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The importance of drinking frequency in evaluating individuals' drinking patterns: implications for the development of national drinking guidelines

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ABSTRACT

Aims This paper examines the relationship between frequency of drinking, usual daily consumption and frequency of binge drinking, taking into consideration possible age and gender differences. **Participants and design** Subjects were 10 466 current drinkers (5743 women and 4723 men) aged between 18 and 76 years, who participated in the GENACIS Canada (GENder Alcohol and Culture: an International Study) study. **Setting** Canada. **Measurements** The independent variable was the annual drinking frequency. The dependent variables were the usual daily quantity consumed, annual, monthly and weekly frequency of binge drinking (five drinks or more on one occasion). **Findings** Logistic regressions show (i) that those who drink less than once a week are less likely than weekly drinkers to take more than two drinks when they do drink; (ii) that the usual daily quantity consumed by weekly drinkers is not related to their frequency of drinking; but that (iii) the risk and frequency of binge drinking increase with the frequency of drinking. **Conclusions** Given that risk and frequency of binge drinking among Canadians increases with their frequency of drinking, any public recommendation to drink moderately should be made with great caution.

Keywords Alcohol, Canada, binge drinking, drinking guidelines, gender, moderate drinking.

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INTRODUCTION

The idea that moderate drinking could have medicinal virtues appeared first in the 19th century [1] and became more widespread in the 1970s following the study of Klatsky, Friedman & Siegelaub [2]. Since then, research has demonstrated that moderate consumption can provide protection against certain illnesses, particularly cardiovascular illnesses, among post-menopausal women and among men over 40 [3–8]. Given the simplicity of the message and the marketing forces behind it, the benefits of moderate drinking have become a recurrent theme in the media. Accordingly, Canadian studies revealed that 57% of Canadians aged 12 years or more believe that moderate drinking has health benefits [9] and 87% of the adults in Ontario think that drinking one or two glasses of wine per day reduces the risk of heart disease [10].

However, there is no clear and universal understanding of what is 'moderate drinking'. The term 'moderate drinking' is used frequently but it remains highly subjective; its meaning varies between cultures and within cultures according to gender, age, socio-economic status and people's self-reported tolerance [11–13]. Many countries have proposed drinking guidelines [14]; nevertheless, no consensus emerges on what is low-risk or moderate drinking. Most guidelines address only the daily intake (for instance in Australia, Austria, Czech Republic, France, Italy, Japan, the Netherlands, Portugal, Romania, Slovenia, Spain, Sweden, Switzerland), others only the weekly intake (Denmark, Finland, Ireland, South Africa) and others both the daily and weekly intake (Canada, New Zealand, United Kingdom, United States). Regarding the daily quantity not to be exceeded, the recommendations range from 20 g to 70 g for men and from 10 g to 70 g for women. The only common feature of these

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guidelines is their silence on the frequency of drinking, suggesting implicitly that the frequency of drinking does not matter and, therefore, that drinking regularly and lightly is possible.

In fact, very little is known on the relationship between frequency of drinking and risky drinking patterns. Twenty years ago Knupfer [15] demonstrated that, in the United States, 'most light drinkers are not daily and most daily drinkers are not light' (p. 551), but since then, to our knowledge, no study has addressed this issue. The aim of this paper is to assess the relationship between the frequency of drinking, the usual daily quantity consumed and the frequency of binge drinking (five drinks or more on one occasion), taking into consideration possible age and gender differences.

METHODOLOGY

Sample

Data were derived from the GENACIS Canada project [16] (GENder Alcohol and Culture: an International Study) that is part of a large international collaboration to gain knowledge regarding the influence of social and cultural variations on gender differences in alcohol use and problems. Between January 2004 and January 2005, a representative sample of 14 067 Canadian residents (6012 males and 8054 females) aged between 18 and 76 years from all 10 provinces was surveyed on a number of topics, including alcohol consumption and consequences, drinking contexts, reasons for drinking, social roles, psychological and physical health. A two-stage sampling design was used. First, households were selected using random digit dialling (RDD) and secondly, within households with more than one eligible adult, the adult whose birthday followed the survey date most closely was selected as the survey respondent, thereby ensuring a random selection of respondents within households. Interviews were conducted using computer-assisted telephone interviewing (CATI). To maximize the response rate, at least 14 call attempts were made during the day and the evening for both week and weekend days, with more than 14 calls made if additional call attempts were judged likely to lead to a completed interview. The response rate was 52.8% of all eligible households. The average interview time was 25.64 minutes [standard deviation (SD) = 7.46].

In this study, the analytical sample included the individuals who reported alcohol consumption at least once during the last 12 months ($n = 10\,914$). After excluding cases with missing data on either variables used in this study ($n = 448$), the final sample consisted of 5743 women and 4723 men. Data were weighted for household and individual probability of being sampled.

Measures

Three measures of drinking were used: the annual frequency of drinking, the annual frequency of binge drinking (five drinks or more per occasion) and the usual daily quantity consumed.

For the annual frequency, respondents were asked: 'During the last 12 months, how often did you usually have any kind of drink containing alcohol?'. For the frequency of binge drinking, they were asked: 'How often did you usually have five drinks or more on one occasion?'. Possible responses to these two questions were: (i) every day; (ii) 5 or 6 days a week; (iii) 3 or 4 days a week; (iv) once or twice a week; (v) 1–3 days a month; (vi) less than once a month; or (vii) never. For the frequency of drinking, the two first categories were collapsed into a single category of '5–7 a week', due to the small number of drinkers reporting daily drinking. Three dummy variables were derived from the frequency of binge drinking in order to assess individuals' difference in such a behaviour's frequency. The first variable discriminates those who never had a binge drinking episode over the previous year (0) from those who had at least once (1). The second variable discriminates drinkers who reported binge drinking at least once a month (1) from those who did not (0). The third variable discriminates drinkers who reported binge drinking at least once a week (1) from those who did not (0).

For the usual daily quantity, respondents were asked the following question: 'One drink means one 12 oz. regular beer, 5 oz. of wine, 3 oz of Port, Sherry or Vermouth, one-and-a-half oz. of hard liquor or liquor, or one 12 oz. of cooler. In the past 12 months, on those days when you had any kind of beverage containing alcohol, how many drinks did you usually have?'. Respondents' answers ranged from 0.8 (light beer) to 30. Answers were recoded into a dummy variable, distinguishing low-risk from higher-risk drinking, based on *The Low Risk Drinking Guidelines* released by the Center for Addiction and Mental Health [17] that recommends never to consume more than two drinks per occasion. Hence, the dummy discriminates between those who usually take two drinks or less per day on the days they drink (0) from those who take more than two drinks per day (1).

Age was recoded into a three-category variable to distinguish demographic subgroups (aged 18–24; 25–49; 50 and over) that have been recognized to have different drinking patterns [18].

Analyses

Logistic regression analyses were performed to model association between the annual frequency of drinking and (i) usual daily quantity consumed; (ii) occurrence of annual binge drinking; (iii) occurrence of monthly binge

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drinking; and (iv) occurrence of weekly binge drinking. Because the frequency of binge drinking is necessarily constrained by the frequency of drinking, analyses that focused on the annual, the monthly and the weekly occurrence of binge drinking were performed, respectively, on respondents who reported to drink minimally on an annual, a monthly or a weekly basis. For clarity's sake, the same referent category was used irrespective of whether the analyses focused on annual, monthly or weekly drinking. Hence, respondents who reported to drink minimally on a weekly basis were chosen as the referent category, therefore the odds ratios (ORs) of any other category of annual drinking frequency have to be interpreted in comparison to 'once or twice a week' drinkers. The odds ratios were estimated with SPSS version 16.0 using weighted data. Wald tests and related confidence intervals were used to assess statistical significance and precision. Effect modification by annual frequency of drinking was assessed at the 0.05, 0.01 and 0.001 levels of significance. All analyses were performed separately for women and men of each age category.

RESULTS

Table 1 shows the results of the logistic regression analyses. First, across every gender–age group, drinking less than once a month reduces the likelihood of usually taking more than two drinks per day, with odds ratios varying between 0.22 and 0.48. Among male drinkers aged between 25 and 49 (OR = 0.69), as well as male and female drinkers aged over 50 (male 50+: OR = 0.45; female 50+: OR = 0.48), drinking 'one to three times per month' is also protective. However, for all gender–age groups, drinkers who drink more often than 'once or twice a week' are not more at risk of reporting a usual daily consumption greater than two drinks.

Regarding the occurrence of drinking five drinks or more per occasion, it appears to be associated significantly to the annual frequency of drinking. For all the gender–age groups, drinkers who drink 'less than once a month' or '1–3 days per month' are less likely to report at least one episode of five drinks or more per occasion over the previous year, with ORs varying between 0.05 and 0.58, whereas drinking 'three to four times a week' increases the risks for men, particularly for young men (18–24: OR = 5.61; 25–49: OR = 1.83; 50+: OR = 1.49), and for women aged between 25 and 49 years (OR = 1.83). Finally, women aged between 25 and 49 years (OR = 1.78) as well as men and women over 50 years old (OR = 2.29 and 1.78, respectively) who drink '5–7 days per week' are significantly more likely to report having had five drinks or more per occasion at least once over the previous year.

Regarding the monthly occurrence of five drinks or more per occasion, results show a positive association with the frequency of drinking among monthly drinkers. In all gender–age groups, those who drink 'one to three times per month' are less likely to report having five drinks or more per occasion at least once a month than those who drink 'once or twice per week' (OR varying from 0.26 to 0.66). On the contrary, men aged between 18 and 24 (OR = 4.39) as well as both men and women aged between 25 and 49 who drink '3–4 days per week' (OR = 2.49 and 3.00, respectively) are at least twice as likely to have five drinks or more per occasion on a monthly basis. Moreover, except for women aged between 18 and 24, respondents who drink '5–7 days per week' are also more likely to have five drinks or more per occasion at least once a month (OR varying from 1.94 to 4.44).

Among weekly drinkers, the likelihood of having five drinks or more per occasion at least once a week increases with the frequency of drinking, except for women aged between 18 and 24 years. Men aged between 18 and 24 years are more at risk (OR = 4.5 and 7.1, respectively, for those who drink '3–4 days per week' and '5–7 days per week'). It should also be noted that for women and men aged over 50 a significant difference was observed only for those who report drinking at least 5 days a week, who are 2.49 and 3.69, respectively, more likely to report having five drinks or more per occasion at least once a week.

DISCUSSION

In summary, our results show that (i) occasional drinkers, i.e. those who drink less than once a week, are less likely than weekly drinkers to exceed two drinks when they do drink; (ii) that the usual daily quantity consumed by weekly drinkers is not related to their frequency of drinking; but that (iii) the risk and frequency of binge drinking increase with the frequency of drinking. All in all, the older drinkers—who could benefit most from taking one or two drinks regularly—do not behave differently. Men and women aged over 50 who drink 5–7 days per week are at least nearly twice as likely to exceed five drinks or more per occasion than less regular drinkers.

The explanation of the relationship between the drinking frequency and the quantity consumed per occasion might be both cultural and biological. The Canadian drinking culture has a 'time-out' representation of drinking [19]. Alcohol is a boundary mark between week and weekend, work and leisure, and therefore between routine and 'time off' spontaneity [20]. Alcohol does not need to be consumed in excess to indicate a change in routine, as its use is in itself a cue to this change. Nevertheless, a person who consumes one or two drinks in everyday life may indulge in detrimental levels of alcohol

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Table 1 Odds ratios (ORs) for alcohol quantities per occasion among current drinkers aged 18 years and over, by annual alcohol consumption frequency, age and gender: GENACIS Canada, 2004–05.

		Alcohol quantity per occasion[b]			
Frequency of drinking	*n*	*Usual daily quantity >2 drinks OR (95% CI)*	*Annual binge drinking episode OR (95% CI)*	*Monthly binge drinking episodes OR (95% CI)*	*Weekly binge drinking episodes OR (95% CI)*
Male 18–24 years	534				
<once a month	72	0.22*** (0.14–0.36)	0.05*** (0.03–0.09)	–	–
1–3 days per month	156	0.69 (0.45–1.06)	0.25*** (0.14–0.46)	0.32*** (0.22–0.46)	–
1–2 days per week[a]	188	1	1	1	1
3–4 days per week	87	1.04 (0.62–1.76)	5.61* (1.06–29.64)	4.39*** (2.27–8.52)	4.52*** (2.88–7.11)
5–7 days per week	31	1.69 (0.65–4.43)	1.01 (0.25–4.08)	4.44** (1.41–14.01)	7.11*** (3.09–16.37)
Male 25–49 years	2608				
<once a month	424	0.47*** (0.37–0.60)	0.14*** (0.11–0.19)	–	–
1–3 days per month	694	0.69*** (0.57–0.85)	0.35*** (0.28–0.44)	0.43*** (0.35–0.54)	–
1–2 days per week[a]	921	1	1	1	1
3–4 days per week	365	1.15 (0.89–1.48)	1.83*** (1.28–2.61)	2.49*** (1.93–3.21)	2.09*** (1.58–2.76)
5–7 days per week	204	0.83 (0.61–1.12)	1.47 (0.97–2.22)	2.89*** (2.11–3.97)	4.24*** (3.09–5.82)
Male 50+ years	1581				
<once a month	257	0.36*** (0.24–0.52)	0.23*** (0.16–0.33)	–	–
1–3 days per month	352	0.45*** (0.32–0.62)	0.38*** (0.28–0.50)	0.33*** (0.22–0.48)	–
1–2 days per week[a]	462	1	1	1	1
3–4 days per week	220	0.89 (0.64–1.26)	1.49* (1.08–2.08)	1.10 (0.78–1.56)	1.23 (0.74–2.05)
5–7 days per week	290	1.15 (0.85–1.55)	2.29*** (1.68–3.11)	2.09*** (1.55–2.83)	3.69*** (2.50–5.46)
Female 18–24 years	539				
<once a month	131	0.28*** (0.18–0.42)	0.08*** (0.05–0.13)	–	–
1–3 days per month	209	0.74 (0.51–1.08)	0.33*** (0.20–0.54)	0.26*** (0.18–0.38)	–
1–2 days per week[a]	156	1	1	1	1
3–4 days per week	33	0.61 (0.32–1.18)	2.50 (0.63–10.01)	1.63 (0.82–3.24)	1.72 (0.87–3.40)
5–7 days per week	10	0.42 (0.14–1.24)	0.33 (0.94–1.13)	1.16 (0.38–3.57)	2.93 (0.97–8.85)
Female 25–49 years	3160				
<once a month	970	0.48*** (0.39–0.60)	0.21*** (0.17–0.26)	–	–
1–3 days per month	1002	0.84 (0.69–1.04)	0.58*** (0.48–0.70)	0.66** (0.51–0.87)	–
1–2 days per week[a]	810	1	1	1	1
3–4 days per week	255	0.97 (0.72–1.31)	1.83*** (1.36–2.47)	3.00*** (2.19–4.10)	2.14** (1.33–3.45)
5–7 days per week	123	0.82 (0.54–1.23)	1.78** (1.20–2.65)	3.15*** (2.12–4.70)	2.79*** (1.59–4.93)
Female 50+ years	2044				
<once a month	676	0.45*** (0.29–0.67)	0.29*** (0.21–0.42)	–	–
1–3 days per month	555	0.48*** (0.31–0.74)	0.46*** (0.33–0.64)	0.34*** (0.19–0.62)	–
1–2 days per week[a]	445	1	1	1	1
3–4 days per week	169	0.96 (0.57–1.59)	1.35 (0.92–1.99)	1.30 (0.74–2.29)	0.48 (0.14–1.68)
5–7 days per week	199	1.23 (0.77–1.95)	1.56* (1.08–2.27)	1.94** (1.17–3.22)	2.49* (1.19–5.18)

***$P = 0.001$; **$P = 0.01$; *$P = 0.05$. [a]Referent category. [b]Usual daily quantity of consumed alcohol is greater than two drinks; at least one episode of binge drinking in past year; at least one episode of binge drinking per month in past year; at least one episode of binge drinking per week in past year. CI: confidence interval; GENACIS: (GENder Alcohol and Culture: an International Study).

when marking a transition to a special occasion and getting into a cheerful mood. Alcohol's psychoactive proprieties can fuel this propensity to drink more on special occasions. Regular drinking builds up tolerance [21], therefore daily drinkers will need more than their usual drink or two to make a difference with everyday life and gain that festive feeling. Consequently, they will more probably drink beyond healthy limits at least occasionally and perhaps weekly. Hence, our comprehensive interpretation of the present results is that the psychoactive characteristics of alcoholic beverages and the prevailing cultural perception of alcohol are two elements that feed on each other and make regular drinkers more at risk.

However, even if it is undeniable that consuming five units is above the recommended limits of healthy drinking, an episode of five drinks or more does not necessarily imply drunkenness. It depends upon the manner in which alcohol is consumed. Do drinkers toss down liquor shots one after another, or do they have long dinners that begin with a cocktail and end with wine a few hours

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later? To further our understanding of the relationship between the frequency of drinking and the usual daily quantity, we need to question how drinkers are actually consuming alcohol on the occasions when they have five drinks or more, as well as the symbolic role that alcohol plays on these occasions.

Limitations

A major limitation of our research is that, given the nature of our data, it was impossible to infer the causal link between drinking frequency and quantity per occasion with certitude. Our cross-sectional data allowed us to clarify, at a given point in time, the link between the frequency of drinking, the usual daily quantity consumed and the frequency of binge drinking, but they did not enable us to determine what happens when, over time, a person increasingly drinks more often. Can someone increase frequency of drinking without increasing frequency of binge drinking? According to our interpretation of present results, we would assume that the answer to this question is 'no', but this remains to be confirmed with further research using longitudinal data. A second and equally important limitation is the absence of data regarding the frequency of four drinks or more on one occasion. According to health-related organizations in Canada, the United States and elsewhere, women should never take more than four drinks on one occasion. Hence, it might have been more accurate to use a four-drinks cut-point to estimate women's frequency of binge drinking. Because of this, we may have underestimated the association between women's frequency of drinking and women's risk of binge drinking. A third limitation relates to the random digit dial (RDD) telephone survey's response rate. While our survey response rate is low (52,9%), it reflects the general trend of response rates of large-scale studies that have been declining throughout the developed world [22,23] because of cynicism, declining civic participation as well as concerns with privacy, confidentiality and abuse of personal information [24,25]. Most refusals were made at the time of the initial household contact. When an eligible respondent was reached, the participation rate was 85.4%.

CONCLUSION

From a health viewpoint, alcohol is beneficial only when consumed in very small quantities. As there is a risk that regular drinking could increase alcohol abuse, drinking guidelines might take this aspect of the drinking pattern into account, at least in the Canadian context.

Declarations of interest

None.

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