

Clinical and Demographic Characteristics of Binge Drinkers Associated with Lack of Efficacy of Brief Intervention and Medical Advice

Características clínicas y demográficas de bebedores “por atracones” que se relacionan con una falta de eficacia de la intervención breve y el consejo médico

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Abstract

Brief Counseling Intervention (BCI) and Medical advice (MA) are psychotherapeutic approaches used for the treatment of binge drinkers in Primary Care. Although binge drinking is a common pattern of alcohol misuse in Europe and in the US, no studies have evaluated those subjects who do not respond to Brief Counseling Interventions or Medical Advice. **Objective.** To determine the clinical and demographic characteristics of binge drinkers in whom BCI or MA are not effective in reducing harmful alcohol use. **Methods.** This is a secondary analysis of data from a randomized alcohol brief intervention trial with a 12-month follow-up period. A total of 674 subjects (89%) participated right through to the end of the study. The primary outcome measure was change in harmful alcohol use from baseline to 12 months. **Results.** The strongest baseline predictors of harmful alcohol use during follow-up were educational status, young adults, and high number of cigarettes smoked, present family history of alcoholism, treatment condition and number of drinks per episode of binge drinking. **Conclusions.** Binge drinkers are a heterogeneous group that responds to brief intervention or MA but in a subgroup of them these interventions fail to prevent harmful alcohol use. Other interventions should be implemented for these subjects.

Key words: Brief intervention, Medical advice, Binge drinking, Harmful alcohol consumption.

Resumen

La Intervención Breve (IB) y el Consejo Médico simple (CM) son intervenciones psicoterapéuticas usadas para el tratamiento del consumo de alcohol por atracones en Atención Primaria. A pesar de la frecuencia de este patrón de abuso en Europa y en los Estados Unidos, ningún estudio ha evaluado las características de los sujetos que no responden a esas dos técnicas. **Objetivo.** Determinar las características demográficas y clínicas de los bebedores por atracones en los que la IB y el CM no son efectivos para la reducción del consumo perjudicial de alcohol. **Métodos.** Se trata de un análisis secundario de los datos obtenidos en un ensayo aleatorizado de intervención breve en alcohol con un período de seguimiento de 12 meses. Un total de 674 sujetos (89%) participaron durante todo el estudio hasta el final. La variable principal fue el cambio en el uso perjudicial de alcohol tras 12 meses de seguimiento. **Resultados.** Para ambos grupos de tratamiento las variables que predecían la continuidad en el consumo perjudicial tras el seguimiento eran: bajo nivel educativo, ser jóvenes, el número de cigarrillos fumados, la historia familiar de alcoholismo y la gravedad del consumo de alcohol basalmente. **Conclusiones.** Las características clínicas y sociodemográficas de los sujetos con un patrón de consumo de alcohol por atracones atendidos en Atención primaria influyen en el pronóstico de las Intervenciones breves y del Consejo Médico.

Palabras clave: Intervención breve, Consejo médico, Atracones, Consumo perjudicial.

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The pattern of binge drinking is characterized in men by the consumption of five or more standard drink units (SDU) (50gr. of alcohol), and in women by more than four SDUs in a period of 2 hours (NIAAA, 2004). In the European Union, one in five adults consumes this amount at least once per week (Anderson and Baumberg, 2006).

This pattern of alcohol use is associated with traffic accidents, medical complications, tobacco consumption, and various social complications (NIH, 2000, Naimi et al., 2003).

Brief Counseling Interventions (BCI) constitute a group of approaches designed to reduce the damage linked to alcohol consumption among subjects who are heavy or binge drinkers (Fleming, 2003, Kaner et al., 2007). Their efficacy, however, is moderate and there is much variability in their effectiveness (Bertholet et al., 2013). Results of trials which included binge drinkers are not conclusive. Therefore, the findings of the Project Trial for Early Alcohol Treatment (TrEAT) (Fleming et al., 1997; 1999; Grossberg et al., 2004) and our own group (Rubio et al., 2010) indicate that subjects exposed to BCI significantly reduce the number of binge drinking episodes compared with control groups. Nevertheless, other studies did not find any significant differences (Ockene et al., 1999; Curry et al., 2003; Reiff-Hekking et al., 2005).

In the opinion of some authors, disagreement as to the efficacy of BCIs could be due to the heterogeneity of the subjects included, which implies the necessity to evaluate the influence of the socio-demographic variables in the prognoses of these approaches (Littlejohn, 2006). Other authors posit that the neurological damage associated with alcohol diminishes the results of these therapies with this type of subject and increases the number of relapses (Soler-González et al, 2014).

In terms of controlled studies carried out among binge drinkers, the project implemented by our group is the only one centered exclusively on this population (Rubio et al., 2010). In this article, therefore, we have carried out a second analysis of the earlier results in an attempt to determine the clinical and socio-demographic characteristics which might influence the lack of efficacy of BCI or medical advice (MA) after a twelve month follow-up. As the principal variable, we have chosen the fact that at the end of the follow-up our patient evidenced a pattern of harmful use of alcohol (HUA), whether through continued binge drinking or a risky level of consumption, given that the goal of each intervention (BCI or MA) was to achieve a reduction in any type of harmful consumption.

Methods

As the methodology of this study has been described in a separate article (Rubio et al., 2010), only the most salient aspects are described here.

Subjects and procedures

The subjects of the study were adult patients between 18 and 65 years of age attended in primary care centers in the city of Madrid between March 2003 and March 2006. If, after the completion of the AUDIT questionnaire (Alcohol Use Disorders Identification Test, AUDIT [Rubio et al., 1998]), they displayed a binge drinking pattern and scored 15 points or less in the AUDIT, they were considered to be candidates for randomization. The percentage of patients who declined to complete the questionnaire was 2.4%. The characteristics of the sample are described in Table 1.

Criteria of inclusion and exclusion. Binge drinking patients included are defined thus: males who drank five or more standard drink units (SDU, 10gr. of alcohol per unit) at a single sitting on one or more occasions in the previous month; women who drank four SDUs or more at a single sitting on one or more occasions in the previous month.

Intervention protocol. The CBI was carried out by primary care staff and consisted of two sessions, four weeks apart. Each face-to-face session lasted between 10 and 15 minutes and was carried out during normal clinic hours. The intervention included a checkup of the effects related to alcohol consumption, a conversation about the methods of reducing alcohol consumption and planning what the patient was ready to do before the next interview.

The subjects assigned to the MA group received a leaflet covering the general health problems caused by alcohol consumption. Any doubts about the leaflets or the IB could be dealt with in the usual way by speaking with their doctor or a nurse.

Monitoring. A total of 751 people fulfilled the criteria for brief counseling intervention (BCI, N=371) or medical advice (MA, = 381), of which 89.62% (N= 674) completed the follow-up after 12 months. Of the 78 who did not complete the follow-up after 12 months, 49 declined to take part in the interview and 29 disappeared during the year.

The follow-up interviews were carried out by "blind" researchers not linked to the patient's treatment center.

Principal variable. For this study, we chose a pattern of harmful alcohol use (HAU) in the previous month as the outcome variable. This included subjects with binge drinking episodes (>5 SDU for men, >4 for women per sitting) and/or consuming more than 18 (men) or 13 (women) drinks per week.

Other variables. A history of family alcohol consumption was established after the interview with the participants and by applying the diagnostic criteria of family history research (Endicott, Andreasen & Spitzer 1989). The age of alcohol consumption onset was the age the subject claimed to have started drinking.

Table 1
Clinical and demographic characteristics of the population classified by the persistence of harmful alcohol use (HAU) in the last month of follow-up.

Demographic characteristics	HAU (-) N=274 No. (%)	HAU (+) N=400 No. (%)	p-value
Intervention Group			
Control	106(31.7)	228(68.3)	0.000
CBI	168(49.4)	172(50.6)	
Sex			
Male	150 (36.1)	283(63.9)	0.001
Female	114 (49.4)	117 (50.6)	
Marital Status			
Never Married	44(27.2)	118 (72.8)	0.000
Widow(er)/Divorced/Estranged	4(25.0)	12 (75.0)	
Married/Living with Partner	226 (45.6)	270 (54.4)	
Educational Level			
Secondary school or lower	110(26.7)	302(73.3)	0.000
High school diploma	144 (60.3)	95(39.7)	
University or higher	20 (87.0)	3 (13.0)	
Employment Situation			
Working	231(38.7)	366 (61.3)	0.000
Unemployed	3 (9.7)	28 (90.3)	
Domestic Work	40(87.0)	6(13.0)	
Family History of Alcohol Dependence			
NO	244(49.9)	245(50.1)	0.000
YES	30(16.2)	155(83.8)	

Clinical Characteristics	Mean (SD)	Mean (SD)	p-value
Current Age, year	39.49(6.03)	35.67(4.02)	0.000
Number of cigarettes/day	9.52(5.36)	16.55(9.24)	0.000
Onset age	14.50(2.45)	13.41(1.58)	0.000
Age when smoking became habitual (More than once a week)	14.81(2.38)	13.66(1.81)	0.000
Baseline pattern of alcohol consumption			
Days of consumption per month	18.38(4.92)	19.98(4.15)	0.000
Number of Standard Drink Units (SDU) per week	26.11(10.42)	30.36(8.31)	0.000
Number of binge drinking episodes per month	2.95(2.08)	3.46(2.45)	0.000
Number of SDUs per binge drinking episode	8.98(2.08)	10.80(2.95)	0.000

HAU(+) = Persistence of harmful drinking in the last month.
HAU(-) = Absence of harmful drinking in the last month.

Statistical analysis

Categorical variables were described using the frequency distribution and continuous variables in the form of means and standard deviations. The comparisons among categorical variables were realized with the chi square homogeneity test, and the Mann-Whitney U test was used for comparisons among continuous variables.

The principal variable “harmful alcohol use in the previous month” was characterized by the answer “I had harmful alcohol consumption in the last month / I did not have harmful alcohol consumption in the last month” (1/0).

Univariate analysis. Initially, a univariate logistic regression analysis was run to determine the risk of association with the principal variable. Following the recommendations of Hosmer & Lemeshow (2000), we used the likelihood ratio test (LRT) as a screening criterion to select the candidate variables for each multivariate model. Taking into account that the criteria for binge drinking patterns were different for men than for women, and that men and women differed in baseline patterns of consumption ($p < 0.031$), we chose to carry out separate regression analyses for men and women. In the case of the model for the women’s group, only one variable (number of binge drinking episodes per month

$p=0.944$) did not achieve predictive capacity in the univariate model.

Values greater than 1 of the odds ratio indicated a higher likelihood of “harmful alcohol consumption”, while values below 1 reduced this probability.

Multivariate analysis. A multivariate logistic regression analysis was run, following the method proposed by Hosmer & Lemeshow (2000). The degree of fit of the prediction equation was measured using Nagelkerke’s R^2 coefficient. The area under the ROC curve was also calculated. Data analysis was carried out using SPSS 19 and Statgraphics Centurion.

Results

The subjects included in the BCI or MA groups did not display significant differences in clinical or demographic characteristics (p value > 0.197), which demonstrates that the groups were well balanced.

During the 12 month follow-up period, 78 subjects abandoned the study, 47 of them in the medical advice group and 31 in the group which received BCI. Comparing these percentages, we found a greater drop-out ratio among the MA group ($p=0.036$).

During the final month of the study, 59.34% ($N=400$) of the total sample continued to have a harmful alcohol use pattern (HAU+), while the rest (40.65%, $N= 274$) had broken this pattern (CPA-). No statistically significant differences were observed between the two groups.

Univariate logistic regression analysis models adjusted by sex

Given the small number of women in some of the categories, we reformulated the following variables: “employment situation” which changed to “domestic work (YES / NO)” and “marital status” was changed to “married (YES / NO)”.

Table 2 shows the odds ratio of the univariate regression models with their 95% confidence interval, and the likelihood ratio by sex. The probability of harmful alcohol consumption was reduced for both men and women by BCI, while a family history of alcohol abuse increased it. It was observed that the younger the subject and the earlier the onset of alcohol use, the greater the probability of harmful alcohol consumption persisting at the end of the study. Having alcohol and tobacco consumption patterns at the start of the study was associated with a worse prognosis at the end of it. In terms of socio-demographic variables, the worst prognosis was for single people, the unemployed and those with lower educational levels.

Multivariate regression models to explain the presence of Harmful Alcohol Use (HAU) at the end of the study

Table 3 shows the regression models by sex. For men, the selected variables were treatment group, educational level, alcoholic father/mother, age, cigarette consumption, days

of baseline consumption, number of drinks per binge drinking sitting. After a study of the linearity of the following variables: age, cigarette consumption, days of baseline consumption, number of drinks per binge drinking sitting, it was found that “cigarette consumption” and “days of baseline consumption” did not have a linear effect and therefore, following Hosmer & Lemeshow (2000) the transformations Tobacco*LN (Tobacco) and Days*LN (Days) were added.

For women, the chosen variables were: treatment group, educational level, age, cigarette consumption, number of SDUs consumed per week. Similarly in this case, the number of cigarettes smoked and the number of SDUs consumed did not have a linear effect, and therefore the following transformations were carried out: Cigarettes*LN (Cigarettes) and Drinks*LN (Drinks).

For both men and women, the possible interaction of all variables were checked for type of treatment (BCI or MA) and none showed statistical significance (all p values were > 0.194 for men and >0.135 for women), which means that the clinical and socio-demographic variables included in the models explained the lack of efficacy of both BCI and medical advice.

In summary, the risk for subjects treated under BCI as well as those receiving medical advice of continuing harmful alcohol use after twelve months of follow-up increased among subjects with low educational level (primary school), young people (<37), heavy smokers (>25 cigarettes), having a family history of alcoholism and consuming a greater number of SDUs before starting the therapeutic intervention (drinking more than 10 SDUs per sitting in the case of men, or having high levels of alcohol consumption during the baseline week in the case of women).

Discussion

This is the first study to be carried out exclusively with subjects with a binge drinking pattern, treated in primary care centers in which the influence of clinical and socio-demographic variables is shown on the prognosis of the interventions (Brief Counseling Intervention and Medical Advice) after a 12 month follow-up. The variables linked to the “harmful alcohol use” pattern in both treatment groups were smoking a high number of cigarettes (>25), having a family history of alcoholism, being young (<37 year of age), low educational level, heavy baseline consumption (more than 10 SDUs per binge drinking sitting for men and high weekly consumption for women).

The influence of high number of cigarettes on harmful alcohol use found in our study matches the findings in earlier studies (Murray et al. 1995, Fleming et al., 1997). In another study which attempted to show the effectiveness of an integrated therapy for smokers and drinkers with a binge drinking pattern, it was shown that while the treatment significantly reduced the number of cigarettes, the effect

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Table 2
Results of the univariate logistic regression models, by sex

	Male			Female		
	Odds ratio	95% interval	p-value	Odds ratio	95% interval	p-value
Group (Reference group: control)						
IB	0.597	0.402 - 0.884	0.009	0.303	0.176- 0.520	0.000
Marital Status: (Reference group: never married)						
Widow(er)/Divorced/Estranged	0.497	0.313 -0.789	0.009			
Married/Living with partner	0.681	0.191- 2.421				
Marital Status: (Reference group: not married)						
Currently married				0.374	0.178-0.781	0.009
Educational level (Reference group: Secondary or lower)						
High school, vocational training	0.219	0.142-0.337	0.000	0.286	0.163- 0.503	0.000
University students	0.024	0.003-0.191		0.139	0.028-0.680	
Employment Situation (Reference group: Working)						
Unemployed	4.411	1.295-15.026	0.005			
Employment situation (Reference group: not domestic work)						
Domestic Work				0.100	0.040-0.248	0.000
Family History of Alcohol Dependence (Reference group: without family history)						0.023
With	6.703	3.887- 11.556	0.000	2.310	1.093- 4.876	
Current age, years	0.877	0.844- 0.912	0.000	0.725	0.655- 0.801	0.000
Number of cigarettes per day	1.134	1.096-1.173	0.000	1.162	1.103- 1.224	0.000
Onset age	0.747	0.673-0.829	0.000	0.809	0.708 -0.942	0.002
Age when consumption became continuous (more than one day per week)	0.754	0.684-0.832	0.000	0.823	0.718-0.942	0.003
Days of consumption per month	1.074	1.027- 1.121	0.001	1.093	1.026- 1.164	0.005
Number of standard drinks units per week	1.050	1.028- 1.073	0.000	1.041	1.007-1.075	0.014
Number of binge drinking episodes per month	1.132	1.040-1.231	0.003	0.968	0.841-1.112	0.644
Number of SDUs per binge drinking episode	1.354	1.238-1.480	0.000	1.244	1.114- 1.387	0.000

Table 3
Results of the multivariate logistic regression models by sex

	Male		Female	
	Coefficients	ODDS	Coefficients	ODDS
Group BCI	-0.900	0.407	-2.253	0.105
Education level				
Primary or Secondary	-0.894	0.409	-0.898	0.407
High school or higher	-2.827	0.059	-1.951	0.142
Family History of Alcohol Dependence				
Yes	1.825	6.201		
Current Age	-0.072	0.930	-0.354	0.702
Number of cigarettes smoked per day (Cigarettes)	-0.454	0.635	-0.332	0.717
Days of alcohol use per month (Days)	2.930	18.714		
Number of Standard Drink Units per Week (Drinks)			2.116	8.296
Number of Standard Drink Units per binge drinking episode (Drinks)	0.240	1.271		
Cigarettes*LN(Cigarettes)	0.178	1.195	0.157	1.171
Days*LN(Days)	-0.768	0.464		
Drinks*LN(Drinks)			-0.514	0.598
Constant	-11.155		2.507	
Nagelkerke's R ²	0.547		0.665	
ROC area	0.898		0.928	

was not repeated on the number of binge drinking episodes (Ames et al., 2010). Nevertheless, the expectation that both can be reduced was confirmed in a pilot clinical trial to test the efficacy of an intervention aimed at decreasing both (Ames et al., 2014) in which it was observed that when the treatment was realized simultaneously and was also focused on smoking, after three and six months the patients continued not to smoke and also reduced the consumption of alcohol. Therefore, and despite the heterogeneous nature of these results, the existence of a special relationship between smoking and binge drinking appears to be consistent (Blazer and Wu, 2009). In our sample, the subjects at greater risk of continuing harmful alcohol use were smokers of 25 or more cigarettes per day, followed by ex-smokers and finally smokers of fewer than 10 cigarettes per day. Our data support the need to design interventions for binge drinkers which integrate treatment for tobacco addiction.

From our point of view, the impact of family history of alcoholism on harmful alcohol use is of special interest. This variable has been linked to a higher risk of developing alcohol dependence (Rubio et al., 1999) and to a bad prognosis to pharmaceutical treatment of alcohol-dependent people (Rubio et al., 2005; Keifer et al., 2008). It is possible that these patients require more intensive therapeutic strategies, which is why we consider that more studies focused on this issue are necessary.

The association between educational level and the prognosis of brief interventions has been pointed out in different studies (Fleming et al., 1997; Ockene et al., 1999; Aalto & Sullanaue, 2000). As in our study, the subjects who dropped out of school before finishing secondary education were at greater risk of harmful alcohol use after the treatment. These results therefore support the need to adapt treatment strategies to the educational level of the population at whom the intervention is aimed.

Our findings regarding the lower efficacy of the treatments among young subjects does not support the results of earlier research (Monti et al., 1999; Grossberg et al., 2004). The reasons for these differences are not clear. It is possible that younger binge drinkers are less aware of the possible consequences of this pattern of consumption (Okoro et al., 2004), which could explain that treatments based on motivational interventions are more efficacious, especially with those who experienced certain negative consequences linked to alcohol (Daeppen et al., 2011).

In our study, consumers with a baseline pattern of heavy consumption had greater problems giving up harmful consumption. This fact may be explained in different ways. It has been shown that compared to non-drinkers, binge drinkers have a greater deficit of inhibitory control performed by the frontal lobe (Townshend & Duka, 2005), this damage of the brain also being partly related to accumulated alcohol (So-

ler González et al, 2014). Furthermore, moderate drinkers who consume alcohol occasionally have a higher likelihood of being classified as subjects with alcohol disorder (abuse or dependence) than those who drink moderately but daily (Knight et al., 2002).

This has led to the hypothesis that binge drinking episodes provoke withdrawal symptoms, which can make it difficult to control consumption (Stephen et al, 2005) and, furthermore, contribute to heightening the adaptive processes underlying the development of alcohol dependence (Breese et al, 2005). In summary, drinkers who have frequent binge drinking episodes may represent a group of drinkers with greater difficulties in modifying their drinking patterns (Cournet & Polich, 2009), and for whom a more intensive therapeutic treatment than medical advice or BCI needs to be proposed.

One of the limitations of our study is that the measure of efficacy is based on the self-reports of patients. Unfortunately, there are no efficient biological measurements to demonstrate the reduction of alcohol ingested. In this study, ethyl glucuronide (EtG) in urine or ethyl sulphate was used, but their high cost makes them unfeasible for this type of study. Nevertheless, research indicates that self-reports are more reliable than other methods of measuring alcohol consumption (Harrison et al, 1997). In order to reduce the limitation of the self-report, we have used different strategies such as, for example, informing the patients that they are participating in a research project and that their data will not appear in their medical records. Furthermore, the questions relating to alcohol consumption were masked, mixed in among others on health habits. We have also used standardized methods of reporting on consumption and information gathering. Of binge drinkers who scored 15 points or less on the AUDIT, 29% declined to take part in the initial interview. As we do not know whether they could have fulfilled the inclusion criteria, we must be cautious when generalizing from our results. The majority of our sample was white, which also limits generalization from our findings to other populations.

Conclusions

In general, our results show that a substantial proportion of binge drinkers continues harmful alcohol use after undergoing Brief Counseling Intervention or Medical Advice. Therefore, we believe that other treatment strategies should be adopted for other specific groups, such as people with a family history of alcoholism, smokers, young adults or drinkers with frequent bingeing episodes.

Conflict of Interests

In the name of all authors, the first signatory of the reference manuscript declares that no potential conflict of interests exists in connection with this article.

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