ARTIGO ARTICLE

Do drinking problems in the past affect current consumption?

Problemas com bebida no passado coíbem consumo atual?

¿Los problemas con la bebida en el pasado evitan su consumo actual?

Ana Maria Reis ¹ Carlota Quintal ^{2,3} Óscar Lourenço ^{2,3}

doi: 10.1590/0102-311X00025618

Abstract

Harmful use of alcohol ranks among the top five risk factors for disease, disability and death worldwide. However, not all individuals who consume alcohol throughout life are addicted and our premise is that addiction implies a chain of consumption that produces harmful effects. The objective of this study was to evaluate whether self-assessed past drinking problems – our measure of harmful alcohol consumption - affect the current alcohol consumption patterns. We expected that drinking problems in the past could have a positive effect on current alcohol consumption. Using Portuguese data from the Survey of Health, Ageing and Retirement in Europe (SHARE), we applied an ordered probit model, given the ordered nature of the dependent variable. Our dependent variable measures the current consumption using categories listed in ascending order of alcohol intake frequency (from less than once a month to daily consumption). Our results suggest that harmful alcohol consumption in the past is an important determinant of current alcohol consumption. Self-assessed past drinking problems had a positive effect on the first five lower categories of current alcohol consumption frequency - less than once a month to up to six days a week. Therefore, to reduce non-communicable avoidable diseases related to the use of alcohol, policies should consider the individuals' decisions regarding alcohol consumption during their lifetime, and specific policies should focus on individuals with past drinking problems.

Alcohol Drinking; Alcoholism; Risk-taking; Health Policy

Correspondence

A. M. Rei

European Business School and Research Group of ISAG, Instituto Superior de Administração e Gestão. Rua Central Sul 23, Vilamar, Coimbra 3060-767, Portugal. anamariacpr@hotmail.com

- ¹ European Business School and Research Group of ISAG,
 Instituto Superior de Administração e Gestão, Porto, Portugal.
 ² Centre for Business and Economics Research, Coimbra,
 Portugal.
- ³ Faculdade de Economia, Universidade de Coimbra, Coimbra, Portugal.



Introduction

Alcohol consumption is considered a major public health issue in the world 1. Harmful use of alcohol ranked among the top five risk factors for disease and disability in 2010 2, and alcohol-attributable deaths and disability-adjusted life years (DALYs) have increased worldwide, compared to 1990 3. Globally, the harmful use of alcohol causes approximately 5.9% of all deaths, and 5.1% of the global disease burden is attributable to alcohol consumption 1.

Excessive alcohol consumption is responsible not only for health costs, but also for economic and social costs 1,4. Social impacts include death and disability resulted from accidents and injuries, violence and other crimes caused by the harmful use of alcohol 4.5. The economic costs of excessive drinking include health treatment costs, as well as productivity losses 6,7,8. Alcohol-attributable costs per capita in high-income countries ranged from USD 358 to USD 837 - PPP based 9.

Given that alcohol consumption is a risk factor with special importance in the aetiology of certain chronic diseases, some of the disease burden associated with these diseases can be avoided 10. Nowadays, this is a subject of utmost importance to health policies and public health, which have been largely focused on the noncommunicable diseases that can be associated with unhealthy lifestyles 11. International organizations exert continuous efforts in collecting health data 1,12, particularly to help countries reduce harmful alcohol consumption 1. Considering that there are relevant data available in Portugal and that the harmful use of alcohol ranked among the five most important risk factors for DALYs in 2010 13, which is similar to global estimates, we could learn from the Portuguese experience.

Moreover, given the proneness of alcohol to promote a substance use disorder, the analysis of its consumption is not suited to a standard economic analysis. The distinct economic nature of the then recognised as addictive goods was firstly transposed and discussed based on theoretical models, which were developed to address the specificities of addictive behaviors. The rational addiction models, first developed by Becker & Murphy 14, consider addiction as a fully rational behavior, assuming that rational addiction requires the complementarity of consumption over time, and that greater past consumption of addictive goods, such as alcohol, stimulates current consumption. Several authors empirically tested and discussed Becker & Murphy's rational addiction model, with results that were consistent with that model 15,16,17,18,19. These authors considered that rational addiction only requires a positive effect of past consumption on current consumption, regardless of consumption level, ignoring the existence, or otherwise, of harmful effects related to the use of alcohol.

In this study, a different analysis perspective was chosen. That is, we followed the assumption of Orphanides & Zervos 20 for alcohol dependence, according to whom it implies a history of past consumption beyond a threshold that requires harmful consequences, and which varies between individuals 20. The interpretation of our findings is thus based on the premise that alcohol dependence implies a chain of consumption that produces harmful side effects, and that not all individuals who consume alcohol throughout life are dependent 20.

In what concerns alcohol consumption, for most people, they receive only the beneficial immediate rewards of current consumption 20, and much of alcohol consumption is social in nature, being socially accepted and encouraged in friendships and peer groups 21. For potentially alcoholdependent users, however, the same chain of consumption produces harmful side effects, stimulating current consumption 20.

Different types of alcohol consumers were identified in the literature ²², which supports our premise. There are different types of heavy alcohol consumers: the alcoholic, who is unresponsive to price; and the heavy drinking non-alcoholic, who drinks heavily from time to time, but whose annual consumption is smaller than that of an alcoholic 23. Other authors have also pointed out that alcohol-related harm is determined by the volume consumed and the pattern of drinking 1, and that the adverse effects of alcohol result from overuse or misuse 24. Thus, there are different types of alcohol consumers, and not all individuals become alcohol-dependent or experience the same type

The objective of this study was to evaluate whether self-assessed past drinking problems affect, and in which way, the current patterns of alcohol consumption. Given the assumptions above (based on the theoretical models and previous empirical estimates), we expected that drinking problems in the past could have a positive effect on current alcohol consumption.

As far as we know, previous studies did not consider the effects of harmful alcohol consumption on the current frequency of consumption, but only assumed that alcohol addiction depends on consuming alcohol in the past and in the present, ignoring the occurrence of negative consequences, or considered the occurrence of relapses in diagnosed patients with alcohol use disorders. Using the available data of the *Survey of Health, Ageing and Retirement in Europe* (SHARE), we aim to provide a new perspective and an opportunity to enhance the debate on this topic.

Given the discrete and ordered nature of the outcome variable (which is current alcohol consumption frequency), we adopted an ordered probit model to analyze our research question.

Methods

From an empirical point of view, the main purpose of this study was to investigate if past harmful alcohol consumption influences current alcohol consumption patterns. For this purpose, we used data taken from the SHARE wave 4 database ^{25,26,27,28}, which was collected in Portugal in 2011.

To measure current alcohol consumption (as of the date of the questionnaire, 2011), we adopted a metric that reflects alcohol consumption frequency. More specifically, the question "During the last 3 months, how often did you drink any alcoholic beverages?" was asked to the individuals. The following categories were considered: 0 – not at all in the last three months; 1 – less than once a month; 2 – once or twice a month; 3 – once or twice a week; 4 – three or four days a week; 5 – five or six days a week; 6 – almost every day.

The covariate of interest ("drinking problem") should be a measure of harmful alcohol consumption. As noted in the introduction, in this study, we followed the assumption that alcohol dependence implies a history of past consumption beyond a threshold that requires harmful consequences and which varies between individuals. To obtain a proxy for this threshold, we resorted to the question: "Was excessive drinking a problem at any time of your life?". This variable, "drinking problem", relates to excessive and problematic drinking in the past and fits the assumption of harmful side effects caused by alcohol consumption. In addition, it provides a subjective evaluation of alcohol-related consequences. This means that the problematic chain of consumption in our empirical estimation is not a fixed variable; it can vary from individual to individual.

In terms of statistical methods, we first analyzed the interrelation between the two variables ("drinking problem" and "frequency of consumption") using a simple contingency table and Person's chi-square test 29 . However, to control other factors that may influence current alcohol consumption, we adopted a regression-based methodology. Given that our dependent variable is a categorical and ordered variable, a model fit to analyze ordered outcomes is required 30,31 . The starting point to specify ordered models is an index model, with a single latent variable, which relates linearly with the covariates and an error term 31,32 . In our application, we let the real frequency of consumption (unobserved) be denoted by a latent variable (y_i^*). Moreover, we assume that:

$$y_i^* = x_i'\beta + \varepsilon_i$$

where ε_i is an unobserved random error term, x_i a vector of the covariates and β the parameters to be estimated. The assumptions made regarding the random error terms determine the actual model adopted. If ε_i is assumed to be distributed according to a logistic distribution, then the model generates an ordered logit model, whereas when a standard normal distribution is assumed, then the regression model is called an ordered probit model 31,33 . In fact, the logistic and normal distributions have a similar shape, except in the end of the tails which are seldom reached. In addition, Cameron & Trivedi 31 state that there is often a minor difference between the probabilities predicted with probit and logit models. Moreover, the same authors also mention that the difference is much less significant if interest lies in the probabilities' marginal effects, which is our case. Therefore, in our application, we adopted the ordered probit alternative.

To estimate the ordered probit model, the following relationship is assumed between the observed ordered outcome (y_i) and the latent variable (y^*):

$$y_i = k \Leftrightarrow \mu^{k-1} \leq y_i^* < \mu^k, k = 1,...,6$$

where $\mu^0 < \mu^1 < ... < \mu^6$, and $\mu^0 = -\infty$ and $\mu^6 = \infty$. μ^1 , μ^2 , μ^3 , μ^4 and μ^5 , are constant thresholds, to be estimated along with the other parameters. Then, the probability of each observed outcome is given by:

$$P\{(y_i = k | x_i) = \phi (\mu^k - x_i'\beta) - \phi (\mu^{k-1} - x_i'\beta)\}$$

where ϕ is the standard normal cumulative distribution function. Maximum likelihood was the estimation method used. More details about the estimation procedure can be found in Cameron & Trivedi ³¹ and Greene ³².

The coefficients of the covariates (the β s) have a direct qualitative interpretation. A positive coefficient indicates a positive effect on the frequency of consumption, while a negative sign indicates the opposite ³⁰. However, it is also of interest to estimate the effect of the covariates on the actual probabilities of the current alcohol consumption categories. Therefore, we estimate the probabilities' marginal effects, which are given by:

$$\frac{\partial P\{(y_i=k|x_i)\}}{\partial x_i} = [\phi'(\mu^{k-1} - x'_i\beta) - \phi'(\mu^k - x'_i\beta)]\beta$$

where ϕ' denotes the derivative of ϕ . To estimate the overall effect of the covariates in each probability, we calculate the averages of the marginal effects for all individuals ³¹.

The control variables included in the regression model are those that are commonly considered to affect alcohol consumption in the literature. Alcohol dependence has been studied from a clinical point of view, in clinical trials that tried to identify factors predicting relapses ^{34,35}, such as the occurrence of negative life events, cognitive appraisal variables, alcohol expectancies, motivation for change, coping resources, craving experiences and affective status ³⁶. Moreover, age, gender, familiar risk factors, socioeconomic status, economic development and culture are factors that have been identified to affect alcohol consumption and alcohol-related harm ¹. Relapses are also associated with psychosocial distress ^{34,37}. Depressed individuals have more cravings for alcohol after detoxification and rehabilitation ³⁵, which justifies the inclusion of depression as a variable. A brief description of the variables studied in this research is shown in Table 1. Stata release 13 (https://www.stata.com) was used for all analyses.

Results

The data covered 1,103 adults who answered the question "Was excessive drinking a problem at any time of your life?", whose characteristics are depicted in Table 1. The average age of the respondents was 64 years old, 59.3% were men and 78.7% were married. Of all respondents, 7.1% were unemployed and 56% were retired. The mean annual income was EUR 9,896. The average duration of smoking was 11 years.

Despite the sample's mean age having been 64 years old, whereas the Portuguese average in 2011 was 41.8 years old ³⁸, it is representative of Portuguese individuals aged 45 years old and over. In relation to socioeconomic characteristics, the 2011 Portuguese annual gross disposable income per inhabitant, EUR 11,531 (Instituto Nacional de Estatística. Contas económicas regionais, 2011. http://www.ine.pt, accessed on 15/Sep/2016), is similar to that of the sample, which is also true for occupation, as according to these same data, 48% of the Portuguese population aged 45 years old and over was retired, and 12.1% of the working population was unemployed ³⁸. In this sample, 13.6% of the respondents has a degree, similarly to national statistics (12%) (Instituto Nacional de Estatística. Contas económicas regionais, 2011. http://www.ine.pt, accessed on 15/Sep/2016). In what concerns marital status, 78.7% were married. This is not very different from the Portuguese population's data, according to which 68.2% were married ³⁸. However, this sample has an overrepresentation of men (59.2% in our sample, compared to 45% in Portugal) ³⁹.

Of the respondents who reported past drinking problems (3.6%), 85% were men and had education and income levels that were, on average, higher than those of the whole sample. In this subsample, the mean duration of the participants' smoking habit was higher, compared to the whole sample. In addition, a higher percentage of respondents of this subsample reported symptoms of depression (47.5% versus 30%). The individuals in the subsample, on average, consumed alcoholic beverages three or four days a week (more than the whole sample), and none of them had abstained from

Table 1 Dependent and independent variables' definition and descriptive statistics.

Explanatory variables	Description	Overall mean	Mean (population with pas drinking problems)	
Drinking problem	Binary variable of a self-assessed drinking problem. 1 – if excessive consumption of alcohol was a problem at some point in the respondent's life course; 0 – otherwise.	0.036		
Age	The number of years that the respondent has lived.	63.8	62.8	
Male	Binary variable. 1 – if male; 0 – otherwise.	0.593	0.850	
Education	Number of years the respondent has received full-time education.	6.49	8.15	
Married	Binary variable. 1 – if married.	0.787	0.600	
Unemployed	Binary variable. 1 – if unemployed.	0.071	0.100	
Retirement	Binary variable. 1 – if retired.	0.560	0.550	
Smoke	Number of years the respondent smoked.	11.1	23.5	
Physical activity	Binary variable. 1 – if the individual does physical exercise more than once a month.	0.480	0.400	
Depression	Answer to the question: "Was there ever a time or times [] when you suffered from depression symptoms which lasted at least two weeks?". 1 – if the answer is yes.	0.300	0.475	
Income	Value of annual income in the previous year, after taxes.	EUR 9,896.03	EUR 10,360.13	
Diseases	Number of diseases the individual suffers from (of the following list: heart problems; high blood pressure or hypertension; high blood cholesterol; stroke or cerebral vascular disease; diabetes or high blood sugar; chronic lung disease; cancer or malignant tumour; stomach or duodenal ulcer, peptic ulcer).	1.31	1.57	
Dependent variable				
Frequency	Categorical and ordered variable, according to the self- assessed consumption frequency: 0 – not at all in the last 3 months; 1 – less than once a month; 2 – once or twice a month; 3 – once or twice a week; 4 – three or four days a week (frequent drinker); 5 – five or six days a week (regular drinker); 6 – almost every day (daily drinker).	2.582	4.400	

drinking in the three months before the interview. Regarding the number of diseases, used as a proxy for worse health status, the respondents in the subsample are characterized by a comparatively worse health status.

In Table 2, we can observe that individuals who admitted having experienced past drinking problems had consumed alcoholic beverages in the three months before the questionnaire. Based on Pearson's chi-square test, we do not reject the null hypothesis of independence between the current frequency of alcohol consumption and past drinking problems (p-value = 0.554).

The ordered probit model results are presented in Table 3. Our central explanatory variable "drinking problem" had a negative effect on the probability of being a daily drinker. Moreover, past problems related to alcohol consumption had a positive effect on the probability of drinking alcohol less than once a month, as well as on the other four lower categories. Considering the values of the predicted probabilities, past drinking problems increased the probability of individuals belonging to the first three consumption categories - drinking alcohol less than once a month, once or twice a month and once or twice a week.

In what concerns sociodemographic characteristics, males, compared to females, and married individuals were more likely to be daily drinkers and less likely to drink less than once a month.

Table 2 Contingency table presenting variables drinking problems in the past and current frequency of alcohol consumption.

	Drinking problem (%)			
	0 (no)	1 (yes)	Total	
Frequency				
1 – Less than once a month	7.62	0.45	8.07	
2 – Once or twice a month	6.35	0.45	6.80	
3 – Once or twice a week	12.06	0.45	12.51	
4 – Three or four days a week	5.08	0.09	5.17	
5 – Five or six days a week	4.53	0.18	4.71	
6 – Almost every day	60.74	1.99	62.74	
Total	96.37	3.63	100.00	
n	1,063	40	1,103	

Note: Pearson χ^2 (5) = 3.9683; p-value = 0.55.

Table 3 Ordered probit model's results: regression coefficients and average marginal effects.

Variables	Ordered	Average marginal effects on probabilities					
	probit model	y = 1	y = 2	y = 3	y = 4 (frequent drinker)	y = 5 (regular drinker)	y = 6 (daily drinker)
	parameter						
Drinking	-0.342 *	0.046 *	0.026 *	0.029 **	0.008 *	0.004 *	-0.117 *
problems	(0.197)	(0.038)	(0.016)	(0.015)	(0.005)	(0.001)	(0.071)
Age	0.005	-0.001	-0.000	-0.001	-0.000	-0.000	0.002
	(0.005)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)
Male	0.680 ***	-0.091 ***	-0.056 ***	-0.069 ***	-0.017 ***	-0.011 *	0.232 ***
	(0.088)	(0.014)	(0.009)	(0.010)	(0.003)	(0.002)	(0.032)
Education	-0.039 ***	0.005 ***	0.003 ***	0.004 ***	0.001 ***	0.001 ***	-0.013 ***
	(0.009)	(0.001)	(0.001)	(0.001)	(0.000)	(0.000)	(0.003)
Married	0.215 **	-0.029 **	-0.017 **	-0.020 **	-0.005 **	-0.003 *	0.074 **
	(0.090)	(0.014)	(0.007)	(0.008)	(0.002)	(0.001)	(0.032)
Unemployed	0.079	-0.010	-0.006	-0.007	-0.002	-0.001	0.027
	(0.153)	(0.019)	(0.011)	(0.014)	(0.004)	(0.003)	(0.051)
Retirement	-0.044	0.006	0.003	0.004	0.001	0.001	-0.015
	(0.101)	(0.013)	(0.007)	(0.009)	(0.003)	(0.002)	(0.034)
Smoke	0.003	-0.000	-0.000	-0.000	-0.000	-0.000	0.001
	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.001)
Physical activity	0.187 **	-0.025 **	-0.014 **	-0.017 **	-0.005 **	-0.003 **	0.064 **
	(0.078)	(0.011)	(0.006)	(0.007)	(0.002)	(0.001)	(0.026)
Depression	-0.150 *	0.020 *	0.011 *	0.014 *	0.004 *	0.002 *	-0.051 *
	(0.084)	(0.011)	(0.006)	(0.008)	(0.002)	(0.001)	(0.029)
Income	-1.16e-06	1.55e-07	8.69e-08	1.08e-07	2.89e-08	1.82e-08	-3.97e-07
	(1.99e-06)	(1.49e-07)	(1.49e-07)	(1.85e-07)	(4.95e-08)	(3.12e-08)	(6.78e-07)
Diseases	0.036	-0.005	-0.003	-0.003	-0.001	-0.001	0.012
	(0.033)	(0.004)	(0.002)	(0.003)	(0.001)	(0.001)	(0.011)

Notes: N = 1,052. Standard errors in parentheses. Ordered probit model cut-points: μ_1 = -0.810; μ_2 = -0.407; μ_3 = 0.089; μ_4 = 0.255; μ_5 = 0.386. $\chi^2(12) = 144.83.$

^{*} p < 0.1;

^{**} p < 0.05;

^{***} p < 0.01.

On the other hand, one extra year of education reduced the probability of daily consumption by 1.3 percentage points and increased the probability of drinking less than once a month by 0.5 percentage points. The results also show that having a history of depression increased the probability of reporting the first four categories of consumption, but reduced the frequency of daily alcohol consumption. The number of diseases, used as a proxy for worse health status, did not influence alcohol consumption. In relation to health-related behaviors, smoking did not have a statistically significant effect, but being sedentary reduced daily consumption, although it increased all other categories of consumption, with higher effect on the first category.

Discussion

As we described in the previous section, our results suggest that harmful alcohol consumption in the past is an important determinant of current alcohol consumption. Self-assessed past drinking problems had a positive effect on the first five lower categories of current alcohol consumption frequency – less than once a month to up to six days a week. Previous evidence that explored the predictors of the alcohol dependence treatment's efficiency suggests that alcohol-dependent users relapse after natural and treated remission ^{40,41}. These authors concluded that individuals who had higher levels of alcohol-related problems were more likely to relapse ³⁴, and described a higher prevalence of lifetime drinking problems as being associated with relapse ⁴¹. However, these authors considered diagnosed patients, thus, after recognizing their need for help and the treatment's effects, while in this study, we aimed also to identify undiagnosed alcohol-dependent users and assess the frequency of current consumption (and not the occurrence of relapses only).

The remaining variables were only used in the model as control variables, and the discussion of the corresponding results obtained was made by comparing them to those in the existing literature. Age did not have a statistically significant effect, although a previous study suggested that age reduces consumption ⁴². Caution must be taken regarding the interpretation of these results because the sample in this study has lower variability between the respondents' ages than the one from the aforementioned analysis ⁴². Males, when compared to females, were more likely to be daily drinkers, corroborating a study that concluded that males were less likely to be abstainers ⁴³.

In relation to the respondents' marital status, being married increased the frequency of daily consumption. This result is different from the one found by Kerr et al. ⁴⁴, who concluded that married respondents had lower alcohol consumption. Previous studies showed that peer influence induced individuals to drink alcohol when those around them were also drinking ²¹. Spousal influence was also found to affect alcohol consumption and other health behaviors ^{45,46,47,48,49,50}. Evidence suggests that marriage exerts an influence both with respect to excessive drinking and to the development of alcohol disorders ⁵⁰.

Previous findings suggested that the presence of depression in alcohol-dependent individuals is likely to negatively influence the treatment's outcomes ³⁵, and our results show that having a history of depression increased the probability of them reporting the first four categories of consumption, but reduced the frequency of daily alcohol consumption, possibly due to medical advice.

Although in previous studies unemployment and income emerged as important determinants of alcohol consumption ^{51,52,53}, we did not find any statistically significant association between unemployment and retirement and frequency of alcohol consumption, nor between frequency and income, which suggests alcohol consumption is not caused by economic motivations. Other authors concluded that employed individuals were more likely to consume alcohol ⁵², and described that lower income levels increased abstention ⁵³.

Some limitations of this work should be noted. As we measured harmful alcohol consumption in the past, used as a proxy for alcohol dependence, harmful consumption in the present was not observed, because we had information on the current frequency of consumption only. Moreover, we do not know the exact moment when the past drinking problems occurred, which means that it is not possible to fully assess how and when the individuals reacted after experiencing drinking problems, i.e., whether they reduced their consumption compared to the problematic threshold or instead continued with the same chain of consumption. In what concerns our dependent variable, although

ideally we should have gathered information on both frequency and level of consumption, as well as on dependence symptoms, no such data was available in the dataset. However, we acknowledge that questioning individuals about their drinking problems in the present, although desirable from a research standpoint, could raise ethical issues. Asking individuals to talk about their possible alcohol use disorder can cause distress and fear of stigmatization.

The main difficulty in developing studies focused on alcohol consumption is to choose the adequate concept and measure of harmful consumption. It is not easy to identify what levels of alcohol consumption are "undesirable". If we consider a measure of consumption level in a single occasion, we can characterize a case of heavy episodic drinking, but we are not able to identify if this consumption is harmful. Another possibility is to measure the frequency of consumption, but again we cannot conclude that alcohol consumption entails negative consequences only because the individual drinks every day. The problems related with measurement increase if we want to select valid instruments to assess alcohol dependence 54,55. Many individuals with alcohol dependence are high-functioning alcoholics 56,57,58. Usually, these individuals keep their dependence hidden from society. Despite the existence of instruments to diagnose alcohol dependence, if we considered this measure only, we would not be able to identify undiagnosed alcohol-dependent users.

Accordingly, the difficulties to measure alcohol dependence reveal that health policy debates are needed to clarify how to measure health risk behaviors. For more insightful analyses, a definition of valid instruments to quantify alcohol dependence is required. This work aims to provide empirical evidence to discuss future alcohol consumption reduction policies. It is of major relevance that the factors influencing the adoption of unhealthy behaviors are understood, to help the definition of policy targets and to direct the policy resources more wisely.

Regardless of the aforementioned limitations, this study used a large and representative sample, whose profile was similar to that of the adult Portuguese population. We also proposed an original approach to alcohol dependence. Our covariate of interest ("drinking problem") is a self-assessed measurement. Self-assessed measurements are widely used 59,60, and self-reported alcohol consumption is, in fact, frequently under-reported due to social desirability and recalls bias 61. Considering this under-reporting tendency, the variable "drinking problem" appears to be a good proxy of the critical level of consumption, which is harmful consumption. Moreover, it also enables the identification of undiagnosed alcohol-dependent users.

Conclusions

We investigated whether self-assessed past drinking problems, as a measure of harmful alcohol consumption, were related to current alcohol consumption. Our main explanatory variable ("drinking problem") is related to excessive and problematic drinking in the past and fits the assumption of harmful side effects caused by alcohol consumption. The results of this study show that individuals drink in the present after having experienced past drinking problems, which reveals interdependence between past and present alcohol consumption, possibly due to a dependence syndrome. Moreover, past drinking problems have a positive effect on the probabilities of consuming alcohol less than once a month to up to five or six days a week. It thus seems that drinking problems in the past do not discourage the respondents from consuming alcohol regularly.

These remarks can shed some light on prevention policies concerning alcohol consumption. Our results showed harmful alcohol consumption in the past is an important determinant of present consumption. Thus, to reduce non-communicable avoidable diseases related to alcohol consumption, it is important to consider the individuals' decisions regarding the use of alcohol during their lifetime. Interventions must contemplate different targets based on drinking patterns, namely by distinguishing heavy from moderate drinkers. Moreover, from a policy perspective, the adoption of a proactive attitude might be worth considering, with the application of questionnaires in primary care services, for example, to identify individuals with past drinking problems. Family doctors too can play an important role in this regard by being attentive to their patients' past consumption patterns.

Contributors

A. M. Reis, C. Quintal and O. Lourenço participated with substantial contributions to study design and conception, to analysis and interpretation of data and collaborated in the drafting and critical proof-reading of the article and gave the final approval of the version to be submitted.

Additional informations

ORCID: Ana Maria Reis (0000-0003-0674-7327); Carlota Quintal (0000-0002-8306-3431); Óscar Lourenço (0000-0002-3642-4919).

References

- World Health Organization. Global status report on alcohol and health, 2014. Geneva: World Health Organization; 2014.
- World Health Organization. Global status report on alcohol and health. Geneva: World Health Organization; 2011.
- 3. Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, Adair-Rohani H, et al. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2012; 380:2224-60.
- Organisation for Economic Co-operation and Development. Health at a glance 2015. Paris: OECD Publishing; 2015.
- Chaloupka F, Grossman M, Saffer H. The effects of price on alcohol consumption and alcohol-related problems. Alcohol Res Health 2002; 26:22-34.
- Cook P, Moore M. Alcohol. In: Pauly MV, McGure TG, Barros PP, editors. Handbook of health economics. New York: Elsevier; 2000. p. 1629-73.
- Kenkel D, Wang P. Are alcoholics in bad jobs? In: Chaloupka FJ, Grossman F, Bickel WK, Saffer H, editors. The economic analysis of substance use and abuse: an integration of economic and behavioral economic research. Chicago: University of Chicago Press; 1999. p. 251-78.
- 8. Kenkel D, Wang P. Rational addiction, occupational choice and human capital accumulation. In: Grossman M, Hsich C-R, editors. The economic analysis of substance use and abuse: the experience of developed countries and lessons for developing countries. Cheltenham: Edward Elgar Publishing; 2001. p. 33-60.
- Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J. Global burden of disease and injury and economic cost attributable to alcohol use and alcohol-use disorders. Lancet 2009; 373:2223-33.
- 10. McDaid D, Sassi F, Merkur S. Promoting health, preventing disease: the economic case. Berkshire: McGraw Hill Education; 2015.
- 11. Petersen A, Lupton D. The new public health: health and self in the age of risk. London: Sage Publications; 1996.
- 12. Organisation for Economic Co-operation and Development. Tackling harmful alcohol use. Paris: OECD Publishing; 2015.
- Direção Geral da Saúde, Serviço Nacional de Saúde. A saúde dos portugueses: perspetiva 2015. Lisboa: Direção Geral da Saúde, Serviço Nacional de Saúde; 2015.

- 14. Becker G, Murphy K. A theory of rational addiction. J Polit Econ 1988; 96:675-700.
- 15. Baltagi BH, Griffin JM. Rational addiction to alcohol: panel data analysis of liquor consumption. Health Econ 2002; 11:485-91.
- 16. Bask M, Melkersson M. Rationally addicted to drinking and smoking? Appl Econ 2004; 36:373-81.
- 17. Grossman M, Chaloupka FJ, Sirtalan I. An empirical analysis of alcohol addiction: results from the monitoring the future panels. Econ Inq 1998; 36:39-48.
- 18. Pierani P, Tiezzi S. Infrequency of purchase, individual heterogeneity and rational addiction in single households' estimates of alcohol consumption. G Degli Econ E Ann Econ 2011; 70:93-116.
- 19. Waters TM, Sloan FA. Why do people drink? Tests of the rational addiction model. Appl Econ 1995; 27:727-36.
- 20. Orphanides A, Zervos D. Rational addiction with learning and regret. J Polit Econ 1995;
- 21. Larsen H, Engels RC, Souren PM, Granic I, Overbeek G. Peer influence in a micro-perspective: imitation of alcoholic and non-alcoholic beverages. Addict Behav 2010; 35:49-52.
- 22. Manning W, Blumberg L, Moulton LH. The demand for alcohol: the differential response to price. J Health Econ 1995; 14:123-48.
- 23. Grossman M. The economic analysis of addictive behavior. In: Hilton ME, Bloss G, editors. Economics and the prevention of alcohol-related problems. Bethesda: National Institute on Alcohol Abuse and Alcoholism; 1993. p. 91-
- 24. Grossman M, Sindelar JL, Mullahy J, Anderson R. Policy watch: alcohol and cigarette taxes. J Econ Perspect 1993; 7:211-22.
- 25. Börsch-Supan A. Survey of Health, Ageing and Retirement in Europe (SHARE) Wave 4. http:// dx.doi.org/10.6103/SHARE.w4.500 (accessed on 20/Jun/2016).
- 26. Börsch-Supan A, Brandt M, Hunkler C, Kneip T, Korbmacher J, Malter F, et al. Data resource profile: the Survey of Health, Ageing and Retirement in Europe (SHARE). Int J Epidemiol 2013; 42:992-1001.
- 27. Börsch-Supan A, Brandt M, Litwin H, Weber G. Active ageing and solidarity between generations in Europe. First results from SHARE after the economic crisis. Berlin: De Gruyter;
- 28. Malter F, Börsch-Supan A. SHARE Wave 4: innovations & methodology. Munich: Max Planck Institute for Social Law and Social Policy; 2013.
- 29. Pearson K. Mathematical contributions to the theory of evolution. XIII. On the theory of contingency and its relation to association and normal correlation. London: Dulau and Co.;
- 30. Jones AM, Rice N, d'Uva TB, Balia S. Applied health economics. 2nd Ed. New York: Routledge; 2013.

- 31. Cameron C, Trivedi P. Microeconometrics: methods and applications. Cambridge: Cambridge University Press; 2005.
- 32. Greene WH. Econometric analysis. 5th Ed. Upper Saddle River: Prentice Hall; 2003.
- Verbeek M. A guide to modern econometrics. 2nd Ed. Chichester: John Wiley & Sons; 2004.
- 34. Vieten C, Astin JA, Buscemi R, Galloway GP. Development of an acceptance-based coping intervention for alcohol dependence relapse prevention. Subst Abuse 2010; 31:108-16.
- Kuria MW, Ndetei DM, Obot IS, Khasakhala LIM Bagaka BM, Mbugua MN, et al. The association between alcohol dependence and depression before and after treatment for alcohol dependence. ISRN Psychiatry 2012; 2012:482802.
- 36. Miller W, Westerberg V, Harris R, Tonigan JS. What predicts relapse? Prospective testing of antecedent models. Addiction 1996; 91:155-
- 37. Bottlender M, Soyka M. Impact of craving on alcohol relapse during, and 12 months following, outpatient treatment. Alcohol Alcohol 2004; 39:357-61.
- Instituto Nacional de Estatística. Censos 2011: resultados definitivos Portugal. Lisboa: Instituto Nacional de Estatística; 2012.
- 39. Instituto Nacional de Estatística. População média anual residente (série longa, início 1971 - 2015). Lisboa: Instituto Nacional de Estatística; 2015.
- 40. Kuria MW. Factors associated with relapse and remission of alcohol dependent persons after community based treatment. Open J Psychiatr 2013; 3:264-72.
- 41. Moos R, Moos B. Rates and predictors of relapse after natural and treated remission from alcohol use disorders. Addiction 2006; 101:212-22.
- 42. Vicente-Herrero MT, López-González AA. Consumo de alcohol en trabajadores españoles del sector servicios: variables sociodemográficas y laborales implicadas. Cienc Trab 2014; 16:158-63.
- 43. Nayga R, Capps O. Analysis of alcohol consumption in the United States: probability and level of intake. Journal of Food Distribution Research 1994; 25:17-23.
- 44. Kerr WC, Greenfield TK, Bond J, Ye Y, Rehm J. Age-period-cohort modelling of alcohol volume and heavy drinking days in the US National Alcohol Surveys: divergence in younger and older adult trends. Addiction 2009; 104:27-37.
- 45. Barlow DH. The Oxford handbook of clinical psychology. Oxford: Oxford University Press; 2011.
- 46. Dollar KM, Homish GG, Kozlowski LT, Leonard KE. Spousal and alcohol-related predictors of smoking cessation: a longitudinal study in a community sample of married couples. Am J Public Health 2009; 99:231-3.

- 47. Homish G, Leonard K. Spousal influence on general health behaviors in a community sample. Am J Health Behav 2008; 32:754-63.
- 48. Homish G, Leonard K. Spousal influence on smoking behaviors in a US community sample of newly married couples. Soc Sci Med 2005; 61:2557-67.
- 49. Leonard K, Homish G. Changes in Marijuana use over the transition into marriage. J Drug Issues 2005; 35:409-30.
- Leonard K, Eiden RD. Marital and family processes in the context of alcohol use and alcohol disorders. Annu Rev Clin Psychol 2007; 3:285-310
- 51. Ogwang T, Cho DI. Economic determinants of the consumption of alcoholic beverages in Canada: a panel data analysis. Empir Econ 2009; 37:599-613.
- Su S-JB, Yen ST. A censored system of cigarette and alcohol consumption. Appl Econ 2000; 32:729-37.
- 53. Meng Y, Holmes J, Hill-McManus D, Brennan A, Meier PS. Trend analysis and modelling of gender-specific age, period and birth cohort effects on alcohol abstention and consumption level for drinkers in Great Britain using the General Lifestyle Survey 1984-2009: model APC on abstention and consumption in Great Britain. Addiction 2014; 109:206-15.
- 54. Conway KP, Levy J, Vanyukov M, Chandler R, Rutter J, Swan GE, et al. Measuring addiction propensity and severity: the need for a new instrument. Drug Alcohol Depend 2010; 111:4-

- 55. Samet S, Waxman R, Hatzenbuehler M, Hasin DS. Assessing addiction: concepts and instruments. Addict Sci Clin Pract 2007; 4:19-31.
- Benton S. Understanding the high-functioning alcoholic: professional views and personal insights. Westport: Praeger; 2009.
- 57. Johnson BA, Cloninger CR, Roache JD, Bordnick PS, Ruiz P. Age of onset as a discriminator between alcoholic subtypes in a treatment-seeking outpatient population. Am J Addict 2000; 9:17-27.
- Yechiam E, Stout JC, Busemeyer JR, Rock SL, Finn PR. Individual differences in the response to forgone payoffs: an examination of high functioning drug abusers. J Behav Decis Mak 2005; 18:97-110.
- 59. Feunekes G, Van't Veer P, van Staveren W, Kok FJ. Alcohol intake assessment: the sober facts. Am J Epidemiol 1999; 150:105-12.
- 60. Ross J. The reliability, validity, and utility of self-assessment. Practical Assessment, Research, and Evaluation 2006; 11:1-13.
- 61. Bajunirwe F, Haberer JE, Boum 2nd Y, Hunt P, Mocello R, Martin JN, et al. Comparison of self-reported alcohol consumption to phosphatidylethanol measurement among HIV-infected patients initiating antiretroviral treatment in Southwestern Uganda. PLoS One 2014; 9:e113152.

Resumo

O uso prejudicial de álcool figura entre os cinco principais fatores de risco para doença, deficiência e óbito em todo o mundo. Contudo, nem todos os indivíduos que consomem álcool durante suas vidas são drogaditos e nossa premissa é que a drogadição pressupõe um fluxo de consumo que produz efeitos danosos. O objetivo deste artigo foi avaliar se problemas autoavaliados com bebida no passado - nossa medida de consumo danoso de álcool – afetam padrões atuais de consumo de álcool. Esperávamos que problemas no passado poderiam ter um efeito positivo sobre o consumo atual de álcool. Usando dados portugueses do Inquérito de Saúde, Envelhecimento e Aposentadoria na Europa (SHARE, em inglês), aplicamos um modelo ordered probit, dada a natureza ordinal da variável dependente. Nossa variável dependente mede o consumo atual usando categorias listadas em ordem ascendente de frequência de ingestão de álcool (de menos de uma vez por mês até consumo diário). Nossos resultados sugerem que o consumo danoso de álcool no passado é um determinante importante do consumo atual de álcool. Problemas autoavaliados com bebida no passado tiveram um efeito positivo nas primeiras cinco categorias mais baixas de frequência atual de consumo de álcool - menos de uma vez por mês até seis dias por semana. Portanto, para reduzir doenças não-transmissíveis preveníveis relacionadas ao consumo de álcool, as políticas públicas devem levar em consideração as decisões de indivíduos relacionadas ao seu consumo de álcool durante suas vidas, e políticas específicas devem ser dirigidas a indivíduos com problemas passados com bebida.

Consumo de Bebidas Alcoólicas: Alcoolismo: Assunção de Riscos; Política de Saúde

Resumen

El abuso de alcohol se sitúa entre los cinco factores con mayor riesgo alrededor del mundo para enfermedad, incapacidad y muerte. No obstante, no todas las personas que consumen alcohol a lo largo de su vida son adictas y nuestra premisa es que la adicción implica un consumo continuado que produce efectos dañinos. El objetivo de este trabajo fue evaluar si los problemas pasados con el alcohol autoevaluados -nuestra medida de consumo dañino- afecta a los estándares actuales de consumo de alcohol. Esperábamos que los problemas con el alcohol en el pasado pudieran tener un efecto positivo en el consumo actual. Utilizando los datos portugueses de la Encuesta para la Salud, Envejecimiento y Jubilación en Europa (SHARE), aplicamos un modelo ordered probit, proporcionado por la propia naturaleza de la variable dependiente. Nuestra variable dependiente mide el consumo actual, usando categorías listadas en orden ascendiente de frecuencia de consumo de alcohol (desde menos de una vez al mes al consumo diario). Nuestros resultados sugieren que un consumo dañino de alcohol en el pasado es un importante determinante del consumo de alcohol en la actualidad. Los problemas autoevaluados en el pasado con la bebida tuvieron un efecto positivo en las primeras cinco categorías más bajas de la frecuencia actual de consumo de alcohol -menos de una vez al mes hasta seis días a la semana. Por consiguiente, para reducir las enfermedades evitables no comunicables, relacionadas con el consumo de alcohol, se deberían considerar políticas que tuvieran en mente las decisiones individuales, en relación con el consumo de alcohol a lo largo de la vida, así como centrar las políticas específicas en personas con problemas con la bebida en el pasado.

Consumo de Bebidas Alcohólicas; Alcoholismo; Asunción de Riesgos; Política de Salud

Submitted on 09/Feb/2018 Final version resubmitted on 24/Sep/2018 Approved on 10/Oct/2018