
	5 or more	1	0.2
	Frequency of drunkenness in the last 30 days	1-2	138
3-5		54	10.7
6-9		8	1.6
10 or more		4	0.8
Number of drinks during the weekend		1-2	143
	3-4	130	25.8
	5 or more	119	23.6

AUD Prevalence

Overall, 12.5% of the total sample (15% of students who reported alcohol use in the past year) were diagnosed with an AUD. Boys showed a significantly higher AUD rate than girls ($\chi^2 = 7.252, p < 0.01$): 10.1% (N = 21) of those girls who reported alcohol use in the past year (N = 208) met the criterion for AUD, compared to 20% (N = 42) of the boys who reported alcohol use over the same period (N = 210).

Thirty-four adolescents (6.7% of the total sample and 8.1% of those who reported alcohol use in the past year)

endorsed criteria for an AA diagnosis (without dependence). Of those girls who had drunk in the last year (N = 208), 2.9% (N = 6) met the criterion for AA. Also, of those boys who reported alcohol use in the past year (N = 210), 13.3% (N = 28) endorsed AA ($\chi^2 = 13.901, p < 0.01$).

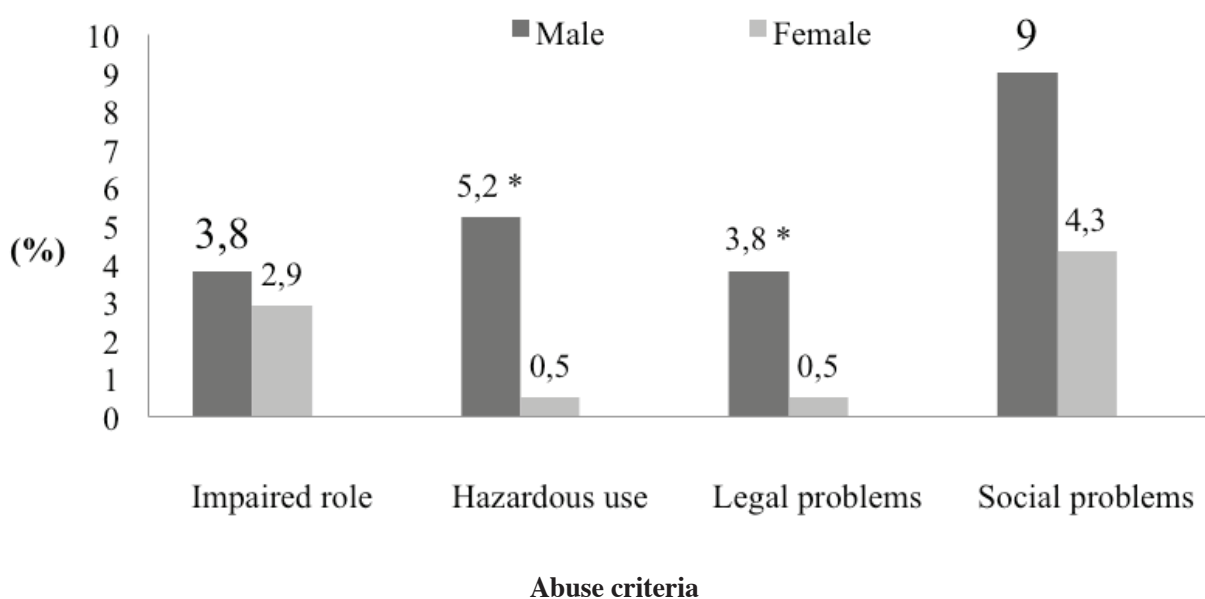
Twenty-nine adolescents (5.8% of the total sample and 6.9% of those who reported alcohol use in the past year) endorsed the criteria for AD diagnosis. Of those girls who had drunk alcohol during the last year (N = 208), 7.2% (N = 15) endorsed criteria for AD diagnosis, while of the boys (N = 210), 6.7% (N = 14) met this criterion. There were no statistically significant differences between boys and girls ($\chi^2 = 0.001, p > 0.05$).

Prevalence of AA criteria

The scores on each criterion of AA by gender and for the total sample of respondents who reported alcohol use in the past year are shown in Figure 1. The most prevalent criterion was social problems, while the least prevalent was legal problems.

The percentage of participants endorsing social problems (6.7%) was significantly higher ($p < 0.01$) than the percentage that endorsed impaired role (3.3%), hazardous use (2.9%) and legal problems (2.2%). Impaired role was endorsed by a significantly higher percentage than hazardous use ($p < 0.01$). The proportion of adolescents who endorsed hazardous use was also significantly higher than the proportion who endorsed legal problems ($p < 0.05$).

Analyses by gender showed that boys scored significantly higher than girls in hazardous use ($\chi^2 = 6.861, p = 0.009$) and in legal problems ($p < 0.05$).



Distribution of DSM-IV Alcohol Abuse Disorder criteria by gender
*Differences were statistically significant at $p < 0.05$

Figure 1. DSM-IV Alcohol Abuse Disorder criteria by gender among adolescents who reported alcohol use in the past year

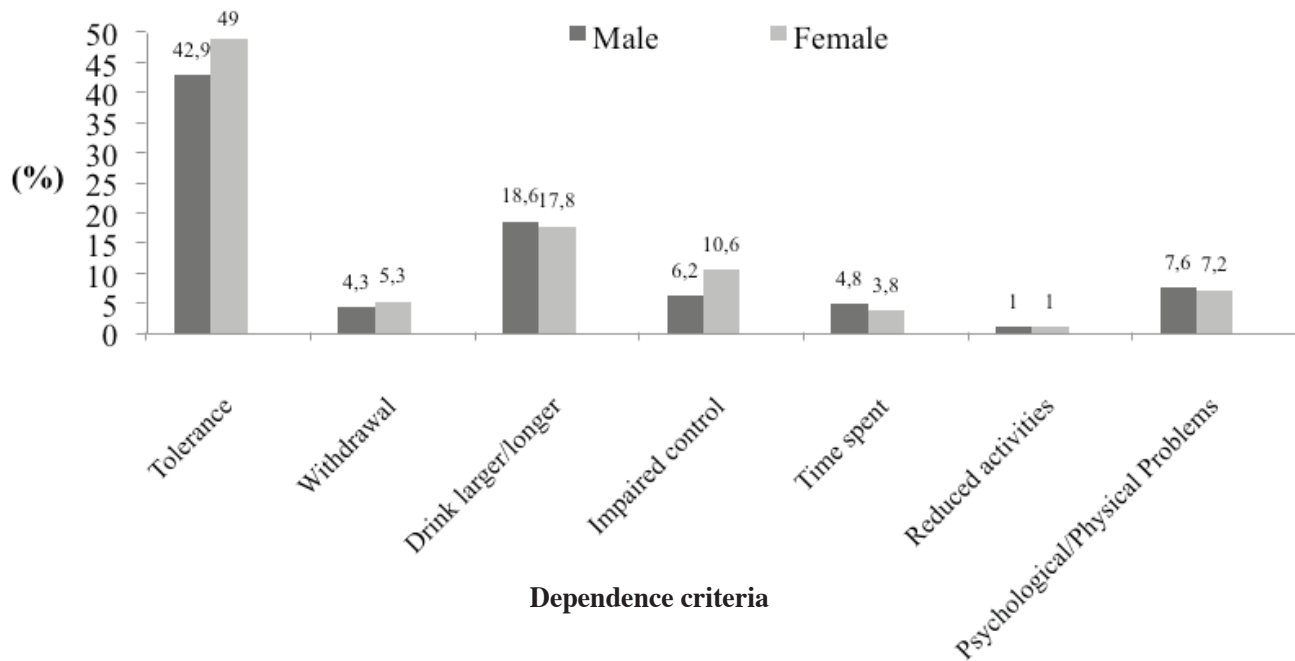


Figure 2. DSM-IV Alcohol Dependence Disorder criteria by gender among adolescents who reported alcohol use in the past year

Prevalence of AD criteria

The scores on each criterion by gender and for the total sample of adolescents who reported alcohol use in the past year are shown in Figure 2. The most prevalent criterion for AD was tolerance (45.8%), while the least prevalent was reduced activities (1%).

The percentage of adolescents endorsing tolerance was significantly higher ($p < 0.01$) than the percentage that met the criteria drink larger/longer (18.1%) and psychological/physical problems (7.4%). Prevalence of drink larger/longer was significantly higher ($p < 0.01$) than those found for impaired control (8.4%), psychological/physical problems (7.4%), withdrawal (4.8%), time spent (4.3%) and reduced activities (1%). Prevalence of impaired control was higher than that of psychological/physical problems ($p < 0.05$), while for this latter criterion the scores were significantly higher than those for withdrawal ($p < 0.01$), time spent ($p < 0.01$) and reduced activities ($p < 0.01$). Also, scores for withdrawal were significantly higher than those for time spent ($p < 0.01$) and reduced activities ($p < 0.01$). Finally, the percentage of participants endorsing time spent was higher than that found for reduced activity ($p < 0.01$).

There were no statistically significant differences between boys and girls in any of the seven AD criteria.

Discussion

To our knowledge, this is the first study that presents data on the prevalence of AUD among adolescents in Spain and on gender differences in AUD among this population. We highlight three major findings: 1) the estimated prevalence of AUD (AA and AD) among Spanish youth is very high; 2) the most

prevalent AA symptom was social problems, while the most prevalent AD symptom was tolerance; and 3) males were more likely than females to have AUD, AA and two AA diagnosis criteria: hazardous use and legal problems. However, there are no gender differences in rate of AD or in prevalence for any of the AD criteria.

The percentage of adolescents meeting the criteria for AUD (abuse and dependence) is very high, and near the upper limit of the range of prevalence found in previous studies from U.S. (Chen, Sheth, Elliott, & Yeager, 2004; Harford, et al., 2005; Harford, et al., 2009; Swendsen, et al., 2012; Wu, Woody, Yang, Pan, & Blazer, 2011), Mexico (Mancha, Rojas, & Latimer, 2012), Germany (Holly & Wittchen, 1998; Nelson & Wittchen, 1998) or Brazil (Madruga et al., 2012). This finding is consistent with the high prevalence of alcohol use among adolescents in Spain, which is much higher those found in other countries. In the Asturias region in particular, rates of alcohol use are higher than the national average. Furthermore, the low age of alcohol use onset in Spain (13.7 years old) (National Plan on Drugs, 2012a) and the predominant drinking pattern among youth in Spain characterized by "binge drinking" (intense use of alcohol resulting in drunkenness within a few hours) (Calafat Far, 2007) both increase the risk of developing AUD (Bonomo, et al., 2004; Hingson, Heeren, & Winter, 2006; Salamo Avellaneda, Gras Perez, & Font-Mayolas, 2010).

The explanation for the high rates of alcohol use, and the consequent high prevalence of AUD, can be found in both individual and environmental factors. First, perceived risk of heavy drinking among young Spanish people is very low. Of all types of drug, alcohol is that perceived as less dangerous, boys perceiving less risk from it than girls (Salamo Avellaneda, et al., 2010). Second, the availability of alcohol is very much higher

than in other countries, where there is greater restriction on the purchase of alcohol in public places (Hibell, et al., 2012; National Plan on Drugs, 2012a). This is important, given that availability is a major risk factor for alcohol use and abuse, especially among young people (Bryden, Roberts, McKee, & Petticrew, 2012; Paschall, Grube, Thomas, Cannon, & Treffers, 2012). In addition, although the legal age for purchasing alcohol in public places is 18 years in Spain, in the Principality of Asturias it was reduced to 16, and even then, the indications are that in most cases this rule is not adhered to by sellers (National Plan on Drugs, 2012a).

Our findings underscore the importance of developing prevention and treatment strategies aimed at curtailing alcohol use among adolescents. Intensive educational campaigns for raising awareness about the health consequences of alcohol use (Anderson, Møller, & Galea, 2012), legal restrictions for reducing adolescents' accessibility to alcohol or even advertising that targets them (Anderson & Baumberg, 2006; Gordon, Harris, Mackintosh, & Moodie, 2011; Gosselt, Van Hoof, & De Jong, 2012), and school and family-based prevention programs (Secades-Villa, Fernandez-Hermida, & Vallejo-Seco, 2005) are necessary to reduce the prevalence of alcohol use and of AUD in this population.

The most prevalent symptom of AA was social problems, while the most prevalent symptom of AD was tolerance, these results being similar to those obtained in previous research from U.S. (Chung, Martin, Armstrong, & Labouvie, 2002; Harford, et al., 2005; Rose, Lee, Selya, & Dierker, 2012). These findings are not surprising if we consider that excessive alcohol use by adolescents and young people usually implies severe consequences in their social environment. Traditionally, such use by teens has been associated with truancy (Duarte & Escario, 2006), violence and vandalism (Clark, 2004), more problems at home and fighting with partner (Trujillo Cano, Perez Gomez, & Scoppetta Diaz-Granados, 2011), carrying weapons in nightlife recreational contexts, being threatened or injured, participating in physical fights, and problems with the police (Blay et al., 2010).

Despite the differences in methods compared to those employed in previous research, the high prevalence of tolerance among our sample is consistent with findings from other studies using community-based surveys. The majority of adolescents who met criteria for AD did so because of their report of tolerance. If we eliminate tolerance criteria, the prevalence of AD in our study would be reduced to 2.8% for the total sample and 3.3% for students who had drunk alcohol in the last year (data not shown in the results section). The high prevalence of this criterion reported in adolescent samples may indicate that the onset of tolerance during adolescence is a normal developmental phenomenon rather than a pathological process, which does not clearly distinguish adolescents with and without alcohol-related problems (Chung, et al., 2002; Chung, Martin, Winters, & Langenbucher, 2001; Martin & Winters, 1998). Additionally, young adults, whose alcohol use tends to be concentrated in episodes of heavy drinking, may be reporting tolerance with high frequency because of a tendency attributable in part to the wording of structured interview schedules, which can lead

to the confusion of binge drinking and its sequelae with more classical physical symptoms of AD (Caetano & Babor, 2006).

Therefore AD symptoms such as tolerance, with its very high prevalence, can affect the observed high dependence diagnosis. Many adolescents report marked increases to produce the same effect but are relatively light drinkers, often showing no other symptoms; some level of tolerance may occur as a normative developmental phenomenon in youth who drink (National Institute on Alcohol Abuse and Alcoholism, 2004). Thus, symptom-level examination points to tolerance as a potentially problematic symptom when applied to adolescents (Chung, et al., 2002). Similarly, "drink larger/longer", a criterion extensively endorsed in the present study, is often assigned as a result of adolescents' poor judgment, inexperience with the effects of alcohol or social pressure to drink, rather than as a compulsive pattern of alcohol use (Chung & Martin, 2005).

If measurement error is the reason for the increased prevalence of AUD in younger age cohorts, there is a need to explore symptom-level data more thoroughly to refine the operational definitions for these criteria in the DSM-V. Future studies need to assess the concurrent and discriminate validity of symptom wording in diverse samples. Better guidelines regarding the identification of a clinically significant level of tolerance need to be developed and tested for use with adolescents. One potential way to revise tolerance is to assign the symptom when substance use is sufficiently heavy to infer physiologic adaptation to its acute effects, even if a person do not endorse the change-based components of the symptom. Particularly for alcohol, may be useful the blood alcohol concentration (BAC) as a method to evaluate a degree of tolerance (Martin, Chung, & Langenbucher, 2008). Moreover, epidemiologist and clinicians need to be more cautious of the tendency of structured interviews to classify adolescents as being alcohol dependent (Caetano & Babor, 2006).

Consistent with findings from previous studies (Harford, et al., 2009; Langenbucher & Martin, 1996; Wagner, et al., 2002; Young et al., 2002), boys scored significantly higher than girls in hazardous use and in legal problems. Greater levels of impulsivity and sensation-seeking among males (Adan, 2012; Petry, Kirby, & Kranzler, 2002) may explain their greater risk of meeting higher levels of these criteria. Furthermore, boys tend to transgress social norms under the effects of alcohol due to the fact that they perceive fewer social sanctions for drinking than girls; girls show more of a tendency to perceive such social norms, and are less likely to display characteristics associated with excessive drinking such as aggressiveness, lack of behavioral control and anti-social behavior (Nolen-Hoeksema, 2004). Moreover, boys drink with greater intensity (frequency and quantity) than girls, and this fact increases the risks associated with alcohol use, since they are more likely to get drunk (Calafat Far, 2007; National Plan on Drugs, 2012c). Also, some risk factors for alcohol abuse are typically associated with male adolescents, such as antisocial behavior (Windle, 1990), conduct disorder (Bukstein, Glancy, & Kaminer, 1992) or delinquent predisposition (Becker & Grilo, 2006).

These gender differences are not found, however, for AD or for any dependence criteria. Previous research (Dawson, 1996; Wagner, et al., 2002) has found that the likelihood of gender

differences in the risk of AD symptoms is directly related to years since drinking onset, and that prevalence of AD tends to remain constant across sex until the age of 18, at which point the rates tend to diverge, with males consistently more likely to be diagnosed with an AD within the adult population as a whole (Mewton, Teesson, Slade, & Grove, 2011). This result suggests that young adulthood may be a critical period for research into AD, in that it appears that certain risk factors active during this period predispose males to the development of AD in later adulthood (Mewton, et al., 2011).

Several study limitations merit mention. First, the sample was primarily recruited from an undergraduate research pool, which may limit generalizability. However, drinking rates in the current sample are close to those in data from the latest national survey by the Spanish National Plan on Drugs (National Plan on Drugs, 2012c), which suggests that our study sample is generally representative of Spanish adolescents. Second, information on alcohol use was based on self-report and not confirmed by collateral informants. Even so, the use of self-reports is considered a valid and reliable method for collecting data on drug use in adolescents (Brenner, Billy, & Grady, 2003). Finally, because the DSM-IV substance use disorder framework was developed on the basis of the manifestation of substance disorders in adults, its applicability to adolescents has not yet been ascertained, and epidemiological application of DSM criteria may be problematic for this population (Chung & Martin, 2005; Chung, et al., 2002; Deas, Riggs, Langenbucher, Goldman, & Brown, 2000; Harrison, Fulkerson, & Beebe, 1998; Slade, Teesson, Mewton, Memedovic, & Krueger, 2012).

Despite these limitations, the present study reports several novel findings concerning the incidence and prevalence of AUD among Spanish youth. Our data indicate that a very high percentage of adolescents meet criteria for AUD (abuse or dependence), that males were more likely than females to have AUD, and that AUD differences between boys and girls is due to the higher prevalence of AA in males, particularly in relation to two criteria: hazardous use and legal problems. These findings reveal that heavy drinking in this population is a serious public health problem, and highlight the urgent need to identify mechanisms that explain the high rates of alcohol use and, above all, to strengthen preventive efforts, implement community-based interventions and introduce drinking-related policies for reducing alcohol-related harm among Spanish adolescents.

Conflict of Interest

No conflict declared.

References

Adan, A. (2012). Impulsividad funcional y disfuncional en jóvenes con consumo intensivo de alcohol (binge drinking). *Adicciones*, 24, 17-22.

American Psychiatric Association (2000). *Diagnostic and statistical manual of mental disorders: DSM-IV-TR. Fourth Edition, Text Revision*. Washington, D.C.: American Psychiatric Association.

Anderson, P., & Baumberg, B. (2006). *Alcohol in Europe: a public health perspective*. London: Institute of Alcohol Studies.

Anderson, P., Møller, L., & Galea, G. (2012). *Alcohol in the European Union. Consumption, harm and policy approaches*. World Health Organization Regional Office for Europe.

Becker, D. F., & Grilo, C. M. (2006). Prediction of drug and alcohol abuse in hospitalized adolescents: Comparisons by gender and substance type. *Behaviour Research and Therapy*, 44, 1431-1440.

Blay, N., Calafat, A., Juan, M., E., B., Mantecón, A., Ros, M., et al. (2010). Violencia en contextos recreativos nocturnos: su relación con el consumo de alcohol y drogas entre jóvenes españoles [Violence in nightlife environments and its relationship with the consumption of alcohol and drugs among young Spaniards]. *Psicothema*, 22, 396-402.

Bonomo, Y. A., Bowes, G., Coffey, C., Carlin, J. B., & Patton, G. C. (2004). Teenage drinking and the onset of alcohol dependence: a cohort study over seven years. *Addiction*, 99, 1520-1528.

Brenner, N. D., Billy, J. O. G., & Grady, W. R. (2003). Assessment of factors affecting the validity of self-reported health-risk behavior among adolescents: Evidence from the scientific literature. *Journal of Adolescent Health*, 33, 436-457.

Bryden, A., Roberts, B., McKee, M., & Petticrew, M. (2012). A systematic review of the influence on alcohol use of community level availability and marketing of alcohol. *Health Place*, 18, 349-357.

Bukstein, O. G., Glancy, L. J., & Kaminer, Y. (1992). Patterns of affective comorbidity in a clinical population of dually diagnosed adolescent substance-abusers. *Journal of the American Academy of Child and Adolescent Psychiatry*, 31, 1041-1045.

Caetano, R., & Babor, T. F. (2006). Diagnosis of alcohol dependence in epidemiological surveys: an epidemic of youthful alcohol dependence or a case of measurement error? *Addiction*, 101(Suppl 1), 111-114.

Calafat Far, A. (2007). El abuso de alcohol de los jóvenes en España [Alcohol abuse by young people in Spain]. *Adicciones*, 19, 217-224.

Clark, D. B. (2004). The natural history of adolescent alcohol use disorders. *Addiction*, 99, 5-22.

Chartier, K. G., Hesselbrock, M. N., & Hesselbrock, V. M. (2011). Alcohol problems in young adults transitioning from adolescence to adulthood: The association with race and gender. *Addictive Behaviors*, 36, 167-174.

Chen, K., Sheth, A. J., Elliott, D. K., & Yeager, A. (2004). Prevalence and correlates of past-year substance use, abuse, and dependence in a suburban community sample of high-school students. *Addictive Behaviors*, 29, 413-423.

Chung, T., & Martin, C. S. (2005). What were they thinking? Adolescents' interpretations of DSM-IV alcohol dependence symptom queries and implications for diagnostic validity. *Drug and Alcohol Dependence*, 80, 191-200.

Chung, T., Martin, C. S., Armstrong, T. D., & Labouvie, E. W. (2002). Prevalence of DSM-IV alcohol diagnoses and symptoms in adolescent community and clinical samples. *Journal of the American Academy of Child and Adolescent Psychiatry*, 41, 546-554.

- Chung, T., Martin, C. S., Winters, K. C., & Langenbucher, J. W. (2001). Assessment of alcohol tolerance in adolescents. *Journal of Studies on Alcohol and Drugs*, 62, 687-695.
- Dawson, D. (1996). Gender differences in the risk of alcohol dependence: United States, 1992. *Addiction*, 91, 1831-1842.
- Deas, D., Riggs, P., Langenbucher, J., Goldman, M., & Brown, S. (2000). Adolescents are not adults: developmental considerations in alcohol users. *Alcoholism: Clinical and Experimental Research*, 24, 232-237.
- Duarte, R., & Escario, J. J. (2006). Alcohol abuse and truancy among Spanish adolescents: A count-data approach. *Economics of Education Review*, 25, 179-187.
- Espada, J. P., Morales, A., Orgilés, M., Piqueras, J. A., & Carballo, J. L. (2013). Comportamiento sexual bajo la influencia del alcohol en adolescentes españoles. *Adicciones*, 25, 55-62.
- Fernández Artamendi, S., Secades Villa, R., Fernández Hermida, J. R., García Fernández, G., & García Rodríguez, O. (2013). Gender Differences in Early Alcohol and Tobacco Use as a Risk Factor in Spanish Adolescents. *Substance Use & Misuse*, 48, 429-437.
- Fonseca-Pedrero, E., Paino-Pineiro, M., Lemos-Giraldez, S., Villazon-García, U., & Muniz, J. (2009). Validation of the Schizotypal Personality Questionnaire-Brief Form in adolescents. *Schizophrenia Research*, 111, 53-60.
- Gelhorn, H., Hartman, C., Sakai, J., Stallings, M., Young, S., Rhee, S. H., et al. (2008). Toward DSM-V: An Item Response Theory Analysis of the Diagnostic Process for DSM-IV Alcohol Abuse and Dependence in Adolescents. *Journal of the American Academy of Child and Adolescent Psychiatry*, 47, 1329-1339.
- Gordon, R., Harris, F., Mackintosh, A. M., & Moodie, C. (2011). Assessing the cumulative impact of alcohol marketing on young people's drinking: Cross-sectional data findings. *Addiction Research & Theory*, 19, 66-75.
- Gosselt, J. F., Van Hoof, J. J., & De Jong, M. D. T. (2012). Why should I comply? Sellers' accounts for (non-) compliance with legal age limits for alcohol sales. *Substance Abuse Treatment Prevention and Policy*, 7.
- Harford, T. C., Grant, B. F., Yi, H. Y., & Chen, C. M. (2005). Patterns of DSM-IV alcohol abuse and dependence criteria among adolescents and adults: Results from the 2001 National Household Survey on Drug Abuse. *Alcoholism-Clinical and Experimental Research*, 29, 810-828.
- Harford, T. C., Yi, H. Y., Faden, V. B., & Chen, C. M. (2009). The Dimensionality of DSM-IV Alcohol Use Disorders Among Adolescent and Adult Drinkers and Symptom Patterns by Age, Gender, and Race/Ethnicity. *Alcoholism-Clinical and Experimental Research*, 33, 868-878.
- Harrison, P. A., Fulkerson, J. A., & Beebe, T. J. (1998). DSM-IV substance use disorder criteria for adolescents: A critical examination based on a statewide school survey. *American Journal of Psychiatry*, 155, 486-492.
- Hibell, B., Guttormsson, U., Ahlström, S., Balakireva, O., Bjarnason, T., Kokkevi, A., et al. (2009). *The 2007 ESPAD Report. Substance Use Among Students in 35 European Countries*. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs (CAN).
- Hibell, B., Guttormsson, U., Ahlström, S., Balakireva, O., Bjarnason, T., Kokkevi, A., et al. (2012). *The 2011 ESPAD Report. Substance Use Among Students in 36 European Countries*. Stockholm: The Swedish Council for Information on Alcohol and Other Drugs (CAN).
- Hingson, R. W., Heeren, T., & Winter, M. R. (2006). Age at drinking onset and alcohol dependence - Age at onset, duration, and severity. *Archives of Pediatrics & Adolescent Medicine*, 160, 739-746.
- Holly, A., & Wittchen, H. U. (1998). Patterns of use and their relationship to DSM-IV abuse and dependence of alcohol among adolescents and young adults. *European Addiction Research*, 4, 50-57.
- Inglés, C. J., Torregrosa, M. S., Rodríguez-Marín, J., García del Castillo, J. A., Gázquez, J. J., García-Fernández, J. M., et al. (2013). Uso de alcohol y tabaco y variables cognitivo-motivacionales en el ámbito escolar: Efectos sobre el rendimiento académico en adolescentes españoles. *Adicciones*, 25, 65-70.
- Langenbucher, J. W., & Martin, C. S. (1996). Alcohol abuse: Adding content to category. *Alcoholism-Clinical and Experimental Research*, 20, A270-A275.
- Lee, C. T., Rose, J. S., Engel-Rebitzer, E., Selya, A., & Dierker, L. (2011). Alcohol dependence symptoms among recent onset adolescent drinkers. *Addictive Behaviors*, 36, 1160-1167.
- Madrugá, C. S., Laranjeira, R., Caetano, R., Pinsky, I., Zaleski, M., & Ferri, C. P. (2012). Use of licit and illicit substances among adolescents in Brazil - A national survey. *Addictive Behaviors*, 37, 1171-1175.
- Mancha, B. E., Rojas, V. C., & Latimer, W. W. (2012). Alcohol use, alcohol problems, and problem behavior engagement among students at two schools in northern Mexico. *Alcohol*, 46, 695-701.
- Martin, C. S., Chung, T., & Langenbucher, J. W. (2008). How should we revise diagnostic criteria for substance use disorders in the DSM-V? *Journal of Abnormal Psychology*, 117, 561-575.
- Martin, C. S., & Winters, K. C. (1998). Diagnosis and Assessment of Alcohol Use Disorders Among Adolescents. *Alcohol Health & Research World*, 22, 95-105.
- McKay, M. T., Percy, A., & Cole, J. C. (2013). Present orientation, future orientation and alcohol use in Northern Irish adolescents. *Addiction Research & Theory*, 21, 43-51.
- Merikangas, K. R., & McClair, V. L. (2012). Epidemiology of substance use disorders. *Human Genetics*, 131, 779-789.
- Mewton, L., Teesson, M., Slade, T., & Grove, R. (2011). The epidemiology of DSM-IV alcohol use disorders amongst young adults in the Australian population. *Alcohol and Alcoholism*, 46, 185-191.
- National Institute on Alcohol Abuse and Alcoholism (2004). Interventions for alcohol use and alcohol use disorders in youth. *Alcohol Research & Health*, 28, 163-174.
- National Plan on Drugs (2009). *Encuesta estatal sobre uso de drogas en estudiantes de enseñanzas secundarias (ESTUDES), 1994-2008 [National Survey on Drug Use among Secondary School Students, 1994-2008]*. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas.
- National Plan on Drugs (2012a). *Encuesta estatal sobre uso de drogas en estudiantes de enseñanzas secundarias (ESTUDES) 2010, España [National Survey on Drug Use among Secondary School Students*

- 2010, Spain]. Madrid: Delegación del Gobierno para el Plan Nacional sobre Drogas.
- National Plan on Drugs (2012b). *Drogas y juventud en Asturias. Datos básicos. Encuesta estatal sobre uso de drogas en estudiantes de enseñanzas secundarias (ESTUDES) 2010 [Drugs and youth in Asturias. Basic data. National Survey on Drug Use among Secondary School Students 2010]*: Observatorio sobre Drogas en Asturias. Dirección General de Salud Pública. Servicio de la Evaluación de la Salud y Programas. Plan de Drogas de Asturias.
- National Plan on Drugs (2012c). *INFODROG 2010. Informe sobre Drogas en Asturias [INFODROG 2010. Report on Drugs in Asturias]*: Observatorio sobre Drogas para Asturias. Unidad de Coordinación del Plan sobre Drogas de Asturias. Dirección General de Salud Pública. Consejería de Sanidad.
- Nelson, C. B., & Wittchen, H. U. (1998). DSM-IV alcohol disorders in a general population sample of adolescents and young adults. *Addiction, 93*, 1065-1077.
- Newton, N. C., Havard, A., & Teesson, M. (2012). The association between moral disengagement, psychological distress, resistive self-regulatory efficacy and alcohol and cannabis use among adolescents in Sydney, Australia. *Addiction Research & Theory, 20*, 261-269.
- Nolen-Hoeksema, S. (2004). Gender differences in risk factors and consequences for alcohol use and problems. *Clinical Psychology Review, 24*, 981-1010.
- Paschall, M. J., Grube, J. W., Thomas, S., Cannon, C., & Treffers, R. (2012). Relationships between local enforcement, alcohol availability, drinking norms, and adolescent alcohol use in 50 California cities. *Journal of Studies on Alcohol and Drugs, 73*, 657-665.
- Petry, N. M., Kirby, K. N., & Kranzler, H. R. (2002). Effects of gender and family history of alcohol dependence on a behavioral task of impulsivity in healthy subjects. *Journal of Studies on Alcohol, 63*, 83-90.
- Rose, J. S., Lee, C.-T., Selya, A. S., & Dierker, L. C. (2012). DSM-IV alcohol abuse and dependence criteria characteristics for recent onset adolescent drinkers. *Drug and Alcohol Dependence, 124*, 88-94.
- Salamo Avellaneda, A., Gras Perez, M. E., & Font-Mayolas, S. (2010). Alcohol consumption patterns in adolescence. *Psicothema, 22*, 189-195.
- Sanhueza, C., Garcia-Moreno, L. M., & Exposito, J. (2011). Weekend alcoholism in youth and neurocognitive aging. *Psicothema, 23*, 209-214.
- Secades-Villa, R., Fernandez-Hermida, J. R., & Vallejo-Seco, G. (2005). Family risk factors for adolescent drug misuse in Spain. *Journal of Child & Adolescent Substance Abuse, 14*, 1-15.
- Slade, T., Teesson, M., Mewton, L., Memedovic, S., & Krueger, R. F. (2012). Do Young Adults Interpret the DSM Diagnostic Criteria for Alcohol Use Disorders as Intended? A Cognitive Interviewing Study. *Alcoholism: Clinical and Experimental Research, 36*, 336A-336-A.
- Swendsen, J., Burstein, M., Case, B., Conway, K. P., Dierker, L., He, J., et al. (2012). Use and Abuse of Alcohol and Illicit Drugs in US Adolescents Results of the National Comorbidity Survey-Adolescent Supplement. *Archives of General Psychiatry, 69*, 390-398.
- Trujillo Cano, A. M., Perez Gomez, A., & Scopetta Diaz-Granados, O. (2011). Social context variables and their influence on the occurrence of problematic situations associated with alcohol use in adolescents. *Adicciones, 23*, 349-356.
- Wagner, E. F., Lloyd, D. A., & Gil, A. G. (2002). Racial/ethnic and gender differences in the incidence and onset age of DSM-IV alcohol use disorder symptoms among adolescents. *Journal of Studies on Alcohol, 63*, 609-619.
- Windle, M. (1990). A longitudinal-study of antisocial behaviors in early adolescence as predictors of late adolescent substance use-gender and ethnic-group differences. *Journal of Abnormal Psychology, 99*, 86-91.
- Wu, L.T., Woody, G. E., Yang, C., Pan, J. J., & Blazer, D. G. (2011). Racial/Ethnic Variations in Substance-Related Disorders Among Adolescents in the United States. *Archives of General Psychiatry, 68*, 1176-1185.
- Young, S. E., Corley, R. P., Stallings, M. C., Rhee, S. H., Crowley, T. J., & Hewitt, J. K. (2002). Substance use, abuse and dependence in adolescence: prevalence, symptom profiles and correlates. *Drug and Alcohol Dependence, 68*, 309-322.
- Zeigler, D. W., Wang, C. C., Yoast, R. A., Dickinson, B. D., McCaffree, M. A., Robinowitz, C. B., et al. (2005). The neurocognitive effects of alcohol on adolescents and college students. *Preventive Medicine, 40*, 23-32.