

Evaluation of AUDIT Consumption Items New Adaptation to Improve the Screening of College Students Binge Drinking

Evaluación de la adaptación de los ítems de consumo del AUDIT para mejorar el cribado de Binge Drinking en universitarios

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Abstract

The strong presence of Binge Drinking (BD) amongst university students, as well as the consequences associated with the same and the changes taking place over recent years regarding its conceptualization make it necessary to examine the usefulness of screening instruments used to detect this drinking pattern. This study examines the usefulness of a briefer adaptation of the AUDIT proposed by Cortés, Giménez, Motos, and Sancerni (2017a).

College students self-administered the AUDIT, the revised items 2 and 3 (A2r and A3r), and completed a weekly self-report of their alcohol intake. BD was classified according to the amount consumed and the frequency of that consumption over the past six months. The AUDIT, AUDIT-C and items A2r+A3r (AR2I) were examined.

The results obtained from a sample of 605 college students (18–21 years old/55.2% female) indicate that 449 meet the BD criteria. Items A2r and A3r, adapted to the most consensual definition of BD, were found to identify 98% of BD college students when using a cut-off point of ≥ 3 in females and ≥ 4 in males with optimum levels of sensitivity and specificity.

The new adaptation, which includes fewer items, identifies BD college students more accurately. This confirms the need to adjust both consumption items from the model according to the pattern of consumption in college students to detect BD more precisely and as soon as possible.

Keywords: Binge Drinking; Undergraduate; AUDIT; Alcohol Screening; ROC.

Resumen

La importante presencia del Binge Drinking (BD) entre estudiantes universitarios, junto con las consecuencias asociadas al mismo y los cambios experimentados en los últimos años en su conceptualización, hacen necesario revisar la utilidad de los instrumentos de cribado para detectar este patrón de consumo. Este estudio examina la utilidad de una adaptación del AUDIT propuesta por Cortés, Giménez, Motos y Sancerni (2017a).

Una muestra de estudiantes universitarios cumplimentó el AUDIT, los ítems 2 y 3 revisados (A2r y A3r), y un autoinforme semanal de su consumo de alcohol. A partir de la cantidad máxima de alcohol consumido en una ocasión y de la frecuencia de dicho consumo en los últimos seis meses se clasificaron los jóvenes como BD o no-BD. Se examinaron las puntuaciones del AUDIT, AUDIT-C y de los ítems A2r+A3r (AR2I).

Los resultados obtenidos con 605 universitarios (18-21 años/55,2% mujeres) indican que 449 cumplen criterios de BD. Los ítems A2r y A3r, adaptados a una definición más consensuada de BD, identifican el 98% de los estudiantes BD cuando se usa un punto de corte ≥ 3 en mujeres y ≥ 4 en varones, con valores óptimos de sensibilidad y especificidad.

Esta adaptación realizada, que incluye menor número de ítems, identifica a los universitarios BD de manera más precisa. Se confirma la necesidad de ajustar ambos ítems de consumo de acuerdo al patrón de ingesta BD que realizan los estudiantes universitarios mejorando notablemente su detección y facilitando un abordaje temprano.

Palabras clave: Binge drinking; Universitarios; AUDIT; Cribado de alcohol; ROC.

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The most generalized alcohol consumption pattern amongst European youth is that referred to as *Binge Drinking* (BD), a term which has been adapted to the Spanish language as *Episodio de Consumo Intensivo de Alcohol* (Ministerio de Sanidad y Consumo [MSC], 2008). In Europe, two out of every ten youth between the ages of 14 and 24 admit to having engaged in this behavior (European Union, 2010). As for Spanish youth (Observatorio Español de las Drogas y las Adicciones [OEDA], 2017) the highest incidence is found between the age interval of 20 to 29, being cited in approximately 35% of men and 23% of women in this age bracket. However, upon reviewing the prevalence of BD in minors over the past year (OEDA, 2018) this drinking behavior is found to occur in 14% of 14 year olds and in 56% of 18 year olds. Unfortunately, both in Spain and in Europe in general, changes in this drinking pattern in minors have been less pronounced and have only been observed in boys (42% to 37%), with overall rates declining by one percentage point (36% to 35%) over the past 20 years (European School Survey Project on Alcohol and Other Drugs [ESPAD], 2016). Furthermore, for some time now it has been suggested (Kuntsche et al., 2011; Simons-Morton et al., 2009), and now confirmed, that there is a closing in the gender gap for the excessive consumption of alcohol amongst adolescents. Rates of BD generally increased among younger girls, resulting in a narrowing of the gender differences over time (ESPAD, 2016; OEDA, 2018).

It is not possible to decouple this drinking pattern from the consequences that it causes in the youth. Generally speaking, there are noteworthy alterations and problems of distinct degrees and in different areas, from academic or professional to those related to interpersonal relations, exposure to risky sexual behavior, driving under the influence of alcohol, engaging in fights, suffering from injuries, having legal issues, having a propensity to engage in addictive processes or even causing injury to third parties (Barnet et al., 2014; Brewer & Swahn, 2005; Cortés, Motos & Giménez, 2015; Hingson, Heeren, Zakocs, Winter & Wechsler, 2003; Mallett, Varvil-Weld, Turrisi & Read, 2011; McKetin, Chalmers, Sunderland & Bright, 2014; Shield, Gmel, Patra & Rehm, 2012).

The large presence of this drinking pattern in youth, as well as the changes occurring in the same in terms of gender equalization and the consequences resulting, justify the need for screening instruments that facilitate its detection in distinct areas (Primary Care, traumatology departments, university health services, etc.) and the subsequent referral of the youth to the most appropriate care resources (Clark & Moss, 2010).

The AUDIT is a screening instrument used to identify *Binge Drinking* (BD) in the university student population (Hagman, 2016; Seguel, Santander & Alexandre, 2013). Application of its reduced versions is recommended, given

their increased effectiveness (Barry, Chaney, Stellefson & Dodd, 2015; Clark, Gordon, Ettaro, Owens & Moss, 2010; de Meneses-Gaya, Zuairi, Loureiro & Crippa, 2009). Of these abridged versions, the AUDIT-C is of special note, given that it has better psychometric properties than those of the complete scale in the university student population (Barry et al., 2015; Cortés, Giménez, Motos & Sancerni, 2016; DeMartini & Carey, 2012; Kelly, Donovan, Chung, Bukstein & Cornelius, 2009).

However, the AUDIT and its abridged versions use an operationalization procedure that is not very precise for BD, making it difficult to identify it with great precision. Of the three items related to the consumption of alcohol, only the third item attempts to reflect binge drinking (*How often do you consume 6 or more drinks a day?*) but is very distinct from that which is currently considered to be Intensive Alcohol Consumption (Cortés & Motos, 2015; Mota et al., 2010).

An additional problem is that many of the studies that have applied the AUDIT or its reduced versions have measured BD in very distinct manners, with the majority considering the number of drinks consumed without taking into account the strength of the drink or without detailing the number of hours of duration of the drinking or only assessing the consumption from the past week or using DSM criteria for substance use disorders (Chung, Colby, Barnett & Monti, 2002; Díaz Martínez et al., 2009; Thomas & McCambridge, 2008). Furthermore, very few have considered that this is a very heterogeneous consumer group.

This diversity justifies the need to be very cautious when comparing results from the distinct studies, while at the same time, demanding the need for increased accuracy when operationalizing BD and the instruments attempting to determine the same.

This need to improve the measurement instruments has resulted in the proposed adaptations of the AUDIT. Initially, new combinations of items from the traditional abridged versions were used, attempting to identify those that were more precise in detecting binge drinkers (Babor, Higgins-Biddle & Robaina, 2017). In the case of McCambridge and Thomas (2009), they report that the best combination would be that consisting of items 3, 5 and 8, whereas Bowring, Gouillou, Hellard, and Dietze (2013) concluded that the best grouping was that of the items 3, 4, 8 and 9.

However, attempts to readjust the drafting of the items or their response scales to a more precise definition of BD have been more effective. We find various studies that have all eliminated the first item from the AUDIT-C due to its low correlation with the overall scale (Gmel, Hebb & Rehm, 2001; McCambridge & Thomas, 2009).

Blank, Connor, Gray, and Tustin (2015) proposed the use of only items 2 and 3 (the most explanatory of the BD in university students) while increasing the number

of response options. Other studies recommend modifying the wording of these two consumption items. For item 2, García, Novalbos, Martínez, and O’Ferrall (2016) suggested limiting the time of consumption to “one unique consumption occasion” (instead of “a given day”). As for item 3, in some cases, it was suggested that the number of drinks be reduced (five or more drinks in one sole consumption occasion -Kokotailo et al., 2004; four or more drinks for women and five or more drinks for men -Olthuis, Zamboanga, Martens & Ham, 2011-) and in others, it is suggested that the number of drinks be transformed to Standard Drinking Units (SDU), according to the home country (García et al., 2016). The introduction of this type of modifications produces increases in the levels of sensitivity (between 0.82 and 0.87) and specificity (between 0.87 and 0.92) as compared to the traditional scale (Blank et al., 2015; McCambridge & Thomas, 2009).

However, none of these suggestions have been fully accepted given that they do not include an adjusted definition of BD.

Recently, Cortés, Giménez, Motos, and Sancerni (2017a) adapted the wording of items 2 and 3 to the most agreed upon definition of BD which uses more precise operationalization criteria for this behavior, according to research (Cortés & Motos, 2015; Courtney & Polich, 2009; Parada et al., 2011), including aspects of gender, consumption time interval and equivalences to the Spanish SDU. Definitively, BD is defined as the consumption of 7 or more SDUs for males and 6 or more for females during a period of 2 hours, at least once over the last six months (Cortés et al., 2016, Cortés, Giménez, Motos, Sancerni & Cadaveira, 2017b).

Considering these criteria, item 3 was written as: *During the past 6 months, what is the average number of days per month with BD consumptions (seven or more Spanish SDUs for males and six or more Spanish SDUs for females over a 2 h period)?* The response scale was also adapted based on the results obtained in prior studies conducted with minors and university students (Cortés et al., 2017a; Hagman, 2016; Patrick et al., 2013) (Table 1).

The wording of item 2 was also improved, changing the number of consumptions for the number of Spanish SDUs consumed in one day: *How many SDUs do you tend to have on a day when you drink alcohol?* (Table 1).

Upon testing this adaptation (AR2I) with underage alcohol consumers (14-17 years old), an area of .898 was found under the ROC (Receiver Operating Characteristic) curve, identifying 94% of the BDs with a cut-off point of 5.

The objective of this study was to examine the psychometric properties (sensitivity and specificity) of the AUDIT, AUDIT-C and the AR2I adaptation, attempting to identify the one which best classifies BD in the university student population (18-21 years of age), considering the gender variable.

Based on the results obtained in the prior study carried out by Cortés et al. (2017a) on the effectiveness of the AR2I adaptation in the identification of BD adolescents, the hypothesis is proposed that this would be the instrument that best identifies a greater number of BD university students.

Methods

Participants

Stratified sampling was carried out on students from the University of Valencia. The degree was selected for each area of knowledge (Basic Sciences, Social Sciences, Health Sciences, Education and Humanities Sciences) having the highest number of registered students, with the group having the highest number in each course responding to the questionnaire. A total of 605 students participated, all of Spanish nationality (334 women / 55.2%). Their ages ranged from 18 to 21, with mean age 19.33 years (SD=1.15). In no case did they have any diagnostic criteria to receive treatment for addictive behavior. Of those surveyed, 74.21% (449) complied with the BD criteria, with similar proportions being found for men (44.5%, 200) and women (55.5%, 249) ($X^2=.044$; $p=.834$).

The questionnaires were completed during the 2014 academic year in the classrooms and during class hours (morning or afternoon), and in all cases, members of the research team confirmed that all of the items had been answered. Participation was anonymous and voluntary. The study was conducted in compliance with Spanish legislation (approved by the Department of Education) and the Code of Ethics for Research involving human subjects, as outlined by the University of Valencia Human Research Ethics Committee. Students signed an informed consent form.

Variables and Instruments

The parameters relating to alcohol consumption (age of onset of consumption, number and type of drinks and the time when the drinking took place) were assessed with a self-reporting diary. The amounts of consumption were converted to SDUs following the Spanish SDU definition -1 hard liquor=2 SDU; 1 fermented drink=1 SDU- (Rodríguez et al., 2013).

Table 1. Redrafting of items 2 and 3.

A2r	How many SDUs do you tend to have on a day when you drink alcohol? (0) 1 or 2; (1) 3 or 4; (2) 5 or 6; (3) 7 to 9; and (4) 10.
A3r	During the past 6 months, what is the average number of days per month with BD consumptions (seven or more Spanish SDUs for males and six or more Spanish SDUs for females over a 2 h period)? (0) Never; (1) Sporadically -less than once a month-; (2) between 1 and 4 times; (3) between 5 and 8 times; (4) between 9 and 12 times; (5) 13 or more times.

guez-Martos, Gual & Llopis, 1999). The recoding of all consumption occasions allowed for the identification of the greatest consumption engaged in by each student (*greatest number of SDUs of alcohol consumed in a BD session*). According to this variable, students were classified as BD (individuals who had consumed ≥ 7 Spanish SDUs for males or ≥ 6 Spanish SDUs for females), or non-BD.

The frequency of BD was operationalized by asking the *number of total BD days within 6 months* that they had consumed alcohol at this level.

Items A2r+A3r were operationalized according to the description appearing in Table 1.

The AUDIT was also completed (Spanish version validated by Contel Guillaón, Gual Solé & Colom Farran, 1999), thereby obtaining a total score of the AUDIT (the sum of the 10 original items), a score for the AUDIT-C (the sum of the first three original items). AR2I was also completed, obtaining a score of A2r+A3r.

In this study, the internal consistency of AR2I was higher (0.90) than the AUDIT-C (0.80) and AUDIT (0.71).

Data analysis

Following the methodology proposed by Cortés et al. (2016, 2017a, 2017b) two cluster analyses (one for each sex) were carried out with the BD undergraduates, based on the values of *number of SDUs consumed in a BD session* and *frequency of consumption in the last 6 months*. In both cases, the extraction procedure consisted of two phases, which led to a natural classification of the subjects into different groups.

A multivariate analysis (MANOVA) was performed, with its corresponding *a posteriori* tests, using the four groups obtained in the clusters and the no-BD groups as independent variable (IV) to determine whether there were differences in the number of SDUs consumed, and the frequency of consumption in the last 6 months as dependent variables (DVs).

The area under the ROC curve was calculated using the method proposed by Hanley and McNeil (1983), which provides a graphic representation of a classifier’s performance.

To determine the optimal cut-off score for the AUDIT, our purpose was to minimize false negatives and thus improve, as much as possible, the detection of young people who engage in this activity, so cut-off scores were used that maximized sensitivity.

All of the analyses were carried out using the IBM SPSS-22 statistics package.

Results

The cluster analysis among BD females produced two groups: the BD1F (n=169), which consumed 8.44 SDUs in one session and engaged in BD 22.85 days over the past 6 months and the BD2F (n=80), which consumed 13.41 SDUs per session with a mean of 45.73 BD episodes over the past 6 months. While in the case of the BD males, two groups were produced: the BD1M (n=160), which consumed 12.04 SDUs per session and engaged in BD 34.24 days over the past six months and the BD2M (n=40) group,

Table 2. *A posteriori Games-Howell test.*

(I) Clusters_only_BD	(J) Clusters_only_BD	Difference in means (I-J)	Std. error	Sig.	95% Confidence Interval (Lower Bound – Upper Bound)	
SDUs						
BD1F	BD2F	-4.968(*)	.469	.001	-6.27	-3.67
	BD1M	-3.606(*)	.298	.001	-4.42	-2.79
	BD2M	-16.687(*)	.738	.001	-18.79	-14.59
	NOBDF	4.867 (*)	.211	.001	4.26	5.47
	NOBDM	4.079(*)	.237	.001	3.40	4.76
BD2F	BD1M	1.363	.509	.063	-.04	2.77
	BD2M	-11.719(*)	.846	.001	-14.09	-9.35
	NOBDF	9.836(*)	.463	.001	8.49	11.18
	NOBDM	9.047(*)	.476	.001	7.67	10.43
BD1M	BD2M	-13.081(*)	.764	.001	-15.24	-10.92
	NOBDF	8.473(*)	.288	.001	7.64	9.30
	NOBDM	7.685(*)	.308	.001	6.80	8.57
BD2M	NOBDF	21.554(*)	.734	.001	19.36	23.75
	NOBDM	20.766(*)	.742	.001	18.55	22.98
NOBDF	NOBDM	-.789(*)	.224	.008	-1.44	-.14

Total consumed days within 6 months						
BD1F	BD2F	-22.873(*)	1.661	.001	-27.47	-18.28
	BD1M	-11.385(*)	1.464	.001	-15.41	-7.36
	BD2M	-24.684(*)	2.264	.001	-31.06	-18.24
	NOBDF	6.334(*)	1.534	.001	1.90	10.77
	NOBDM	5.979(*)	1.776	.013	.82	11.14
BD2F	BD1M	11.488(*)	1.923	.001	6.19	16.78
	BD2M	-1.775	2.584	.959	-9.00	5.45
	NOBDF	29.207(*)	1.977	.001	23.51	34.91
	NOBDM	28.852(*)	2.170	.001	22.59	35.12
BD1M	BD2M	-13.263(*)	2.463	.001	-20.16	-6.36
	NOBDF	17.720(*)	1.815	.001	12.50	22.94
	NOBDM	17.364(*)	2.023	.001	11.53	23.20
BD2M	NOBDF	30.982(*)	2.505	.001	23.64	38.32
	NOBDM	30.627(*)	2.660	.001	22.86	38.39
NOBDF	NOBDM	-.356	2.075	1.000	-6.35	5.64
Years consumption						
BD1F	BD2F	-.69667(*)	.21749	.020	-1.3249	-.0684
	BD1M	.21583	.19221	.872	-.3355	.7671
	BD2M	-.28417	.32799	.953	-1.2556	.6872
	NOBDF	.28200	.23387	.833	-.3938	.9578
	NOBDM	.93379(*)	.25042	.004	.2074	1.6602
BD2F	BD1M	.91250(*)	.23983	.003	.2217	1.6033
	BD2M	.41250	.35798	.857	-.6374	1.4624
	NOBDF	.97868(*)	.27435	.006	.1874	1.7699
	NOBDM	1.63046(*)	.28859	.001	.7966	2.4643
BD1M	BD2M	-.50000	.34321	.692	-1.5103	.5103
	NOBDF	.06618	.25478	1.000	-.6679	.8003
	NOBDM	.71796	.27005	.090	-.0625	1.4984
BD2M	NOBDF	.56618	.36817	.641	-.5109	1.6433
	NOBDM	1.21796(*)	.37889	.023	.1111	2.3248
NOBDF	NOBDM	.65178	.30113	.261	-.261	1.5212

Note. * The difference in means is significant at the .05 level.

BD=Binge Drinking; Std. error= Standard error; BD1F=Group one of binge drinkers, females; BD2F=Group two of binge drinkers, females; BD1M=Group one of binge drinkers, males; BD2M=Group two of binge drinkers males; NOBDF=Group no binge drinkers female; NOBDM=Group no binge drinkers males.

which consumed 25.13 SDUs per session with a mean of 47.50 days.

The remaining subjects that did not comply with the criteria for being considered BD were classified according to gender. The group of females -NOBDF- (n=85) who consumed 3.57 SDUs per session, with a frequency of 16.52 days over the last six months and the group of males -NOBDM- (n=71) who consumed 4.36 SDUs per session, over 16.87 days during this same period.

The MANOVA performed among the 4 BD groups and the 2 NOBD groups (Table 2) indicated that there were significant differences in the number of SDUs con-

sumed and in the frequency of consumption in the last 6 months.

According to Table 2, the 4 BD groups consumed significantly higher amounts and with a higher frequency than the NOBD groups. No significant differences were observed between the NOBD groups in either of the two variables.

Comparing the four BD groups, it can be seen that the subgroups that consumed the largest number of SDUs (BD2F and BD2M) also consumed more frequently than the other two subgroups (BD1F and BD1M). When considering the sex of the two subgroups, it was found that

Table 3. Performance of the versions of the AUDIT in detecting Binge Drinking for the entire sample and female and male groups.

	Entire sample					Female					Male				
	Cut-off	Sensitivity	Specificity	ROC (95% Confidence Interval)		Cut-off	Sensitivity	Specificity	ROC (95% Confidence Interval)		Cut-off	Sensitivity	Specificity	ROC (95% Confidence Interval)	
AUDIT	≥2	1.000	.397	.948 (.926-.969)		≥2	1.000	.388	.955 (.929-.981)		≥2	1.000	.408	.948 (.917-.979)	
	≥3	.993	.571			≥3	.992	.612			≥3	.995	.521		
	≥4	.976	.724			≥4	.964	.753			≥4	.990	.690		
	≥5	.955	.833			≥5	.936	.871			≥5	.980	.789		
	≥6	.878	.897			≥6	.847	.929			≥6	.915	.859		
	≥7	.811	.904			≥7	.743	.929			≥7	.895	.873		
	≥8	.724	.942			≥8	.639	.976			≥8	.830	.901		
AUDIT-C	≥2	1.000	.545	.980 (.968-.993)		≥2	1.000	.576	.986 (.978-.995)		≥2	1.000	.507	.977 (.955-.999)	
	≥3	.980	.833			≥3	.980	.824			≥3	.980	.845		
	≥4	.962	.923			≥4	.952	.929			≥4	.970	.915		
	≥5	.875	.974			≥5	.835	1.000			≥5	.925	.944		
	≥6	.724	.987			≥6	.631	1.000			≥6	.840	.972		
	≥7	.584	.994			≥7	.470	1.000			≥7	.725	.986		
AUDIT-CR	≥3	1.000	.718	.992 (.984-1)		≥3	1.000	.776	.995 (.991-.999)		≥3	1.000	.648	.992 (.976-1.000)	
	≥4	.989	.910			≥4	.980	.918			≥4	1.000	.901		
	≥5	.958	.974			≥5	.940	1.000			≥5	.980	.944		
	≥6	.898	.994			≥6	.835	1.000			≥6	.975	.986		
	≥7	.733	.994			≥7	.618	1.000			≥7	.875	.986		
	≥1	1.000	.679	.997 (.995-1)		≥1	1.000	.765	1.000 (1.000-1.000)		≥1	1.000	.143	.998 (.996-1.000)	
AR2i	≥2	1.000	.968			≥2	1.000	1.000			≥2	1.000	.577		
	≥3	.989	.968			≥3	.980	1.000			≥3	1.000	.930		
	≥4	.906	.994			≥4	.847	1.000			≥4	.980	.986		

Note. ROC= Receiver Operating Characteristic.

men consumed larger amounts compared to their respective subgroups of women. Differences were not found for the frequency of consumption variable, except for the two subgroups of less intensive BD, in which males were involved in BD more frequently than females over the past six months.

As shown in Table 3, the scores from the AUDIT and AUDIT-C have optimal values in the area under the ROC curve; however, these are lower than the values obtained in the modified versions.

The redefining of items 2 and 3 (AR2i) permit a greater area under the ROC curve with both the complete BD sample as well as when differentiating by gender. With a cut-off point of ≥ 3 , 98.9% of all BDs are detected (sensitivity) and 96.8% of the no BDs are detected (specificity). When using cut-off points of ≥ 3 for women and ≥ 4 for men, only 2% of the BDs from each group would not be detected.

Discussion

Recent studies (Cortés et al., 2016, 2017a, 2017b; Patrick et al., 2013; Read, Beattie, Chamberlain & Merrill, 2008) allude to the heterogeneity that exists amongst young BD, given that the very definition of BD only indicates a minimum from which it is possible to identify a BD, without considering the distinct levels of seriousness. Along these lines, this work identifies groups of BD that, given both the quantity consumed (duplicating the minimum of the BD definition) as well as the frequency of the appearance of these episodes (twice a week) increasing the risk of experiencing negative consequences as a result of this drinking. This is notably aggravated when this consumption begins at very early age, as in the case of the sample from this study which began to consume alcohol between the ages of 13 and 15. According to the data of the last state survey, the average age of onset is around 14 years (OEDA, 2018), an age period that is associated with a greater seriousness of the consequences in subsequent periods (Hingson, Zha & Weitzman, 2009; Jenkins et al., 2011; Pilatti, Caneto, Garimaldi, Del Valle & Pautassi, 2013), and therefore, with a greater need for proposing interventions that are adjusted to ease or prevent these consequences (Vargas-Martínez, Traperro-Bertran, Gil-García & Lima-Serrano, 2018).

Among the most intense BD groups, a behavior that is much more accentuated in men than in women is found, given that they come to triple the quantity of alcohol whereas women double it. A similarity between both genders is found in the frequency with which this consumption occurs, partially confirming the equalization in the consumption pattern obtained in recent studies and epidemiological surveys (Fernández, Dema & Fontanil, 2019; Kuntsche et al., 2011; OEDA, 2018; Simons-Morton et al., 2009).

It is important to note that the higher frequency of this behavior (more than 7 times a month) implies a notorious

increase in the probability of the appearance of bio-psycho-social consequences, as established in some studies as of two or more times a month (Anderson, 1996; Livingston, 2013).

The assessment of the drinking behavior supports the need to analyze the BDs not as a homogenous group but rather, as distinct groups with clearly differentiated risk levels. This suggests a necessary future research line. When specifying the maximum operationalization of the BD, as done over recent years, it is necessary to define subgroups within the general category, without forgetting gender.

A major advance in order to lessen the bio-psycho-social consequences would be to offer screening instruments that permit the detection of the greatest number of young BD not only in educational contexts, but also in healthcare areas, such as Primary Care and health cabinets of university campuses. In these settings, it would be very useful to have early BD detection tools for the youth that visit these services, as well as the possibility of referring them to specialized resources based on the detected problem.

Although the AUDIT-C has been found to suitably classify university students as BD/NOBD (Cortés et al., 2017b; DeMartini & Carey, 2012; García et al., 2016), using the AR2I reduces the number of false positives to a maximum, resulting in an optimal combination of sensitivity and specificity. This result coincides with that obtained with undergraduates in the study conducted by Cortés et al. (2017a).

In this study, as of the cut-off point of 3 in the AR2I, approximately 99% of the BD university students were detected. When using a cut-off point of 4 in males and 3 in females, the capacity to classify BDs (sensitivity) decreased by only one point, but the capacity to correctly identify the NOBDs (specificity), increased notably, reaching 100% in the case of the females. All of this while surpassing the reliability of the original scale. This result is understandable given that the two most explanatory items of the consumption pattern are being used (Blank et al., 2015), reformulated to provide an account of the characteristics of BD (Cortés et al., 2017a).

To sum up, the results provided by this study confirm the utility of this new combination of items for detecting the youth BD population with greater speed and effectiveness, which may be of considerable relevance in care resources such as Primary Care, in which time is a key factor to take into account. Furthermore, upon revealing the effectiveness in both an adolescent and university population, it may be concluded that this instrument is useful for the detection of BD regardless of age and gender. This makes it a suitable BD screening tool for youth, useful for clinical objectives as well as preventive ones, while at the same time, relevant in the research field (Arnaud et al., 2016; Walton et al., 2015), given that a classification that is more closely adjusted to the subjects may have more precise results.

One of the limitations to be considered is the use of self-reports to determine the consumption pattern. However, in the youth population, the self-reports have been considered valid and reliable as they ensure the anonymity and reliability of the data, unlike what tends to occur with other types of registers, such as surveys sent to homes (Degenhardt et al., 2013; Knight, Sherritt, Harris, Gates & Chang, 2003).

Another limitation lies in the generalization of the results obtained from this study, considering that this consumption is quite present in the elderly population. It is necessary to expand the evaluation of AUDIT, adding young people between the ages of 20 and 29 years, the period with the highest prevalence of BD in Spain (OEDA, 2017).

This work is part of a larger research study that attempts to achieve useful screening instruments to identify youth BD of distinct consumption intensities. Specifically, in this work, the usefulness of the AR2I is proved in different types of BD and in a distinct age group.

Future studies may wish to replicate this adaptation with samples from other countries, previously adjusting the measurement of BD to the SDU of the corresponding country. This would allow us to have a collective screening instrument based on a more rigorous definition of BD, thereby facilitating the comparability of the results.

Conflict of interest

No conflict declared.

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