Association Between Frequency of Heavy Episodic Drinking and Self-reported Consequences: A Cross-sectional Study in a Swedish Population

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Frequency of Heavy Episodic Drinking Related to Self-Reported Consequences: A Cross-Sectional Study in a Swedish Population

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Abstract

Aim: The aim of this study was to describe perceived negative consequences (PNC) of alcohol consumption related to frequency of heavy episodic drinking (HED) in a Swedish population attending primary health care.

Methods: Data from a computer-based assessment, including questions about alcohol consumption and PNC, were collected from 28 primary health care (PHC) centres in Sweden. The analysis included 4559 responders. Risk ratios were calculated concerning PNC for different frequencies of HED.

Results: Engaging in HED once a month for women and 2–3 times a month for men significantly raised the proportion of individuals reporting PNC, compared with engaging in HED less than once a month. Men reported PNC from alcohol consumption to a higher degree than women, and in general the proportion of individuals reporting PNC was associated with frequency of HED.

Conclusion: Engaging in HED once a month for women and 2–3 times a month for men are critical levels regarding PNC from alcohol consumption. To identify a cut-off value for categorizing individuals as hazardous alcohol consumers due to frequency of HED, further studies are needed.

INTRODUCTION

Excessive alcohol consumption is known to have negative consequences on general health and increases risk for injury due to violence or accidents (Room *et al.*, 2005; Mongan *et al*., 2007, Andersson *et al*., 2009, WHO 2011). Negative consequences in other areas, such as work, social relations and economy, are also common. However, in research as well as in practice, the definitions of hazardous and harmful alcohol consumption are usually described in terms of physical or mental health consequences. Hazardous alcohol consumption is defined as a level of consumption or pattern of drinking that is likely to result in harm if habits persist (Babor *et al*., 1994); harmful drinking is a pattern of drinking that more obviously damages health, physical or mental (WHO, 1992). Recommendations on maximum daily intake vary both between and within countries, as described by Harding and Stockley (2007). In Sweden, the National Institute of Public Health defines hazardous drinking as weekly consumption of more than 14 standard drinks (12 g of alcohol) for men and more than 9 standard drinks per week for women, and/or heavy episodic drinking (HED) at least once a month. HED is defined as 4 (female) or 5 (male) drinks or more per occasion (Andréasson and Allebeck, 2005). An alternate, unofficial, definition of hazardous use includes every occasion involving HED (Andréasson and Allebeck, 2005). Rehm *et al*. (2008) recommend for both men and women a volume not exceeding two drinks a day, and find three or four drinks tolerable for occasional drinking. These recommendations are based upon lifetime risk of alcohol-attributable mortality. Binge drinking is defined by the National Institute on Alcohol Abuse and Alcoholism (NIAAA) in the USA, as a pattern of drinking alcohol that brings blood alcohol concentration to 0.08 gram per cent or above, which for a typical adult corresponds to 5 or more drinks (male), or 4 or more drinks (female), in about 2 hours (NIAAA, 2004). These volumes correspond to the definitions of HED presented by the Swedish National Institute of Public Health.

When discussing the consequences of alcohol consumption, it is important to consider the consequences in relation to the amount of alcohol consumed and the drinking pattern, not only on health but also on other areas (Babor *et al*., 2010). In a prospective study of risk drinking, Dawson *et al.* (2008) found that social harm was increased among daily/near daily risk drinkers. Recurrent HED is a drinking pattern that seems to add to the damage caused by alcohol in a population (Bobak *et al*., 2004), and is the pattern that has traditionally been predominant in the Nordic countries. Among young adults, however, HED has also been

shown to be a problem in other parts of the world (Measham and Brain, 2005; Naimi *et al.*, 2010; Fillmore and Jude, 2011). Naimi *et al.* (2010) studied alcohol consumption among US adults and conclude that, to better assess the impact of interventions designed to reduce binge drinking and its consequences, the intensity of binge drinking should be monitored regularly. Fillmore and Jude (2011) stress the importance of not only relying on quantity measures but also considering the frequency of consumption.

Primary health care (PHC) in Sweden has an obligation not only to deliver care for acute or chronic disorders but also to provide preventive health services to the population (SFS, 1982). One important task is to prevent alcohol-related harm, for example, by providing evidence-based advice regarding hazardous and harmful consumption. One method often used is brief intervention (BI), which has been shown to consistently reduce alcohol consumption (Whitlock *et al*., 2004; Kaner *et al.*, 2007). When provided by a health care worker, BI normally takes place within the timeframe of a standard consultation, (5–15 minutes for a GP, longer for a nurse), for 1–4 sessions. The intervention can include feedback on alcohol use, identification of high-risk situations, increased motivation and the development of an individual plan to reduce drinking (Kaner *et al*., 2007). However, researchers are still undecided about what advice should be provided to the patient to prevent negative consequences from alcohol consumption. It is also important to recognize that alcohol sensitivity is to a high degree individual, and any recommendation should be used with caution. However, for screening and categorizing people into risk groups, defined measurements of harmful or hazardous consumption are valuable. One way to guide practitioners on the subject could be to assess at what frequency of HED consumers perceive negative consequences from alcohol consumption in multiple areas, not restricted to physical and mental health.

The aim of this study was to describe the frequency of perceived negative consequences (PNC) regarding health, relationships, work and economy, in relation to the frequency of HED in a Swedish population attending primary health care.

METHODS

Study setting

A computer-based tool for lifestyle assessment and advice was offered to all PHC centres (42 centres) in the County of Östergötland, Sweden, to be placed in the waiting room or in an adjacent room. At the starting point of this study, 10 centres participated, and at the end of the study 28 centres. Patients could perform the assessment spontaneously, or could be referred by the PHC staff. All patients aged 18 years or older who performed the computer-based lifestyle assessment were included in this study. Questions included in the assessment were answered anonymously, and the patients decided whether to discuss their results with a staff member or not. Data from the lifestyle assessment computers were stored in the County Council data base. The County of Östergötland has about 420,000 inhabitants, is a mix of rural and urban communities, and has been found to be representative of the whole Swedish population in terms of gender distribution, employment rates and economic status (SCB, 2012).

The computer-based tool

The lifestyle intervention tool was developed by the Lifestyle Intervention Research (LIR) group at Linköping University, Sweden, and was based on previous experiences from student health care and emergency department settings, as reported in Karlsson and Bendtsen (2005), Bendtsen *et al*. (2007) and Karlsson *et al.* (2005). The tool consists of a touch-screen computer with a printer, and provides a lifestyle assessment form that includes questions about alcohol consumption. Responders who report no alcohol consumption for the last 3 months are not asked any further questions about consumption, and are considered abstainers. Consumption is measured by a beverage-specific self-report of day-by-day consumption during a typical week and frequency of HED. HED is defined as intake of 4 standard drinks or more for women and 5 standard drinks or more for men at the same occasion. The assessment form also includes questions about PNC of consuming alcohol: Has your alcohol consumption negatively influenced any of the following areas: health, relations with family or friends, economy, work, or injury risk? The question is answered with an x to confirm a negative influence for each of the five areas. Patients who complete the assessment receive a printed sheet with their personal results and tailored written advice. In the feedback provided to patients, hazardous alcohol consumption is defined as HED once a week or more and/or

weekly consumption of more than 14 standard drinks per week for men, and more than 9 standard drinks per week for women.

Data collection and analysis

Data collection started in March 2007 and lasted for 30 months until August 2009. Statistical analyses were performed using the computer-based program, Statistical Package for the Social Sciences (SPSS) version 19.0. Statistical significance was set at $p \leq 0.05$. Alcohol consumers were categorized according to frequency of HED, and differences between categories regarding PNC were calculated as a risk ratio (Kirkwood and Sterne, 2003). Differences in age distribution within categories were analysed using the chi-square test. Responders who reported a weekly consumption of more than three times the limit for hazardous consumption (i.e. 45 standard drinks for men, 30 standard drinks for women) were defined as outliers and were not included in the analysis. A flow chart for the study is presented in Fig. 1.

RESULTS

During the study period, 9479 patients completed the assessment form on the computer, and after exclusion of 259 outliers, 9220 responders remained. Of the responders, 26% were abstainers, 21% were defined as hazardous alcohol consumers (due to HED, weekly consumption or both) and 54% were non-hazardous alcohol consumers. Thirty-six percent of participants were referred to the assessment, while 64% completed it spontaneously. There were no differences between referred and non-referred individuals regarding frequency of HED or reported PNC.

Abstainers, individuals never engaging in HED, and individuals who were defined as hazardous drinkers due to their weekly consumption were excluded before analysing the frequency of HED in relation to PNC (Fig. 1). Of the 4559 responders included in the analyses, 22% were in the 18–30 years age group, 55% were aged 31–60 years, and 24% were aged 61 years or older. Of the responders, 53% were men. Responders were categorized into six groups based on frequency of HED; <1/month, 1/month, 2–3/month, 1/week, 2/week and almost daily.

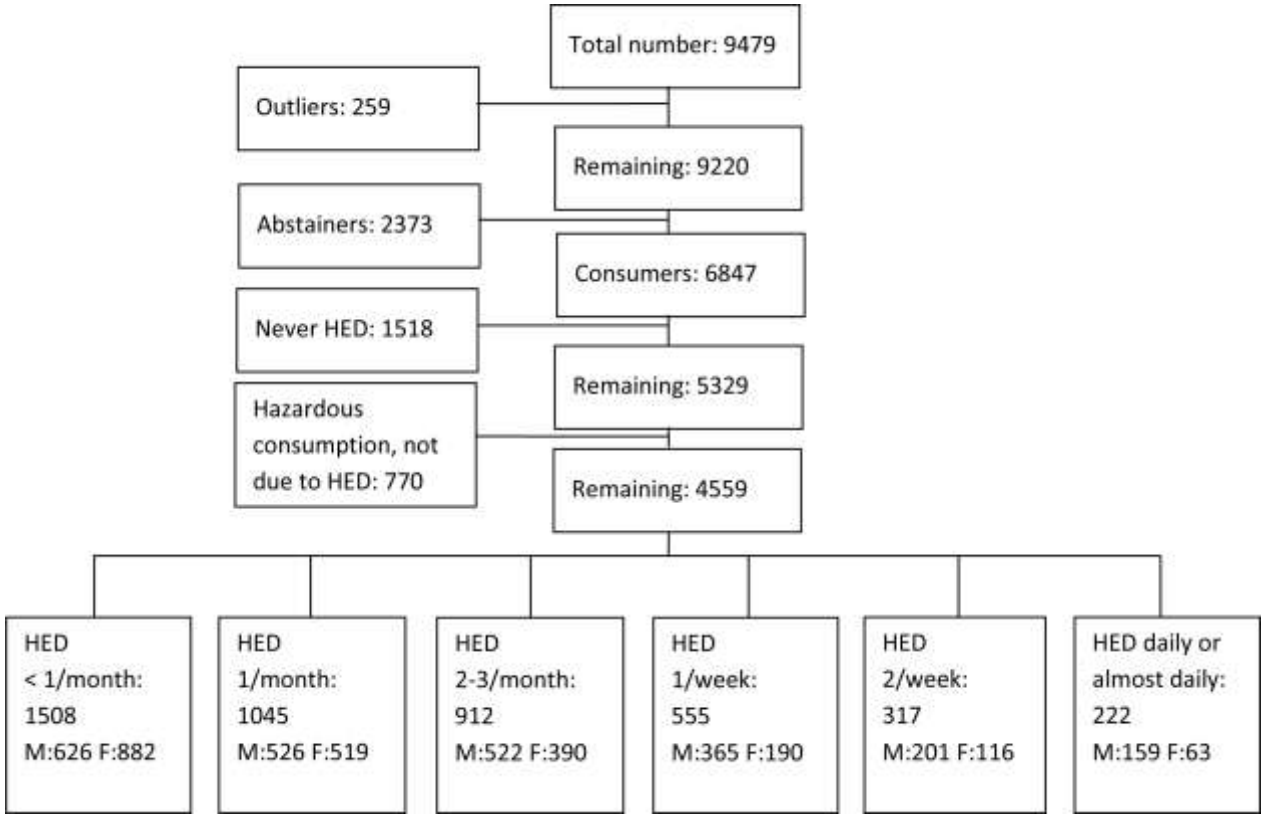

Fig. 1. Flow chart of participants in the study.

There were significant differences in age distribution within the HED categories, both among men and among women, as shown in Table 1. For example, the proportion of individuals aged 61 years or older was considerably higher than the mean among those who engage in HED once a week or more.

Risk ratios for PNC were calculated for each HED category, using HED <1/month as the reference (Table 2). Results are presented for men and women separately. Due to low numbers, no calculation could be done within each age group. Proportions of responders reporting PNC regarding each one of the five areas assessed are illustrated in Figs. 2 and 3.

For men, a significant increase in PNC was seen when the frequency of HED reached 2–3/month, regarding economy and injury risk; for women, HED 1/month resulted in a significant increase in PNC regarding health, relationships and economy. In general, PNC increased with increasing frequency of HED, except for injury risk among men. Men reported PNC more frequently than women.

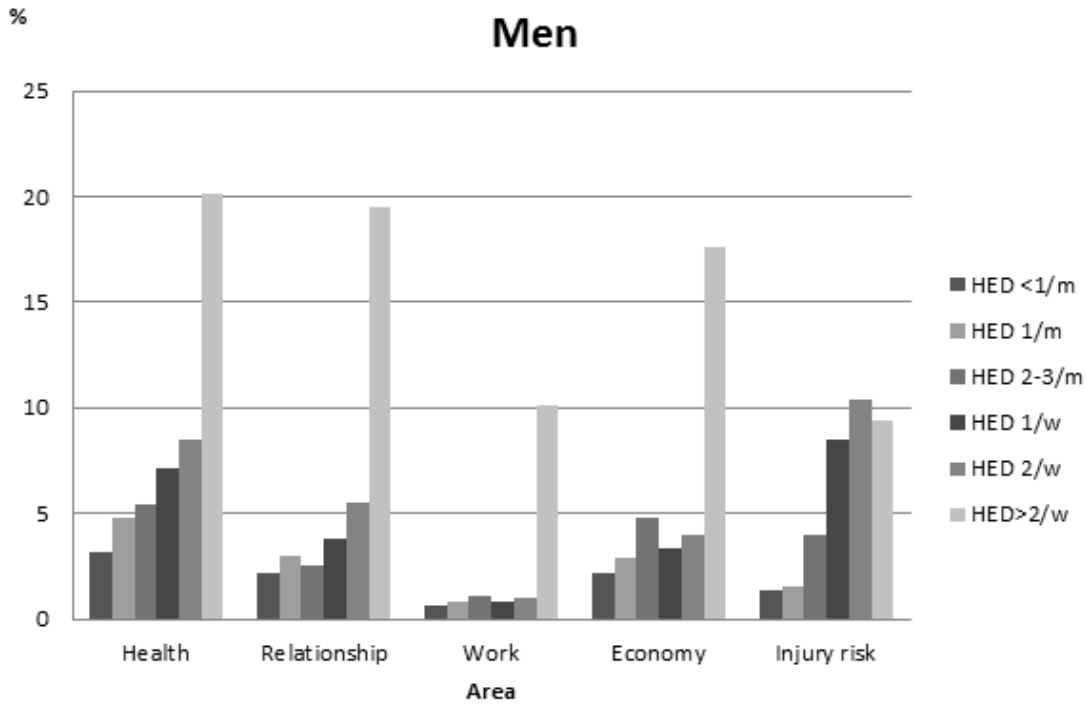

Fig. 2. Proportion of men who reported PNC regarding the five areas assessed, according to HED category.

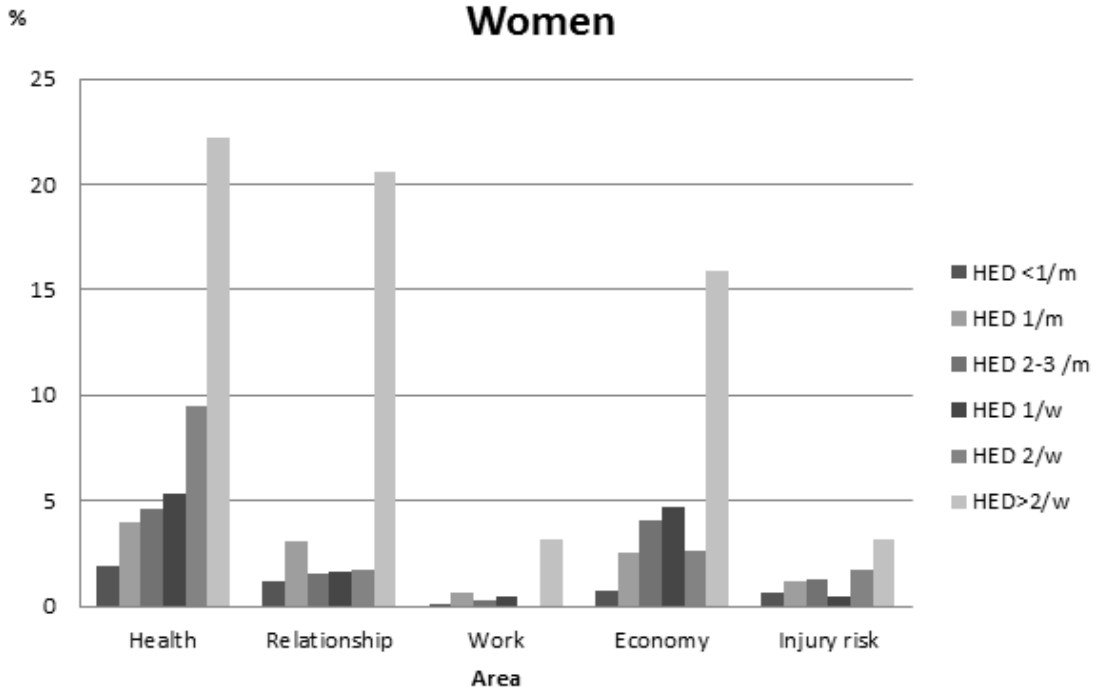

Fig. 3. Proportion of women who reported PNC regarding the five areas assessed, according to HED category.

DISCUSSION

The aim of this study was to describe PNCs related to frequency of HED. The most interesting result was that there are critical levels for some of the areas at HED 1/month for women and HED 2–3/month for men. Health, relationships and economy were the areas first affected among women, and economy and injury risk were the areas first affected among men.

In general, men reported more negative consequences of engaging in HED than women, and not surprisingly, more frequent HED rendered more PNC. When the frequency reached more than twice a week, a group that includes responders addicted to alcohol, significantly higher consequences were perceived in all areas among both men and women.

Consequences on health were the kind of PNC reported by the largest group of responders. It is well known that high alcohol intake is harmful to health, and this was supported by the self-reported experiences among patients frequently engaging in HED in this study. When Miller *et al*. (2007) studied HED among high school students, they found a strong relationship between the frequency of HED and the prevalence of other health risk behaviours, and Dawson *et al.* (2008) stresses that risk drinking through its association with smoking poses the threat of many types of harm. It is possible that other health risk behaviours were prevalent among the alcohol consumers in the present study, and that consequences on health were not only caused by alcohol consumption. Also among those engaging in HED less than once per month, 2–3% reported negative consequences on health. One explanation to this could be that perceived consequences on health have led to cutting down consumption in terms of frequency of HED. More men than women reported negative consequences on relationships due to HED, but among women, PNCs appeared at a lower frequency of HED (1/month compared with 2/week among men). One possible explanation for this could be that women are more sensitive regarding relationships than men. When frequency increased, a lower proportion of women reported PNC on relationships, which is surprising. The fact that those groups were relatively small could explain why no significant differences were found. Among both men and women who engaged in HED more than twice a week, almost 20% reported negative consequences on relationships. Findings supporting a causal relationship between alcohol consumption and marital problems, such as divorce, are scarce in epidemiological studies (Babor *et al*., 2010). It is known, however, that excessive drinking does have negative consequences for relationships with friends and other individuals in the

vicinity of the drinker, and friends may be lost due to violence caused by drinking (Pernam, 2001). Maffli (2001) distinguishes between three interacting and overlapping types of consequences for individuals close to problem drinkers: abusive (unacceptable behaviour), economic and social (may place the household in a precarious situation), and relational (sometimes with separation as an outcome).

PNCs on economy were reported by men and women almost equally, but women reported PNC at a lower frequency of HED (1/month) than men. Regarding economy, there was no linear pattern coinciding with frequency of HED. The self-reported data in this article, however, indicates that consumers are aware of the effects their alcohol consumption has on their economic situation. One of the negative consequences for individuals living close to problem drinkers mentioned by Maffli (2001) is a precarious economic situation. This is a problem especially in low-income countries, where alcohol consumption and tobacco use may affect people's economic ability to meet the basic needs of the family (De Silva *et al*., 2011). The effects that alcohol consumption has on financial situation and relationships are consequences not taken into account when risk levels and guidelines are provided, as these usually are based purely on individual harm.

For injury risk only, men reported PNC at a lower frequency of HED than women. Men also reported higher levels of PNC than women, and the proportion reporting PNC among men engaging in HED weekly is sixfold compared with men engaging in HED less than once a month. In a study performed at a Swedish emergency department, 10% of alcohol consumers acknowledged alcohol as a factor in their injury (Nilsen *et al*., 2007). Higher frequency of HED also was seen to increase reporting of alcohol as a causal factor in the injury (Nilsen *et al.*, 2007). In other studies, heavy drinking occasions have been found to be important contributors to acute consequences from alcohol consumption, such as injury or accidents (Babor *et al.*, 2010).

Higher proportions of PNC regarding injury risk were reported among women, with some exceptions, when the frequency of HED increased. However, in the group with the highest reported frequency of HED only 3% reported perceived injury risk. This could be because heavy drinking is less socially accepted among women than among men (Holmila and Raitasalo, 2005), which might lead to women preferring to drink at home to a greater extent, making them less vulnerable to injury. However, women are more likely than men to suffer physical harm or sexual assault when they are using alcohol (Nolen-Hoksema, 2004).

Regarding work, more PNCs were reported among men than among women, but the overall proportions were low, with 1% of men and 0.5% of women reporting PNC on work when engaging in HED twice a week or less, and no significant increase was seen until the frequency of HED reached more than twice a week. This could be due to drinking patterns in Sweden, and particularly regarding HED; alcohol consumers generally get drunk on Friday and Saturday nights, but stay sober when they have to go to work the day after. It is also possible that those reporting negative consequences on work are not the hazardous drinkers, but the addicted, people who are alcohol dependent and drink excessively also on week days. Heavy drinking occasions have been found to be related to work problems, and there is an association between alcohol consumption and a number of outcome variables at the workplace, although the direction of causality is not clear (Babor *et al*., 2010). In a study of short-term employment in the United States, seven drinks or more on an average drinking day increased the likelihood of not working, and for those who were working, reduced the number of weeks of employment (Booth and Feng, 2002). In the present study, almost 97% of women and 90% of men engaging in HED more than twice per week still report no PNC on work. It could be assumed that the consequences of HED do not affect their working situation because a high number of these do not work at all.

More frequent HED was related to more PNCs for all the areas assessed. Thus, it should not be controversial to inform patients about this in PHC, where screening and advice regarding alcohol consumption is an important task. However, there is also a need to give recommendations about what is hazardous and what is non-hazardous consumption. Recommendations regarding weekly consumption are not very controversial, but opinions on HED are diverging to a larger extent. Any information or recommendation provided by a health care worker has to be correct, but it also has to be perceived as relevant and trustworthy. It is true that, as stated in the Swedish recommendations, every occasion involving HED is hazardous and should be avoided (Andréasson and Allebeck, 2005). To categorize everyone involved in HED at any time as a hazardous alcohol consumer would not be feasible as a basis for advice given to patients. When Bendtsen *et al.* (2011) calculated hazardous drinkers from the same data set that was used in the present study, and chose HED once a month or more as a cut-off value for hazardous drinking, 40% were categorized as risky drinkers.

In a BI situation regarding alcohol consumption, a well-defined cut-off value for hazardous consumption due to HED would be of great value as a base for advice, and could increase the

health care staffs' confidence in and motivation to give alcohol advice. An important obstacle to giving alcohol advice is lack of skills and self-efficacy (Geirsson *et al.,* 2005), and the absence of well-grounded advice might lead to the topic being avoided. Patient compliance also might increase if the advice provided has a solid scientific base. However, there is also a scepticism among professionals about providing risk thresholds regarding alcohol consumption, both in terms of their questionable effect on behaviour, but also a possibility of reverse effects, with people consuming up to the level considered as safe (Rehm *et al*. 2008).

The present study confirms that increased frequency of HED is associated with increased PNC, and indicates that negative consequences appear even at low frequency of HED. These data could be of value in providing advice, but to give a clear indication of a cut-off value for categorizing PHC patients as hazardous alcohol consumers, further studies are needed. The authors believe that the data reported in the present article could be useful for the practitioner when discussing hazardous alcohol consumption with a patient, as it describes the PNCs not only on health but on other areas as well.

There are some weaknesses that should be taken into account when interpreting the results of the study. The study population consisted of individuals attending PHC who chose to perform the assessment, either spontaneously (64%) or after referral from a staff member (36%). In a former study 1.3% of all eligible patients were referred to the computer (Carlfjord *et al.,* 2010), which assumes that in the present study approximately 4% of the individuals attending the PHC performed the assessment. All data were self-reported and may have been influenced by social desirability, as responders tend to answer in a way that they perceive as desirable. This influence, however, should be lower when reporting is made using computer assessment than reporting in a face-to-face situation (Tourangeau and Smith, 1996). Another limitation that might have affected the results is that the group of patients attending PHC is a selected population, of higher age and with a higher proportion of morbidity than the average population. There were also some differences in age distribution between the different HED groups, which make the comparisons less reliable. The number of individuals in the HED groups decreased with increasing frequency of HED, and those engaging in HED more than once a week were few. This is a limitation that should be considered when interpreting the results. It also could explain why risk ratios in most of the areas were not significantly higher in these groups than in the reference group.

Conclusions from the study are that engaging in HED once a month for women and two to three times a month for men significantly increase the proportion of individuals reporting negative consequences, compared with those engaging in HED less than once a month. More frequently engaging in HED increases the proportion of patients perceiving negative consequences of their alcohol consumption. Further studies, including longitudinal assessments, are needed before recommending a cut-off value regarding frequency of HED. The authors believe, however, that despite the limitations in the present study, the results could be of value for practitioners when discussing alcohol habits with patients.

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Table 1. Age distribution among men and women in the six HED frequency groups

Age (years)	Frequency of HED, % (*n*)						
	<1/month	1/month	2-3/month	1/week	2/week	>2/week	Total
Men (p=0.000)							
18–30	18.5 (116)	23.8 (125)	25.1 (131)	13.7 (50)	5.5 (11)	13.8 (22)	19.0 (455)
31–60	56.9 (356)	52.1 (274)	48.3 (252)	47.4 (173)	54.7 (110)	43.4 (69)	51.4 (1234)
61 or older	24.6 (154)	24.1 (127)	26.6 (139)	38.9 (142)	39.8 (80)	42.8 (68)	29.6 (710)
Total	100 (626)	100 (526)	100 (522)	100 (365)	100 (201)	100 (159)	100 (2399)
Women (p=0.000)							
18–30	21.5 (190)	31.4 (163)	32.6 (127)	19.5 (37)	11.2 (13)	7.9 (5)	24.8 (535)
31–60	65.1 (574)	53.0 (275)	53.3 (208)	51.6 (98)	62.1 (72)	47.6 (30)	58.2 (1257)
61 or older	13.4 (118)	15.6 (81)	14.1 (55)	28.9 (55)	26.7 (31)	44.4 (28)	17.0 (368)
Total	100 (882)	100 (519)	100 (390)	100 (190)	100 (116)	100 (63)	100 (2160)

Table 2. PNC according to frequency of HED in terms of risk ratio for men and women

	Frequency of HED									
	<1/month[a]	1/month		2–3/month		1/week		2/week		>2/week	
Men, *n*	626	526		522		365		201		159	
	%	%	RR (CI)	%	RR (CI)	%	RR (CI)	%	RR (CI)	%	RR (CI)
Health	3.2	4.8	1.5 (0.8–2.6)	5.4	1.7 (1.0–3.0)	7,1	2.2[b] (1.3–3.9)	8.5	2.6[b] (1.4–5.0)	20.1	6.3[b] (3.7–10.7)
Relations	2.2	3.0	1.4 (0.7–2.8)	2.5	1.1 (0.5–2.3)	3.8	1.7 (0.8–3.6)	5.5	2.4[b] (1.1–5.3)	19.5	8.7[b] (4.8–16.0)
Work	0.6	0.8	1.2 (0.3–4.7)	1.1	1.8 (0.5–6.3)	0.8	1.3 (0.3–5.7)	1.0	1.6 (0.3–8.4)	10.1	15.8[b] (5.3–46.5)
Economy	2.2	2.9	1.3 (0.6–2.6)	4.8	2.1[b] (1.1–4.1)	3.3	1.5 (0.7–3.1)	4.0	1.8 (0.8–4.2)	17.6	7.9[b] (4.2–14.6)
Injury risk	1.4	1.5	1.1 (0.4–2.7)	4.0	2.8[b] (1.3–6.1)	8.5	5.9[b] (2.8–12.3)	10,4	7.3[b] (3.4–15.6)	9.4	6.6[b] (2.9–14.7)
Women, *n*	882	519		390		190		116		63	
	%	%	RR (CI)	%	RR (CI)	%	RR (CI)	%	RR (CI)	%	RR (CI)
Health	1.9	4.0	2.1[b] (1.1–3.9)	4.6	2.4[b] (1.2–4.6)	5.3	2.7[b] (1.3–5.9)	9.5	4.9[b] (2.4–10.2)	22.2	11.5[b] (6.0–22.3)
Relations	1.2	3.1	2.5[b] (1.2–5.3)	1.5	1.2 (0.5–3.3)	1.6	1.3 (0.4–4.5)	1.7	1.4 (0.3–6.2)	20.6	16.6[b] (7.7–35.4)
Work	0.1	0.6	5.1 (0.5–48.9)	0.3	2.3 (0.1–36.1)	0.5	4.6 (0.3–73.9)	0	–	3,2	28.0[b] (2.6–304.6)
Economy	0.7	2.5	3.7[b] (1.4–9.6)	4.1	6.0[b] (2.4–15.3)	4.7	7.0 (2.5–19.3)	2.6	3.8 (1.0–15.0)	15.9	23.3[b] (8.8–62.1)
Injury risk	0.6	1.2	2.0 (0.6–6.6)	1.3	2.3 (0.7–7.8)	0.5	0.9 (0.1–7.9)	1.7	3.0 (0.6–15.5)	3.2	5.6[b] (1.1–28.3)

CI, confidence interval; RR, risk ratio.
[a]Reference value=1.
[b]Significant at the 0.05 level.