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Alcohol's Harm to Others: Does the Drinking Location Matter?

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ABSTRACT

Background: In order to curb alcohol's harm to others, it is important to identify the contexts where people experience such harm. **Objectives:** To examine whether frequency of drinking in four different locations was associated with increased likelihood of experiencing harm from others' drinking. **Methods:** Data stem from surveys conducted in the five Nordic countries in 2015 ($N=7065$, aged 18–64 years) as part of the European Union's Joint Action on Reducing Alcohol Related Harm (RARHA). Three types of harm from others' drinking in the past 12 months were measured: verbally abused by, harmed physically by, and experienced a serious argument with someone who had been drinking. Respondents also reported frequency of drinking in their own home, in others' homes, in a pub/bar/club/restaurant, and outdoors the past 12 months. **Results:** Country-pooled adjusted analyses showed that higher frequency of drinking in pubs/bars/clubs/restaurants, outdoors and in someone else's home was associated with increased likelihood of experiencing all three harms. Frequent drinking in one's own home was weakly associated with experience of harm. Women, young individuals, respondents without tertiary level of education and individuals who reported drinking almost daily were at increased risk of experiencing harm from others' drinking. **Conclusions:** Frequent drinking on licensed premises and outdoors was most clearly associated with experiencing harm from others' drinking, suggesting that these are important arenas for preventive efforts. Women, young individuals, those with low educational level and the most frequent drinkers are important target groups for preventive efforts.

KEYWORDS

Alcohol; harm to others; locations; contexts; Nordic countries

Introduction

Alcohol use can be detrimental to health and cause social problems (Babor et al., 2010; Forouzanfar et al., 2016; Rehm et al., 2010). In addition to the documented negative consequences of alcohol use for the drinker, alcohol use can also harm people other than the drinker (Nutt et al., 2010; Van Amsterdam et al., 2010). Studies have shown that harm from others' drinking is commonly experienced in the Nordic countries and in other countries (Casswell et al., 2011; Huhtanen & Tigerstedt, 2012; Laslett et al., 2011; Lund et al., 2016; Mäkelä et al., 1999; Moan & Halkjelsvik, 2020; Moan et al., 2015, 2019; Rossow & Hauge, 2004; Storrøll et al., 2016). Because of alcohol's widespread impact on others than the drinker, the World Health Organization has recognized alcohol's harm to others as an important component of global strategies to reduce the harmful use of alcohol (World Health Organization, 2012). From a preventive perspective, it is important to identify the locations and contexts where people are particularly likely to experience harm from others' drinking.

Research on the role of drinking context in exposure to harm has mainly focused on harm to the drinker, not harm to others than the drinker (Kaplan et al., 2017). A few studies from the United States have examined the possible association between drinking context and alcohol's harm to others

(Fillmore, 1985; Kaplan et al., 2017; Nyaronga et al., 2009), suggesting that frequent drinking in bars and other public venues was associated with increased likelihood of experiencing harm from others' drinking. The Nordic countries have a long tradition of survey research on alcohol's harm to others, dating back to a comparative study from 1999 (Mäkelä et al. 1999) and a more recent study from 2015 where the prevalence and correlates of experience of harm from others' drinking in the Nordic countries were compared (Moan et al., 2015). Examples of harms addressed within this survey tradition are whether the respondents have been physically harmed by, been afraid of, or whether they have been verbally abused by people who had been drinking. However, the possible association between frequency of drinking in different locations and harm from others' drinking in the Nordic countries has yet to be examined.

With merged data from Denmark, Finland, Iceland, Norway and Sweden, the main objective of the current study was to examine whether frequency of drinking in four different locations was associated with increased risk of experiencing three specific consequences of others' drinking: been verbally abused by, harmed physically by and involved in a serious argument with someone who had been drinking.

Previous studies have found gender differences in the likelihood of experiencing harm from others' drinking (Huhtanen & Tigerstedt, 2012; Laslett et al., 2011; Moan

et al., 2015; Rossow & Hauge, 2004; Storvoll et al., 2016), differences between age groups (Laslett et al., 2011; Mäkelä et al., 1999; Moan et al., 2015; Rossow & Hauge, 2004; Storvoll et al., 2016), differences between people with different levels of education (Rossow & Hauge, 2004; Storvoll et al., 2016) and differences between respondents with different alcohol intake (Moan et al., 2015; Storvoll et al., 2016). Men generally drink more often than women (Brunborg & Østhus, 2015). Drinking, and drinking to intoxication, is more common among younger compared to older individuals (Ahlström & Österberg, 2004), and individuals with higher education drink more often than those without (Nordfjaern & Brunborg, 2015). Due to the expected association between the above-mentioned characteristics and both the dependent variable (experience of harm from others' drinking) and the independent variable (frequency of drinking in various locations), gender, age, and level of education were included in the analysis.

Methods

Participants and procedures

A Nordic research collaboration project entitled 'Alcohol, harm, inequality and the life-course' was established in 2016, also described in a study by Bloomfield and colleagues (Bloomfield et al., 2019). The main purpose of the project was to examine how and to what extent alcohol harms others than the drinker in the general population. Anonymized data from the European Union's Joint Action on Reducing Alcohol Related Harm (RARHA) were analyzed (Moskalewicz et al., 2016). The primary objective of RARHA was to obtain comparable baseline data for comparative assessment and monitoring of alcohol epidemiology across the European Union. The target population was 18–64 years, and surveys were conducted between 2015 and 2016 in a total of 19 European countries.

Surveys in the Nordic countries (Denmark, Finland, Iceland, Norway, and Sweden) were conducted in 2015. The goal was 1500 respondents aged 18–64 years from each country, except Iceland where a smaller sample was found sufficient. The countries differed somewhat with regard to how the samples were drawn. In Sweden, random samples of women and men were drawn from the population registry. In Finland, random samples were drawn from the telephone registry using quotas for gender, geographical location and three age groups. Residents of Åland, individuals with reservations against their telephone numbers being used for marketing research and individuals with prepaid mobile numbers were not included in the sample. In Denmark, a simple random sample was drawn from the Danish Civil Registration System. In Iceland, random sampling was used from two different sources; one half from the National Registry of Icelanders, the other half from a Gallup panel previously recruited from the national registry. In Norway, a simple random sample was drawn from a telephone database used by TNS Gallup, which includes over 70% of the population aged 20 or above, and 26% of the population aged 15–19 years.

There were differences in the mode of data collection. Computer assisted telephone interviewing (CATI) was used in Finland and Norway; in Iceland, questionnaires were completed on-line; in Sweden, a combination of paper and pencil questionnaires *via* postal mail and on-line questionnaires was used; in Denmark, a combination of CATI and on-line questionnaires was used.

There were also differences in response rates: Sweden 35.9%, Finland 11.5%, Denmark 52.5%, Iceland 47.7%, and Norway 12.0%. In Finland and Norway, the cooperation rates (number of respondents out of those who answered the telephone) were 29.8% and 35.0%, respectively. Details about the sampling procedures, modes of administration, data processing, and the full questionnaire have been described elsewhere (Moskalewicz et al., 2016). The surveys were completed by a total of 7065 participants aged between 18 and 64 years ($M=42.8$, $SD=13.6$), 52.9% were women, and 38.2% of the respondents had tertiary level of education.

Measures

Three types of *harm from others' drinking* were selected for this study, and they were measured as follows in the RARHA questionnaire: "In the past 12 months, because of someone else's drinking...": "...have you been verbally abused i.e. called names or otherwise insulted?", "...have you been harmed physically", and "...been involved in a serious argument". The response options were "Yes" (coded 1), "No" (coded 0), and "No answer" (coded missing).

Frequency of drinking in the past 12 months was measured by asking participants to indicate how often they drank any beverage containing alcohol. The response categories were "Almost daily", "Weekly", "Monthly", "Less frequently", and "Never".

Frequency of drinking in different locations in the past 12 months was assessed by four items: "How often did you drink..." "...in your own home", "...in somebody else's home", "...in a pub, bar, club, restaurant", and "...outdoors, that means in parks, in the street, etc." The response options were "Almost daily (5–7 days a week)", "Weekly (1–4 days a week)", "Monthly (1–3 days a month)", "Less frequently (1–11 days a year)", and "Never in the past 12 months".

The survey questions about gender, age, and level of education were also used in the analyses. In the questionnaire, respondents were asked to indicate their highest completed level of education. The response categories ranged from "Less than primary education" to "Doctoral or equivalent level". For the current study, level of education was dichotomized to "<Tertiary" (coded 0), which included respondents with less than bachelor's level of education and "Tertiary" (coded 1), which included respondents with at least a bachelor's degree. Country of residence was also used in the analysis.

Analyses

Inverse probability weights were calculated for each country separately. Population data from Eurostat was used to calculate the proportion of the population in six strata; three

age groups (18–24 years, 25–49 years, and 50–64 years) for each gender. Weights were determined by dividing the proportions in the population by the corresponding proportions in the RARHA data. All estimates were weighted to reduce the effect of sampling error.

Logistic regression models were used to estimate the change in likelihood of experiencing harm from others' drinking association with increased frequency of drinking, and increased frequency of drinking in four different locations. The three types of harm were modeled separately. Separate models were calculated for each of the drinking frequency variables, as including more than one of the drinking frequency variables in the same model would violate the assumption of no multicollinearity in logistic regression. The variables for drinking in someone else's home and drinking at a licensed premise were recoded to include the "almost daily" in the "weekly" category. For the drinking outdoors variable, "weekly" and "almost daily" were included in the "monthly" category. This recoding was performed because of low cell counts in the highest frequency categories. Gender, age, tertiary level of education, as well as country were adjusted for in the logistic regression models. Age was entered as a continuous variable. Gender, tertiary level of education and country were entered as dummy variables with female gender, lack of tertiary level of education, and Sweden as reference categories. Missing data was handled by list-wise deletion because none of the predictor variables included in the models had more than 5% missing values.

Results

Estimates for experiencing the three types of harm from others' drinking in the past 12 months are shown in Table 1. Being verbally abused and experiencing a serious argument because of someone else's drinking was much more common than being harmed physically.

Table 1. Proportion who reported experience of three specific types of harm from others' drinking during the past 12 months.

	N	% (95% CI)
Verbally abused	6672	15.5 (14.7, 16.5)
Serious argument	6885	9.5 (8.8, 10.2)
Harmed physically	6891	2.2 (1.9, 2.7)

Note: CI, confidence intervals. Weighted estimates.

Table 2. Self-reported harm from others' drinking regressed on demographic variables.

	Verbally abused	Harmed physically	Serious argument
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Gender (male)	0.75 (0.66, 0.87)***	1.18 (0.83, 1.67)	0.76 (0.64, 0.90)**
Age (10-year increments)	0.70 (0.66, 0.74)***	0.62 (0.55, 0.71)***	0.78 (0.73, 0.83)***
Tertiary level of education	0.71 (0.61, 0.82)***	0.41 (0.27, 0.63)***	0.74 (0.62, 0.89)**
Country			
Sweden	Reference	Reference	Reference
Finland	1.12 (0.92, 1.37)	1.12 (0.65, 1.94)	1.27 (0.99, 1.63)
Denmark	0.59 (0.47, 0.75)***	1.02 (0.58, 1.81)	1.07 (0.83, 1.40)
Iceland	0.97 (0.75, 1.26)	1.52 (0.77, 3.01)	1.11 (0.81, 1.54)
Norway	1.15 (0.94, 1.41)	2.23 (1.37, 3.65)**	1.39 (1.09, 1.79)**

Note: All variables included in each model. OR, odds ratio, CI, confidence interval. Weighted estimates. *** $p < .001$, ** $p < .01$, * $p < .05$.

Table 2 shows odds ratios for gender, age, level of education and country of residence for each type of harm. Women had higher odds of being verbally abused and experiencing a serious argument. Higher age was associated with lower odds of all the types of harm. Compared to Swedes, Danes had lower odds of being verbally abused, whereas Norwegians had higher odds of being harmed physically, and experiencing a serious argument.

Frequency distributions for drinking and drinking in specific locations are shown in Table 3. More than 90% reported drinking in the last year, and more than 40% reported drinking weekly or more often. More than one in four reported weekly drinking in their own home. Less than six percent reported weekly drinking at someone else's house, which was similar to the proportion who reported weekly at licensed premises. Few reported regular drinking outdoors: two out of three reported not doing so in the last 12 months.

Results from the logistic regression analysis is shown in Table 4. In separate models, being verbally abused, being harmed physically and experiencing a serious argument were regressed on drinking frequency and drinking frequency in specific locations. The estimates were adjusted for gender, age, level of education and country of residence.

Drinking almost daily (location unspecified) was associated with higher odds of being verbally abused and experiencing a serious argument. Less risk of experiencing harm from others' drinking was found among those who drank weekly or more seldom.

Drinking in one's own home was weakly related to experiencing harm from others' drinking. For instance, the risk was almost the same for those who drank at home almost daily as for those who did so only on a monthly basis. Weekly drinking at someone else's home was associated with greater likelihood of experiencing all three types of harm. Also, frequent drinking on licensed premises was associated with greater likelihood of being verbally abused, being harmed physically, and experiencing a serious argument. Finally, drinking outdoors at least monthly was associated with greater likelihood of experiencing all three types of harm.

Discussion

Previous studies have found that higher frequency of drinking in certain contexts is associated with more harm to the drinker him- or herself (e.g. Carey, 1995; Stockwell et al., 1993). The results from the current study indicate that this

Table 3. Distributions of drinking frequency and drinking in specific locations past 12 months, % (95% confidence intervals).

Frequency of drinking...	Not in the past 12 months	Less frequently	Monthly	Weekly	Almost daily
... in general	9.8 (9.1, 10.5)	19.1 (18.2, 20.1)	29.5 (28.4, 30.6)	37.0 (35.9, 38.2)	4.6 (4.1, 5.1)
... in own home	17.5 (16.6, 18.4)	29.9 (28.8, 31.0)	24.7 (23.7, 25.8)	25.0 (24.0, 26.1)	2.9 (2.5, 3.3)
... in someone else's home	20.2 (19.3, 21.2)	46.4 (45.2, 47.6)	27.7 (26.6, 28.8)	5.6 (5.1, 6.2)	0.1 (0.1, 0.3)
... in a pub, bar, club, or restaurant	24.8 (23.8, 25.8)	50.9 (49.7, 52.8)	19.1 (18.2, 20.1)	5.1 (4.6, 5.7)	0.1 (0.1, 0.2)
... outdoors	66.8 (65.6, 67.9)	28.9 (26.8, 29.0)	4.4 (3.9, 5.0)	0.9 (0.7, 1.1)	0.1 (0.0, 0.2)

Note: Weighted estimates. $N=6785-7029$.

Table 4. Self-reported harm from others' drinking regressed on frequency of own drinking, and frequency of drinking in four different locations.

Predictor variable (range)	Verbally abused AOR (95% CI)	Harmed physically AOR (95% CI)	Serious argument AOR (95% CI)
Frequency of drinking:			
Not in past 12 months	Reference	Reference	Reference
Less frequently	0.78 (0.58, 1.04)	1.08 (0.53, 2.19)	1.15 (0.81, 1.62)
Monthly	1.18 (0.90, 1.54)	1.09 (0.56, 2.14)	1.08 (0.78, 1.51)
Weekly	1.21 (0.93, 1.57)	1.47 (0.76, 2.84)	1.33 (0.96, 1.85)
Almost daily	1.91 (1.28, 2.84)**	1.82 (0.67, 4.92)	1.99 (1.23, 3.21)**
Frequency of drinking in own home:			
Not in past 12 months	Reference	Reference	Reference
Less frequently	0.91 (0.74, 1.13)	0.78 (0.46, 1.32)	1.03 (0.79, 1.34)
Monthly	1.11 (0.89, 1.38)	1.29 (0.77, 2.16)	1.29 (0.98, 1.69)
Weekly	1.06 (0.84, 1.33)	1.10 (0.63, 1.94)	1.18 (0.89, 1.57)
Almost daily	1.13 (0.69, 1.84)	1.10 (0.31, 3.96)	1.28 (0.73, 2.24)
Frequency of drinking in someone else's home:			
Not in past 12 months	Reference	Reference	Reference
Less frequently	1.02 (0.84, 1.24)	0.86 (0.51, 1.44)	1.00 (0.79, 1.26)
Monthly	1.29 (1.04, 1.60)*	1.31 (0.79, 2.18)	1.16 (0.91, 1.51)
Weekly	1.74 (1.27, 2.37)**	2.52 (1.37, 4.63)**	1.90 (1.34, 2.69)***
Frequency of drinking in a pub, bar, club, or restaurant:			
Not in past 12 months	Reference	Reference	Reference
Less frequently	1.09 (0.91, 1.32)	0.90 (0.55, 1.46)	0.98 (0.78, 1.23)
Monthly	1.77 (1.42, 2.19)***	1.38 (0.83, 2.30)	1.54 (1.19, 2.00)**
Weekly	2.31 (1.71, 3.11)***	4.01 (2.33, 6.90)***	3.00 (2.14, 4.19)***
Frequency of drinking outdoors:			
Not in past 12 months	Reference	Reference	Reference
Less frequently	1.34 (1.14, 1.58)***	1.15 (0.77, 1.72)	1.18 (0.97, 1.43)
Monthly	2.39 (1.80, 3.17)***	2.99 (1.79, 4.97)***	2.64 (1.93, 3.60)***

Note: AOR=Odds ratios adjusted for gender, age, level of education and country of residence. Weighted estimates. *** $p < .001$, ** $p < .01$, * $p < .05$. $N=6410-6789$.

is also the case with experiencing harm from others' drinking. We found that higher frequency of drinking in public drinking venues such as pubs and clubs was associated with greater risk of experiencing all three harms assessed, i.e. been verbally abused by, harmed physically by, and involved in a serious argument with someone who had been drinking.

These findings are in line with previous research from the United States in that respondents who reported frequent drinking in bars were more at risk of being verbally abused and physically assaulted by someone who had been drinking (Fillmore, 1985; Kaplan et al., 2017; Nyaronga et al., 2009). Relatedly, a Norwegian study showed that frequency of visits to public drinking places was associated with greater risk of being injured by an intoxicated person (Rossow, 1996). Compared with frequent drinking in one's own home, frequent visits to public drinking venues implies increasing the exposure to – and interaction with – people who are intoxicated, and often in noisy, crowded and dark locations. All of these factors are associated with an increased likelihood of alcohol-related harm (Green & Plant, 2007). While a previous study examined the prevalence of harm from others' drinking in three different locations (Storvoll et al.,

2016), the current study extends on previous findings by showing that frequency of drinking in someone else's home and drinking outdoors were associated with increased risk of harm from others' drinking, albeit to a somewhat lesser degree than frequency of drinking in licensed premises. Outdoor locations and private homes are less regulated drinking locations than pubs and clubs. However, because of a greater density of intoxicated people in public drinking venues in addition to the above-mentioned factors (noise, darkness), it seems reasonable that frequency of drinking in licensed premises is associated with a somewhat greater risk of being harmed by others' drinking.

The overall aim of this study was to estimate the association between the frequency of drinking in different locations and the likelihood of experiencing harm from others' drinking. However, we chose to control for a number of putative confounding variables due to their documented association with both the outcomes and the predictor variables. The gender differences found in the present study, i.e. that women reported experiencing more harm from others' drinking than men, correspond with the findings in previous studies (Huhtanen & Tigerstedt, 2012; Laslett et al., 2011; Moan

et al., 2015; Rossow & Hauge, 2004). Some possible explanations have been offered for the gender differences in the prevalence of harm from others' drinking (Huhtanen & Tigerstedt, 2012). First, men drink more than women (Ahlström & Österberg, 2004; Wilsnack et al., 2009), thus possibly resulting in a corresponding larger share of harm that affect women. Second, women's perception of harm caused by others' drinking is more serious than men's perception (Huhtanen & Tigerstedt, 2012). Moreover, the finding that young individuals report more such harm than older individuals is also in line with those from previous studies (Laslett et al., 2011; Mäkelä et al., 1999; Moan et al., 2015; Rossow & Hauge, 2004; Storrø et al., 2016). Young individuals visit public drinking venues more often than older individuals and are consequently more exposed to situations that may cause harm. Additionally, the declining trend in youth drinking observed in the Nordic countries since the millennium shift (Pape et al., 2018) may have resulted in more restrictive attitudes among young individuals and therefore a lower threshold of reporting harm from others' drinking (Scheffels et al., 2019; Simonen et al., 2019). While one previous study found that those with higher educational level experienced more harm from others' drinking (Rossow & Hauge, 2004), a more recent study showed that those with low educational level experienced more of such harm (Storrø et al., 2016). The current study supports the latter. Low level of education was associated with a greater likelihood of experiencing all three harms (verbally abused, harmed physically, and serious argument). Finally, the respondents who reported drinking most frequently, i.e. almost daily, were at increased risk of being verbally abused by and having been in a serious argument with someone who had been drinking. This corresponds with findings from previous studies (Laslett et al., 2011; Moan et al., 2015; Storrø et al., 2016). Alcohol is often consumed with others (Bye et al., 2013; Stanesby et al., 2019), suggesting that people who drink frequently have greater exposure to situations that may cause harm. In addition, a person impaired by alcohol might be more vulnerable than someone who is sober; for example, it has been found that sexual assault often occurs when the victim is intoxicated (Grubb & Turner, 2012). Finally, a large body of literature provides empirical support for an association between alcohol use and aggressive behaviors (Bye & Rossow, 2008), implying that the most frequent drinkers also may provoke others to cause harm.

Methodological considerations

A strength of this study is the use of data from national surveys conducted in all the Nordic countries during the same time period, and that it contains measures of four different drinking locations, and three different harms from others' drinking. However, some limitations warrant attention. First, although the study was designed to be comparative across the included countries, it was conducted somewhat differently in the countries included in this article. The questions were translated from English to five Scandinavian languages by local researchers. This might have resulted in different wording

and interpretations of the questions. Moreover, the methods for data collection differed between the countries (e.g. face-to-face interviews, telephone interviews, self-administrated postal and Web questionnaires). Previous studies suggest that the level of self-reported harm from others' drinking may be higher in surveys using telephone interviews than in studies using self-administrated postal or Web questionnaires (Johnson, 2014; Sundin et al., 2018). Response rates also varied between surveys (Moskalewicz et al., 2016). To minimize the effects of such methodological differences, country was included in the regression analysis.

Secondly, the prevalence of experience of harm from others' alcohol use is probably underestimated in this study because the most frequent drinkers, who also may be more harmed by others' drinking, are less likely to participate in surveys (Johnson, 2014). However, it is difficult to determine whether, and if how, this may have affected the association between frequency of drinking in different locations and experience of harm from others' drinking. Thirdly, although the present study extends previous research by including more drinking locations, further knowledge is needed about the possible association between these drinking contexts and other harms from others' drinking.

Conclusion

The current study showed that frequent drinking on licensed premises and outdoors is associated with a greater likelihood of experiencing harm from others' drinking. Women, young people, those without tertiary level of education and the most frequent drinkers were more likely to experience harm from others' drinking.

These findings have implications for preventive efforts with an aim to reduce harm from others' drinking. According to this study, the potential to reduce such harm is greater if future interventions focus on drinking locations such as pubs and clubs, and outdoor contexts such as parks. One approach could be to prevent individuals from frequent drinking on licensed premises. Another approach could be to reduce the risk of harm by better enforcement and regulation at licensed drinking establishments. For example, by reducing over-serving of intoxicated customers (Buvik & Rossow, 2015; Green & Plant, 2007), there is also the potential to reduce alcohol's harm to others. The result from this study suggest that preventive efforts should have a particular focus on women, young individuals, respondents without tertiary level of education and the most frequent drinkers.

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Declaration of interest

The authors report no conflicts of interest.

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