Int J Public Health (2017) 62:669–678
DOI 10.1007/s00038-016-0924-7

ORIGINAL ARTICLE

The effects of alcohol-related harms to others on self-perceived mental well-being in a Canadian sample

Candace Lewis-Laietmark · Ashley Wettlaufer · Kevin D. Shield · Norman Giesbrecht · Nicole April · Mark Asbridge · Colleen Dell · Jürgen Rehm · Tim Stockwell

Received: 7 August 2015 / Revised: 21 September 2016 / Accepted: 13 November 2016 / Published online: 29 November 2016

Abstract

Objectives To examine (1) the harms related to the drinking of others in five Canadian provinces, stratified by socio-demographic variables, and (2) the relationship between these harms and mental well-being.

Methods A telephone survey sampled 375 adults from British Columbia, Saskatchewan, Ontario, Quebec, and Nova Scotia. Harms related to the drinking of others were measured through 16 questions in the domains of psychological, physical, social, and financial harms. Self-perceived mental well-being was measured with his or her mental well-being.

Results In 2012, 40.1% of Canadian adults surveyed experienced harm in the previous year related to the drinking of another person. These harms were more frequent among people who had a higher education level, were widowed, separated, divorced or never married, and were employed. Psychological, physical, and financial harms related to the drinking of others were significantly correlated to a person's mental well-being.

Conclusions Harms related to the drinking of others are prevalent in this Canadian survey. Furthermore, the

Electronic supplementary material The online version of this article (doi:10.1007/s00038-016-0924-7) contains supplementary material, which is available to authorized users.

C. Lewis-Laietmark
School of Community Health, Portland State University, Portland, OR, USA
e-mail: Candace.LewisLaietma@camh.ca

C. Lewis-Laietmark · A. Wettlaufer · K. D. Shield · N. Giesbrecht (✉) · J. Rehm
Institute for Mental Health Policy Research, Centre for Addiction and Mental Health (CAMH), Toronto, ON M5S2S1, Canada
e-mail: norman.giesbrecht@camh.ca

A. Wettlaufer
e-mail: Ashley.Wettlaufer@camh.ca

K. D. Shield
e-mail: Kevin.david.shield@gmail.com

J. Rehm
e-mail: Jtrehm@gmail.com

K. D. Shield · J. Rehm
Institute of Medical Science, University of Toronto, Toronto, ON, Canada

N. Giesbrecht · J. Rehm
Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada

N. April
Institut national de santé publique du Québec, Québec City, QC, Canada
e-mail: Nicole.april@inspq.qc.ca

M. Asbridge
Department of Community Health and Epidemiology and Department of Emergency Medicine, Dalhousie University, Halifax, NS, Canada
e-mail: Mark.asbridge@dal.ca

C. Dell
University of Saskatchewan, Saskatoon, SK, Canada
e-mail: Colleen.dell@usask.ca

J. Rehm
Institute of Clinical Psychology and Psychotherapy, Technische Universität Dresden, Dresden, Germany

T. Stockwell
Centre for Addictions Research of BC, University of Victoria, Victoria, BC, Canada
e-mail: Timstock@uvic.ca

psychological, physical, and financial harms related to the drinking of others negatively impact the mental well-being of the affected individuals.

Keywords Alcohol · Harm to others · Mental well-being · Canada · Survey

Introduction

The harmful use of alcohol causes substantial health (Lim et al. 2012; World Health Organization 2014), social (Rehm et al. 1996) and economic burdens (Baumberg 2006; Rehm et al. 2009) globally and within Canada (Rehm et al. 2007, 2008; Shield et al. 2012; Single et al. 1998). In 2013, alcohol was the sixth leading risk factor for the burden of disease globally and in Canada (Forouzanfar et al. 2015), and is hypothesized to be responsible for the most harmful second-hand effects to others when compared to all other drugs (Nutt et al. 2010). Furthermore, of the total social and economic burdens caused by alcohol consumption, which typically amount to more than 1% of total gross domestic product (Casswell and Thamarangsi 2009), approximately one-half is attributable to the alcohol consumption of others (Laslett et al. 2011). However, in the past, research on alcohol's harms to others has been limited primarily to Fetal Alcohol Spectrum Disorder (FASD), drink-driving and intimate partner violence. Moreover, the Global Burden of Disease studies do not include the range of harms caused to others from alcohol, except for FASD and alcohol-related crashes and fatalities (Laslett et al. 2011; Rehm and Room 2006). The second-hand effects of drinking are more far-reaching, and include sexual and physical assault, public nuisance, physical injury, and harassment (Giesbrecht et al. 2010; Laslett et al. 2011; Rossow and Hauge 2004).

The importance of alcohol-related harms caused to people other than the drinker has historically been overlooked (Giesbrecht et al. 2010; Laslett et al. 2011), and only recently has garnered increased international attention (Casswell and Thamarangsi 2009; Giesbrecht et al. 2010; Greenfield et al. 2009; Laslett et al. 2010, 2011; Prime Minister's Strategy Unit 2004; World Health Organization Regional Office for Europe 2009). Reducing harms to others caused by someone else's drinking is a key recommendation of the World Health Organization's (WHO's) *Global strategy to reduce the harmful use of alcohol* (World Health Organization Regional Office for Europe 2009). To date, limited research has examined alcohol-related harms to others in Canada, with only two previous studies describing the effects of drinking on others, and, specifically, on the limited outcomes of being physically and verbally assaulted, feeling threatened or humiliated, being emotionally hurt or neglected, and experiencing family or marriage problems (Kellner 2005; Schrans et al. 2008; Ialomiteanu and Adlaf 2007; Giesbrecht et al. 2010; Health Canada 2009). These earlier examinations of harms to others do not measure the extent of the harms related to the drinking of others examined in more recent studies (Laslett et al. 2011).

Effect of the drinking of others on mental well-being

The impact of risk factors, such as alcohol consumption, on mental well-being (a measure of mental health) is often overlooked except for the development of a mental and behavioural disorder (Lim et al. 2012; World Health Organization 2014). This is especially important where a person may have decreased mental health (Kessler et al. 2003) but does not meet the thresholds for a mental and behavioural disorder diagnosis (Furukawa et al. 2003). The impact of the harmful consumption of alcohol on the mental well-being of the drinker—excluding its impact on the development of mental and behavioural disorders—is somewhat understood (Balogun et al. 2014; Foulds et al. 2013). However, the impact of the harms caused by the drinking of others on mental well-being is not well understood, with only one previous study on the subject (Ferris et al. 2011). Nevertheless, this study did not examine the effect of the typology of harm on mental well-being. The specific types of harms caused by the drinking of others [namely, psychological, physical, social, and financial harms (Laslett et al. 2011)] are related to other measures of mental health, such as non-specific psychological distress (Aneshensel 1992; Tessler and Mechanic 1978; Kessler et al. 2002; Weaver and Clum 1995). Therefore, a study that examines the association between mental well-being and the harms related to the drinking of others (differentiated by types of harm) is imperative.

Present study

The observed prevalence of alcohol consumption in Canada and the preventable social and economic costs associated with drinking remain high. However, the nature and extent of the problem of the second-hand effects of drinking are largely unknown, which has meant that the collateral damages associated with alcohol consumption have been absent from the alcohol policy agenda (Gomes 2008; Thomas et al. 2006). As such, the objective of this study is to understand the types and extent of harms related to the drinking of others and the impact of these harms on mental well-being. The study findings will help researchers, policymakers, citizens, and advocates to broaden their understanding of alcohol-related harms to people other

than the drinker, and will better inform policies and practices around alcohol use in Canada.

Methods

Canadian alcohol-related harms to others survey

The Canadian 2012 alcohol-related harms to others survey employed a computer-assisted telephone survey (both landline and cell phone) of Canadian adults (18 years of age and older) across five provinces, namely British Columbia, Saskatchewan, Ontario, Quebec, and Nova Scotia, from June 19, 2012 to July 22, 2012. These provinces were included in the survey based on their ability to provide a representative sample of the various regions of Canada, including the West Coast, the Prairies, Central Canada, the Francophone population, and the Atlantic provinces. The landline and cell phone sampling frames were obtained from the ASDE Survey Sampler. For landline records, the ASDE Survey Sampler uses a geographically stratified, general phone population random sampling program. Samples are obtained using a Random Digit Dialing (RDD) methodology, and samples are checked against published phone lists to divide the RDD frame into "directory listed" and "directory not listed" components. The sampling frame for cell phone numbers was created using randomly generated numbers as well as known cell phone prefixes, as there are no published lists of cell phone numbers in Canada.

For each landline, an adult respondent was selected based on who in the household had the next birthday. Cell phone respondents were treated as a single-person household. Potential participants were informed of the survey topic as part of the informed consent process. The survey was conducted in both French and English.

Persons who were 17 years of age or younger, who were unable to provide consent, or who spoke neither English nor French were ineligible for the survey. Not-in-service, fax, and non-residence numbers were excluded from all response rate calculations. Population expansion weights were created using census data by age and sex to minimize the potential effects of non-response bias. The study protocol was approved by the Research Ethics Board of the Centre for Addiction and Mental Health.

Measures

The Canadian 2012 alcohol-related harms to others survey collected information on a diverse set of socio-demographic variables, including province of residence, age, gender, highest education attainment, marital status, occupational status, and household income. Self-perceived mental well-being was measured based on a person's indicated "how satisfied" they were with their "mental well-being" on a scale of 0 (completely unsatisfied) to 10 (completely satisfied) (with 5 representing being "neutral—neither satisfied nor dissatisfied"). No additional information was provided to participants on how to assess their mental well-being. Self-perceived mental well-being was asked after socio-demographic characteristics, but before questions concerning alcohol-related harms. In addition to socio-demographic variables and mental well-being, the survey collected information on the harms experienced by participants that were related to the drinking of others.

Participants were asked to think about the heavy drinkers they had contact with over the past 12 months and then asked if they had experienced any harm from each of the heavy drinkers they identified. Participants were then asked to report on the specific harms they experienced from all of the heavy drinkers who had affected them negatively in the past 12 months. Harms related to the drinking of others were classified into four groups and were based on the harms experienced from the drinking of family, friends, co-workers or others in a person's life whom they would consider a fairly heavy drinker. The first group of harms related to the drinking of others were psychological harms, which were measured though the following questions: "How many times in the last 12 months, because of the [drinking of a heavy drinker]": "Did you have a serious argument?," "Did you feel threatened?," "Were you emotionally hurt or neglected?." The second group of harms related to the drinking of others were physical harms, which were measured through the following questions: "How many times in the last 12 months, because of the [drinking of a heavy drinker]": "Were you physically hurt?," "Were you put at risk in the car?," "Were you injured in a car accident?," "Were you forced or pressured into sex or something sexual?." The third group of harms related to the drinking of others were social harms, which were measured through the following questions: "Did the drinking of any of these people negatively affect a social occasion you were at?," "Did any [heavy drinker] fail to do something they were being counted on to do because of their drinking?," "Did someone in your household not do their share of work around the house because of their drinking?," "Have you gone without seeing friends or family as much because you are embarrassed about someone in your household's drinking?." The fourth group of harms related to the drinking of others were financial harms, which were measured through the following questions: "Have you gone without food because of someone in your household's drinking,?" "Did any of the people you mentioned break or damage something that mattered to you because of their

drinking?," "Did any of these people take money or valuables that were yours because of their drinking?," "Did you have to leave home to stay somewhere else because of someone in your household's drinking?," "Was there less money for household expenses because of someone in your household using the money for drinking or while they were drinking?." All harms were measured in relation to a heavy drinker (indicated by a person stating that they know a person "who is a fairly heavy drinker, or someone who drinks a lot sometimes.").

Statistical analyses

Statistical analyses were performed using the statistical software package R version 3.2.0 (R Core Team 2015), and the R software package 'survey' (Lumley 2004) to account for the survey design. Quasi-Poisson regression was used to assess the correlation between self-reported mental well-being and physical, social, psychological, and financial harms.

Results

A total of 384 participants either completed ($n = 375$) or partially completed ($n = 9$) the telephone interview. Cell phone records comprised 6.1% of the completed interviews, whereas 93.9% (352) of participants completed the interview on their landline at home; the overall response rate was 11.9% (based on a 17.4% cooperation rate and an estimated contact rate of 68.2% of all eligible numbers; see Table A1 and Figure A1 in the web appendix). Full data on all socio-demographic, mental well-being, and harm variables were available for 302 participants (the number of observations available for analysis differed by the specific harm examined). Table A2 outlines the demographic characteristics of the participants as compared to the general population.

Harms related to the drinking of others

In 2012, 40.1% of those in the sample of Canadian adults experienced one or more harms in the previous year related to the drinking of another person (Table 1). The most frequent types of second-hand harms experienced by the participants were having someone negatively affect them socially (34.8%), being psychologically harmed by someone under the influence of alcohol (26.6%), being financially harmed by someone under the influence of alcohol (8.3%), and being emotionally hurt or neglected (7.0%). Table 1 outlines the prevalence of experiencing harms related to the drinking of another person, differentiated by the type of harm.

Socio-demographic factors and harms related to the drinking of others

When compared to adult women, adult men had a non-significantly higher prevalence of harms related to the drinking of others; 47.6% of adult men experienced harms

Table 1 Prevalence and average number of harms related to the alcohol consumption of others in Canada in 2012

Variable	Women		Men		Total	
	Point estimate	95% Confidence interval	Point estimate	95% Confidence interval	Point estimate	95% Confidence interval
Psychological ($n = 314$)						
Yes	26.5%	(14.9%, 38.2%)	26.7%	(14.5%, 38.9%)	26.6%	(18.2%, 35.1%)
Number of harms (0–3)	0.45	(0.23, 0.67)	0.41	(0.22, 0.59)	0.43	(0.29, 0.57)
Physical harms ($n = 317$)						
Yes	4.1%	(0.0%, 10.1%)	9.5%	(0.0%, 19.3%)	7.0%	(1.1%, 12.9%)
Number of harms (0–4)	0.05	(0.00, 0.11)	0.10	(0.00, 0.19)	0.07	(0.01, 0.13)
Social harms ($n = 303$)						
Yes	28.3%	(16.3%, 40.3%)	40.6%	(26.5%, 54.6%)	34.8%	(25.5%, 44.1%)
Number of harms (0–4)	0.64	(0.29, 0.98)	0.69	(0.41, 0.97)	0.67	(0.45, 0.88)
Financial harms ($n = 307$)						
Yes	6.2%	(2.1%, 10.3%)	10.2%	(2.2%, 18.1%)	8.3%	(3.7%, 12.9%)
Number of harms (0–5)	0.09	(0.02, 0.15)	0.11	(0.02, 0.20)	0.10	(0.05, 0.16)
Total harms ($n = 302$)						
At least one harm	31.7%	(19.7%, 43.6%)	47.6%	(33.7%, 61.4%)	40.1%	(30.8%, 49.4%)
Number of harm categories (0–4)	0.66	(0.38, 0.93)	1.23	(0.77, 1.69)	0.72	(0.54, 0.91)
Total number of sub-harms (0–16)	1.23	(0.63, 1.83)	0.79	(0.53, 1.04)	1.23	(0.86, 1.60)

related to the drinking of others in the previous year, and 31.7% of adult women experienced harms related to the drinking of others in the previous year. Furthermore, those who experienced at least one harm related to the drinking of another person in the previous year were likely to have a higher education ($p = 0.006$), were more likely to be employed ($p < 0.001$) and were less likely to be widowed, separated or divorced ($p = 0.029$). A significant difference was observed across provinces in the prevalence of experiencing at least one harm related to the drinking of others, with Quebec having the lowest prevalence of people experiencing at least one harm related to the drinking of others ($p = 0.004$) (except Saskatchewan where the difference was not statistically significant). Age and household income were not significantly correlated with experiencing at least one harm in the previous year. See Table 2 for prevalence by socio-demographic factors in the studied provinces.

Association between mental well-being and experiencing harms related to the drinking of others

The average score of self-perceived mental well-being was 8.35 [95% confidence interval (CI): 8.10–8.61] (see Table 2), with people who experienced a harm related to the drinking of another person having a self-perceived mental well-being score of 8.28 (95% CI: 7.91–8.65) and those who did not experience a harm related to the drinking of another person having a self-perceived mental well-being score of 8.40 (95% CI: 8.06–8.75).

A person's self-perceived mental well-being was not significantly correlated with the presence of a harm related to the drinking of another person when examined using a Quasi-Poisson regression model. Despite this finding of there not being a correlation, when the association was statistically evaluated using a regression model, self-perceived mental well-being was significantly correlated with the number of types of physical harms ($p = 0.005$) and the number of types of financial harms ($p = 0.008$) related to the drinking of another person. For these associations, people who had a higher self-perceived mental well-being score were more likely to have experienced fewer physical harms and fewer financial harms related to the drinking of another person. A person's self-perceived mental well-being was also significantly associated with the presence of a psychological harm ($p = 0.010$) and the presence of a physical harm ($p = 0.038$). All associations were examined controlling for gender, age, province, education, marital status, income, and occupational status (see Table 3 for information on all regression models).

Discussion

Strengths

As is the case with the magnitude of harms caused to the drinker in Canada (Rehm et al. 2007, 2008; Shield et al. 2012; Single et al. 1998), this study observed that the harms related to the alcohol consumption of others were commonly reported in this Canadian sample, with 40.1% of adults having experienced at least one harm related to the drinking of others in the previous 12 months. Additionally, we observed that the presence of a harm related to the drinking of others was significantly associated with the province of residence [although not likely to be associated with urban/rural affiliation (Qi et al. 2006)], the attained level of education, marital status, and employment status. These associations between experiencing a harm related to the drinking of another and the socio-demographic characteristics of the respondent may be mediated through an increased likelihood of having a heavy drinker in one's life, and/or coming into contact with strangers who are intoxicated (Seid et al. 2015). Furthermore, this study observed that the psychological, physical, and financial harms related to the alcohol consumption of others were significantly correlated to a person's self-perceived mental well-being. These observations should help to increase our understanding of which geographic and demographic populations are at risk in Canada for harms due to the drinking of another person.

Given the findings concerning the frequency of harms related to the drinking of others and the effect of these harms on self-perceived mental well-being, the findings of previous studies on the harms caused by alcohol consumption to the drinker (Rehm et al. 2007, 2008; Shield et al. 2012; Single et al. 1998), and the WHO's recommendation that governments should minimize the social harms caused by drinking (World Health Organization Regional Office for Europe 2009), there is a need to consider the harms caused by the drinking of others when deciding to implement cost-effective policies and interventions to reduce alcohol-related harms in Canada as well as in countries with a similar drinking and harm profile [such as the United States and Western European countries (World Health Organization 2014)]. Such interventions and policies include increases in price and/or taxation, decreases in outlet density, increases in the minimum legal age to purchase and consume alcohol, and evidence-based server intervention strategies (Anderson et al. 2009; Rehm et al. 2008; Babor et al. 2010).

Table 2 Prevalence of respondents who experienced harms in the previous year related to the drinking of others and of respondents who did not experience such harms among various socio-demographic groups in Canada in 2012

Socio-demographic factors	No harms experienced related to the drinking of others		At least one harm experienced related to the drinking of others		*p* value*
	Prevalence	95% confidence interval	Prevalence	95% confidence interval	
Province					
British Columbia	47.4%	(32.9%, 62.0%)	52.6%	(38.0%, 67.1%)	0.004
Nova Scotia	55.7%	(42.3%, 69.1%)	44.3%	(30.9%, 57.7%)	
Ontario	51.8%	(34.5%, 69.1%)	48.2%	(30.9%, 65.5%)	
Quebec	76.3%	(64.9%, 87.7%)	23.7%	(12.3%, 35.1%)	
Saskatchewan	70.6%	(58.2%, 83.0%)	29.4%	(17.0%, 41.8%)	
Age (years)					
18–34	44.2%	(23.9%, 64.6%)	55.8%	(35.4%, 76.1%)	0.087
35–44	55.6%	(33.4%, 77.8%)	44.4%	(22.2%, 66.6%)	
45–64	68.6%	(58.0%, 79.3%)	31.4%	(20.7%, 42.0%)	
65+	73.7%	(54.2%, 93.2%)	26.3%	(6.8%, 45.8%)	
Gender					
Male	52.4%	(38.6%, 66.3%)	47.6%	(33.7%, 61.4%)	0.094
Female	68.3%	(56.4%, 80.3%)	31.7%	(19.7%, 43.6%)	
Highest education attainment					
Secondary school graduation or less	83.1%	(73.4%, 92.8%)	16.9%	(7.2%, 26.6%)	0.006
Some college or some trade school	59.0%	(38.4%, 79.5%)	41.0%	(20.5%, 61.6%)	
Diploma/certificate for trade school/ community college/CEGEP	43.5%	(23.0%, 64.0%)	56.5%	(36.0%, 77.0%)	
Bachelor degree or higher	52.9%	(37.8%, 68.0%)	47.1%	(32.0%, 62.2%)	
Marital status					
Married/living with a partner/common-law marriage	55.6%	(43.6%, 67.6%)	44.4%	(32.4%, 56.4%)	0.029
Widowed, separated or divorced	86.6%	(76.5%, 96.6%)	13.4%	(3.4%, 23.5%)	
Single, never married	54.5%	(34.9%, 74.2%)	45.5%	(25.8%, 65.1%)	
Occupational status					
Employed part-time, full time or self-employed	48.6%	(37.1%, 60.0%)	51.4%	(40.0%, 62.9%)	<0.001
Retired	85.5%	(76.8%, 94.1%)	14.5%	(5.9%, 23.2%)	
Not working	78.5%	(61.7%, 95.3%)	21.5%	(4.7%, 38.3%)	
Other/refused	65.9%	(27.0%, 104.8%)	34.1%	(0.0%, 73.0%)	
Household income					
Less than $20,000	86.2%	(69.7%, 102.8%)	13.8%	(0.0%, 30.3%)	0.212
$20,000–$49,999	65.9%	(51.7%, 80.1%)	34.1%	(19.9%, 48.3%)	
$50,000–$79,999	60.0%	(39.4%, 80.6%)	40.0%	(19.4%, 60.6%)	
$80,000–$99,999	40.0%	(15.6%, 64.4%)	60.0%	(35.6%, 84.4%)	
$100,000+	52.5%	(33.1%, 71.8%)	47.5%	(28.2%, 66.9%)	
Self-perceived mental health					
Score 0–10	8.4	(8.06, 8.75)	8.28	(7.91, 8.65)	0.697

* Tested using a survey-adjusted Chi-squared test except for self-perceived mental health where a Quasi-Poisson regression was used

Comparison of the study results to previous studies

This is the first study to measure the frequency of harms related to the drinking of others in Canada since the 2008 Canadian Survey on Alcohol and Other Drugs. Previous studies on the topic measured harms using a limited number of questions (Kellner 2005; Giesbrecht et al. 2010; Health Canada 2009). The current survey, however, expands to examine harms to others using a more comprehensive list of 16 questions, which have been used in

Table 3 The association between level of self-perceived mental well-being and the occurrence of alcohol-related harms (ratios represent a decrease in self-perceived mental well-being by 1 point on a scale of 0–10) in Canada in 2012

Alcohol-related harm	Model 1[a]			Model 2[b]		
	Prevalence ratio/count ratio	95% confidence interval	*p* value	Prevalence ratio/count ratio	95% confidence interval	*p* value
Psychological ($n = 314$)						
Yes/no[c]	1.15	(0.93, 1.41)	0.200	1.19	(1.01, 1.41)	0.038
Number of harms (0–3)[d]	1.13	(0.89, 1.43)	0.310	1.17	(0.99, 1.39)	0.063
Physical harms ($n = 317$)						
Yes/no[c]	1.41	(1.02, 1.96)	0.038	1.56	(1.11, 2.18)	0.010
Number of harms (0–4)[d]	1.47	(1.08, 2.01)	0.016	1.57	(1.15, 2.16)	0.005
Social harms ($n = 303$)						
Yes/no[c]	1.01	(0.86, 1.19)	0.861	1.06	(0.91, 1.23)	0.457
Number of harms (0–4)[d]	1.03	(0.82, 1.30)	0.785	1.09	(0.91, 1.30)	0.366
Financial harms ($n = 307$)						
Yes/no[c]	1.29	(0.95, 1.75)	0.110	1.38	(0.98, 1.94)	0.066
Number of harms (0–5)[d]	1.54	(1.11, 2.13)	0.009	1.50	(1.12, 2.03)	0.008
Total harms ($n = 302$)						
At least one harm[c]	1.03	(0.90, 1.19)	0.642	1.09	(0.96, 1.24)	0.180
Number of harm categories (0–4)[d]	1.08	(0.91, 1.27)	0.392	1.12	(0.98, 1.28)	0.107
Total number of sub-harms (0–16)[d]	1.11	(0.88, 1.40)	0.382	1.14	(0.97, 1.34)	0.112

[a] Unadjusted model

[b] Model adjusted for gender, age, province, education, marital status, income, and occupational status

[c] Prevalence ratio

[d] Count ratio

other countries to measure the prevalence of harms related to the drinking of others (Laslett et al. 2011).

Prior to this work, comparable Canadian surveys that looked at a limited number of harms reported that 30.4–32.7% of respondents had experienced at least one harm within the previous year related to the drinking of others (Giesbrecht et al. 2010; Health Canada 2009). Additionally, a US-based study found that over their lifetime 28% of participants had been assaulted due to someone else's drinking (Greenfield et al. 2009), and in New Zealand it was estimated in 2003–2004 that 7% of men and 3% of women had been assaulted due to the drinking of others (Connor et al. 2009); these observations are similar to the frequency of physical harms related to the drinking of others observed in this study. Furthermore, in Australia in 2007, it was estimated that 28% of people were negatively affected by the drinking of others in the previous year (Laslett et al. 2011). In comparison to previous studies, our estimates of the harms related to the drinking of others are greater than previously thought, and the harms related to the drinking of others in Canada are higher than estimated for Australia.

This study also observed that individuals who reported poorer mental well-being were also likely to report that they had experienced harms as a result of someone else's drinking, specifically physical and financial harms. These findings are in agreement with previous research findings that the types of harms related to the drinking of others are related to other measures of mental health such as non-specific psychological distress (Aneshensel 1992; Tessler and Mechanic 1978; Kessler et al. 2002; Weaver and Clum 1995). These findings are also in agreement with those of Ferris and colleagues (2011) who found that impaired mental well-being was associated with being negatively affected by the drinking of others. They also found that this harm was dependent on the relationship with the drinker (due to sample size restrictions this was not investigated in our analysis) (Ferris et al. 2011). Lastly, our study's findings indicate the need for improved mental health policies and services, especially for vulnerable populations.

Limitations

There are important limitations to consider when interpreting the findings of this study. First, this study was limited by the survey response rate of 11.9% and sample size. This response rate may be due to several factors, including the length of the survey (approximately 15 min) (Crawford et al. 2001), discomfort or disinterest in the topic (Fisher 1993), and the increased use of caller ID that

allows potential participants to screen and refuse calls (Kempf and Remington 2007). Additionally, the sampling frame included both cell phone and landline users, and, therefore, individuals with multiple phone lines may have been more likely to have been reached. However, the survey participants are similar to the Canadian population (see Table A2). Due to small sample size, we were unable to perform nuanced analyses on how harms affect specific groups. For instance, we know that women and men experience harms differently (KaKarriker-Jaffe and Greenfield 2014), but the small sample size limited our ability to fully assess the impact of alcohol's harm to others by gender, assess the association between socio-demographic characteristics of the respondent and the type of harm experienced, and operationalize mental well-being as an ordinal rather than as a continuous variable. Nonetheless, a low response rate should not meaningfully bias the measurement of the relationship between harms and mental well-being, as response rates do not affect the measurement of this focal relationship (Groves 2004), except in the case of effect modification (where the focal relationship is different in magnitude or direction in subgroups less likely to be surveyed). Furthermore, the sample size ($n = 302$) had a power of >0.60 to detect medium effects and >0.90 to detect large effects as defined by Cohen (Cohen 1992) and >0.80 to detect moderate decreases (1.00 point decrease) in mental well-being as a result of a moderately prevalent harm (30% of people affected) through a Quasi-Poisson regression (see web appendix for power analysis). Second, the survey data collection was limited to the time period from June 19 to July 22, 2012. The consumption of alcohol in Canada is seasonal, with consumption being the highest in January and from June to August (Carpenter 2003). The harms caused by alcohol are hypothesized to follow a similar pattern (Murdoch et al. 1990). Therefore, recall bias may be present, with more recent events being recalled more accurately than more distant events (Knibbe and Bloomfield 2001; Stockwell et al. 2004). Third, the survey included only respondents from British Columbia, Saskatchewan, Ontario, Quebec, and Nova Scotia. To obtain a more complete picture, future research should survey all provinces and territories of Canada. Fourth, the survey questions were susceptible to a response bias due to the deliberate misreporting of information to conform to social norms (Randall and Fernandes 1991). This bias is observed in cases of highly stigmatized behaviours, such as drug use or mental health problems (Johnson et al. 1999; Randall and Fernandes 1991; Shield and Rehm 2012). Fifth, although the question used to measure mental well-being provides an estimate of mental health, and has been used in previous studies (Beaumont 2011), this measure of mental health does not measure the various domains of mental health. Therefore, future studies should assess mental health using domain-specific questions, such as those included in the non-specific psychological distress questionnaire (Kessler et al. 2003), the Warwick-Edinburgh mental well-being scale (Tennant et al. 2007), and the mental health component of the short form questionnaire (Jenkinson et al. 1993). Last, the survey was cross-sectional in nature, and, thus, it was not possible to establish the temporal relationship between self-perceived mental well-being and the experience of alcohol-related harms caused by the drinking of others.

Conclusions

Serious psychological, physical, social, and financial harms due to the drinking of others are prevalent in Canada. Poorer mental well-being was found to be associated with having experienced physical and financial harms from other's drinking. Notwithstanding the low response rate of the survey, our findings indicate that a substantial proportion of individuals report being affected negatively by other people's drinking. A further in-depth study of these issues, employing a larger national sample, is required for the purposes of ongoing surveillance and improving policies directed at reducing alcohol-related harms in Canada.

Compliance with ethical standards

Conflict of interest The authors have no competing interests.

References

Anderson P, Chisholm D, Fuhr D (2009) Effectiveness and cost-effectiveness of policies and programmes to reduce the harm caused by alcohol. Lancet 373(9682):2234–2246. doi:10.1016/S0140-6736(09)60744-3

Aneshensel CS (1992) Social stress: theory and research. Annu Rev Sociol. doi:10.1146/annurev.so.18.080192.000311

Babor T, Caetano R, Casswell S, Edwards G, Giesbrecht N, Grube J, Hill L, Holder H, Homel R, Livingston M, Österberg E, Rehm J, Room R, Rossow I (2010) Alcohol: no ordinary commodity—research and public policy—revised edition. Oxford University Press, Oxford

Balogun O, Koyanagi A, Stickley A, Gilmour S, Shibuya K (2014) Alcohol consumption and psychological distress in adolescents: a multi-country study. J Adolesc Health 54(2):228–234. doi:10.1016/j.jadohealth.2013.07.034

Baumberg B (2006) The global economic burden of alcohol: a review and some suggestions. Drug Alcohol Rev 25(6):537–552. doi:10.1080/09595230600944479

Beaumont J (2011) Measuring national well-being: a discussion paper on domains and measures. Office for National Statistics, London

Carpenter C (2003) Seasonal variation in self-reports of recent alcohol consumption: racial and ethnic differences. J Stud Alcohol 64(3):415–418. doi:10.15288/jsa.2003.64.415

Casswell S, Thamarangsi T (2009) Reducing the harm from alcohol: call to action. Lancet 373(9682):2247–2257. doi:10.1016/S0140-6736(09)60745-5

Cohen J (1992) A power primer. Psychol Bull 112(1):155

Connor J, You R, Casswell S (2009) Alcohol-related harm to others: a survey of physical and sexual assault in New Zealand. N Z Med J 122(1303):10–20

Crawford SD, Couper MP, Lamias MJ (2001) Web surveys: perceptions of burden. Soc Sci Comput Rev 19(2):146–162. doi:10.1177/089443930101900202

Ferris JA, Laslett AM, Livingston M, Room R, Wilkinson C (2011) The impacts of others' drinking on mental health. Med J Aust 195(3):22–26

Fisher RJ (1993) Social desirability bias and the validity of indirect questioning. J Consum Res 20:303–315. doi:10.1086/209351

Forouzanfar MH, Alexander L, Anderson HR, Bachman VF, Biryukov S, Brauer M et al (2015) Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet 386(10010):2287–2323

Foulds JA, Wells JE, Lacey CJ, Adamson SJ, Sellman JD, Mulder RT (2013) A comparison of alcohol measures as predictors of psychological distress in the New Zealand population. IJADR 2(1):59–67. doi:10.7895/ijadr.v2i1.73

Furukawa TA, Kessler RC, Slade T, Andrews G (2003) The performance of the K6 and K10 screening scales for psychological distress in the Australian National Survey of Mental Health and Well-Being. Psychol Med 33:357–362. doi:10.1017/S0033291702006700

Giesbrecht N, Cukier S, Steeves D (2010) Collateral damage from alcohol: implications of 'second-hand effects of drinking' for populations and health priorities. Addiction 105(8):1323–1325. doi:10.1111/j.1360-0443.2009.02884.x

Gomes LW (2008) A call for context: exploring the situational and relational characteristics of heavy drinking by Canadian adults. Carleton University, Ottawa

Greenfield TK, Ye Y, Kerr W, Bond J, Rehm J, Giesbrecht N (2009) Externalities from alcohol consumption in the 2005 US National alcohol Survey: implications for policy. IJERPH 6:3205–3224. doi:10.3390/ijerph6123205

Groves RM (2004) Survey errors and survey costs. Wiley, Chichester

Health Canada (2009) Canadian alcohol and drug use monitoring survey 2008: microdata user guide. Health Canada, Ottawa

Ialomiteanu A, Adlaf EM (2007) CAMH Monitor 2006: TechnicalGuide. Toronto: Centre for Addiction and Mental Health; 2007. Available at: http://www.camh.net/Research/Areas_of_research/Population_Life_Course_Studies/CAMH_Monitor/CM2006_TechDoc.pdf. Accessed 5 July 2010

Jenkinson C, Coulter A, Wright L (1993) Short form 36 (SF36) health survey questionnaire: normative data for adults of working age. BMJ 306(6890):1437–1440. doi:10.1136/bmj.306.6890.1437

Johnson TP, Frendrich M, Sudman S, Wislar J, Severns E (1999) An experiment to improve drug use reports during survey interviews. In: 1998 Proceedings of the Section on Survey Research Methods. American Statistical Association, Alexandria, USA, pp 888–893

Karriker-Jaffe KJ, Greenfield TK (2014) Gender differences in associations of neighbourhood disadvantage with alcohol's harms to others: a cross-sectional study from the USA. Drug Alcohol Rev 33(3):296–303

Kellner F (2005) Alcohol-related problems: prevalence, incidence and distribution. In: Adlaf E, Begin P, Sawka A (eds) Canadian addiction survey (CAS): a national survey of Canadians' use of alcohol and other drugs: prevalence of use and related harms: detailed report. Canadian Centre on Substance Abuse, Ottawa, pp 33–34

Kempf AM, Remington PL (2007) New challenges for telephone survey research in the twenty-first century. Annu Rev Public Health 28:113–126. doi:10.1146/annurev.publhealth.28.021406.144059

Kessler RC et al (2002) Short screening scales to monitor population prevalences and trends in non-specific psychological distress. Psychol Med 32:959–976. doi:10.1017/S0033291702006074

Kessler RC et al (2003) Screening for serious mental illness in the general population. Arch Gen Psychiatry 60(2):184–189. doi:10.1002/mpr.310

Knibbe RA, Bloomfield K (2001) Alcohol consumption estimates in surveys in Europe: comparability and sensitivity for gender differences. Subst Abus 22(1):23–38. doi:10.1080/08897070109511443

Laslett AM et al (2010) The range and magnitude of alcohol's harm to others. Turning Point Alcohol and Drug Centre, Fitzroy

Laslett AM, Room R, Ferris J, Wilkinson C, Livingston M, Mugavin J (2011) Surveying the range and magnitude of alcohol's harm to others in Australia. Addiction 106(9):1603–1611. doi:10.1111/j.1360-0443.2011.03445.x

Lim SS et al (2012) 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 380:2224–2260. doi:10.1016/S0140-6736(12)61766-8

Lumley T (2004) Analysis of complex survey samples. J Stat Softw 9(8):1–19

Murdoch D, Pihl R, Ross D (1990) Alcohol and crimes of violence: present issues. Int J Addict 25(9):1065–1081. doi:10.3109/10826089009058873

Nutt DJ, King LA, Phillips LD, For the Independent Scientific Committee on Drugs (2010) Drug harms in the UK: a multicriteria decision analysis. Lancet 376(9752):1558–1565. doi:10.1016/S0140-6736(10)61462-6

Prime Minister's Strategy Unit (2004) Alcohol harm reduction strategy for England. Prime Minister's Strategy Unit, London

Qi V, Phillips SP, Hopman WM (2006) Determinants of a healthy lifestyle and use of preventive screening in Canada. BMC Public Health 6(1):1

R Core Team (2015) R: a language and environment for statistical computing version 3.2.0. R Foundation for Statistical Computing, Vienna

Randall DM, Fernandes MF (1991) The social desirability response bias in ethics research. J Bus Ethics 10(11):805–817. doi:10.1007/BF00383696

Rehm J, Room R (2009) Aggregate versus individual data as bases for modeling the impact of alcohol on injury. In: Cherpitel CJ, Borges G, Giesbrecht N, Hungerford D, Peden M, Poznyak V, Room R, Stockwell T (eds) Alcohol and injuries: emergency department studies in an international perspective. World Health Organization, Geneva, pp 95–106

Rehm J et al (1996) On the emerging paradigm of drinking patterns and their social and health consequences. Addiction 91:1615–1621. doi:10.1046/j.1360-0443.1996.911116153.x

Rehm J et al (2007) The costs of alcohol, illegal drugs, and tobacco in Canada, 2002. J Stud Alcohol 68(6):886–895. doi:10.15288/jsad.2007.68.886

Rehm J, Gnam W, Popova S, Patra J, Sarnocinska-Hart A (2008) Avoidable cost of alcohol abuse in Canada 2002. Health Canada, Ottawa

Rehm J, Mathers C, Popova S, Thavorncharoensap M, Teerawattananon Y, Patra J (2009) Global burden of disease and injury and economic cost attributable to alcohol use and alcohol use disorders. Lancet 373(9682):2223–2233. doi:10.1016/S0140-6736(09)60746-7

Rossow I, Hauge R (2004) Who pays for the drinking? Characteristics of the extent and distribution of social harms from others' drinking. Addiction 99(9):1094–1102. doi:10.1111/j.1360-0443.2004.00788.x

Schrans T, Schellinck T, McDonald K (2008) Culture of alcohol use in Nova Scotia. Halifax: Nova Scotia Department of Health Promotion and Protection; 2008

Seid AK, Grittner U, Greenfield TK, Bloomfield K (2015) To cause harm and to be harmed by others: new perspectives on alcohol's harms to others. Subst Abuse Res Treat 9(Suppl 2):13

Shield K, Rehm J (2012) Difficulties with telephone-based surveys on alcohol in high-income countries: the Canadian example. Int J Meth Psych Res 21(1):17–28. doi:10.1002/mpr.1345

Shield K, Kehoe T, Taylor B, Patra J, Rehm J (2012) Alcohol-attributable burden of disease and injury in Canada, 2004. Int J Public Health 57(2):391–401. doi:10.1007/s00038-011-0247-7

Single E, Robson L, Xie X, Rehm J (1998) The economic costs of alcohol, tobacco and illicit drugs in Canada, 1992. Addiction 93(7):991–1006. doi:10.1046/j.1360-0443.1998.9379914.x

Stockwell TR, Donath S, Cooper-Stanbury M, Chikritzhs T, Catalano P, Mateo C (2004) Under-reporting of alcohol consumption in household surveys: a comparison of quantity-frequency, graduated-frequency and recent recall. Addiction 99(8):1024–1033. doi:10.1111/j.1360-0443.2004.00815.x

Tennant R et al (2007) The Warwick-Edinburgh mental well-being scale (WEMWBS): development and UK validation. Health Qual Life Out 5(1):63. doi:10.1186/1477-7525-5-63

Tessler R, Mechanic D (1978) Psychological distress and perceived health status. J Health Soc Behav 19(3):254–262

Thomas G, Flight J, Richard K, Racine S (2006) Toward a policy-relevant typology of cannabis use for Canada. Health Canada, Ottawa

Weaver TL, Clum GA (1995) Psychological distress associated with interpersonal violence: a meta-analysis. Clin Psychol Rev 15(2):115–140. doi:10.1016/0272-7358(95)00004-9

World Health Organization (2014) Global status report on alcohol and health. World Health Organization, Geneva

World Health Organization Regional Office for Europe (2009) Evidence for the effectiveness and cost-effectiveness of interventions to reduce alcohol-related harm. World Health Organization Regional Office for Europe, Copenhagen