

Family burden among US adults experiencing secondhand harms from alcohol, cannabis or other drugs

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Abstract

Background: Family burden has not been studied in relation to alcohol and other drug harms from others. We adapted a family burden scale from studies of caring for those with mental health conditions for use in the US Alcohol and Drug Harm to Others Survey (ADHTOS). We investigated associations between a seven-item summative burden scale and different types of harms attributed to someone else's use of alcohol, cannabis, or another drug: (a) being assaulted/physically harmed; (b) having family/partner problems; (c) feeling threatened or afraid; and (d) being emotionally hurt/neglected due to others' substance use.

Methods: A survey of adults aged 18 years and over conducted between October 2023 and July 2024 ($n = 8,311$), involved address-based sampling ($n = 3,931$ including 193 mail-backs) and web panels ($n = 4,380$), oversampling Black ($n = 951$), Latinx ($n = 790$) and sexual or gender minority (SGM) respondents ($n = 309$). Data from seven items on types of burdens experienced from other people's alcohol or drug use were provided by those harmed by someone else's alcohol or drug use and were used to create a burden scale. Analyses used negative binomial regression on burden sum adjusting for covariates, such as age, gender, race and ethnicity, marital status and years of education.

Results: The single factor burden scale showed good internal consistency ($\alpha = .91$). Components assessing being emotionally drained/exhausted and family friction/arguments were endorsed by 38–39% of participants; finding stigma of the other's substance use upsetting was affirmed by 33%. Fewer endorsed feeling trapped in caregiving roles (22%), problems outside the family (26%), neglect of other family members' needs (16%), and having to change plans (14%). In adjusted regression models, seven of eight harm exposures were significantly associated with burden scores.

Discussion: People reported substantial burden from others' use of alcohol, cannabis, and other drugs. Family support interventions and policy remedies to mitigate these burdens are needed.

Introduction

The burden, including mortality and morbidity, of alcohol and other drugs on society has often been interpreted as the consequences of a person's own use (Shield et al., 2015; Forouzanfar et al., 2016; US Burden of Disease Collaborators et al., 2018). Interventions and policies are typically designed to mitigate these negative outcomes involving a person's own use of alcohol (Rabiee et al., 2017; Stockwell et al., 2021; US Preventive Services Task Force, 2018) and/or other drugs (Rehm & Gmel, 2001). Although for

years, studies have implicitly included harm to others, e.g., drink driving analyses (Voas & Fell, 2011; Wali et al., 2017) and exposure to violence (Berenson et al., 2001; Cameron et al., 2016), fewer studies have focused explicitly on secondhand effects from others' consumption. Secondhand alcohol and drug harms (ADH) are used synonymously with externalities (Greenfield et al., 2009) or harms experienced from others' alcohol or other substance use. One study in Baltimore found 38.4% of alcohol-involved deaths were of someone other than the drinker (Trangenstein & Jernigan, 2020). Some recent reviews of alcohol-related mortality and morbidity also have identified alcohol's extensive harm to

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others, although this has been under-researched (Rehm et al., 2017).

There is a growing literature on alcohol's harms to others (Callinan et al., 2019; Casswell & Thamarangsi, 2009; Casswell et al., 2011; Fillmore, 1985; Greenfield et al., 2009; Greenfield et al., 2016; Jiang et al., 2015) and more recently also secondhand cannabis harms (Greenfield et al., 2024; Kerr et al., 2021). The alcohol harms literature has investigated associations between secondhand alcohol and drug harms (ADH) and quality of life, wellbeing, and mental health problems among affected others, where affected others often are family members (Karriker-Jaffe et al., 2018a; Laslett et al., 2017; Laslett et al., 2023; Romac et al., 2022). This issue sometimes is explicitly framed as a burden on those who have someone in their lives who drinks heavily (Connor & Casswell, 2012).

Regarding family burden, a separate tradition developed mainly from assessing the burden associated with caring for cognitively impaired elderly people (Zarit et al., 1980) has resulted in development of a 10-item burden assessment (Graessel et al., 2014). Others have assessed the burden of people caring for those with serious mental illness (SMI; Reinhard et al., 1994). Reinhard et al. (1994) developed a 19-item, self-administered Burden Assessment Scale (BAS) to capture the degree of burden experienced by caregivers of a family member with SMI. This BAS instrument has been recommended by the *PhenX Toolkit* under its Protocol for Family Burden of Mental Illness (<https://www.phenxtoolkit.org/protocols/view/662201>).

Only one known study has addressed burden related to caring for family members with a substance use disorder, in a comparative framework contrasting burden due to SMI (Kahya et al., 2022). The Kahya and colleagues (2022) study used the Zarit Caregiver Burden Scale (CBS; Zarit et al., 1980) administered to family members who had cared for at least a year for one of three groups of 50 patients diagnosed with either bipolar disorder, schizophrenia, or substance use disorder (SUD). The Zarit CBS score related to the SUD group was found to be higher ($p < .001$) than those related to bipolar disorder or with schizophrenia.

Assessing a study participant's burdens involved in coping with individuals who have various conditions, may also have relevance for situations that involve harms experienced because of someone's (often a partner, family member or other known individual) problematic alcohol or other substance use. Conceivably, this person has often caused various types of 'harm', such as emotional harm or neglect, family or marital troubles, or physical harm as a result of their substance use. Sometimes these harms may be associated with a perceived 'burden', such as feeling drained and exhausted, family frictions and arguments, or feeling the stigma of having a close substance user in their life. These burdens might involve reflecting upon past harms experienced from a person with substance use problems, and, for some people, this might involve a lasting or residual sense of psychological consequences considered to involve these kind of burdens. In our conceptualization, such ongoing or perhaps lasting burdens can be one aspect of, or metric associated with, experiencing specific secondhand

alcohol and other drugs (AOD) harms. As noted earlier, while mental health and quality of life of those affected in specific ways by others' use of alcohol have been well studied (Karriker-Jaffe et al., 2018a), there is a gap in research related to the extent of experiencing various burdens by those reporting types of harms like physical or emotional harms from partners, other family members, and friends who drink a lot of alcohol. This research gap is even greater for burdens experienced from reporting harms from others' use of cannabis and other substances in addition to, or instead of alcohol.

To address this gap, for the present study we adapted relevant items from the BAS, an established burden scale reflective of the kind of harms a person might experience from another's substance use, e.g., alcohol, cannabis, and drugs other than cannabis such as opioid pain pills, fentanyl or heroin, cocaine, etc., presented to participants in multiple choice form. Specifically, we adapted the BAS to yield an alcohol and/or drug harm (ADH) scale assessing strain related to caring for someone using substances. We took six BAS items (Reinhard et al., 1994) and added one new item – having been emotionally drained or become exhausted – resulting in a seven-item burden scale for use in the US Alcohol and Drug Harm to Others Survey (ADHTOS; ICF, 2024). This was used to examine degree of burden experienced by those reporting secondhand ADH resulting from another person's use of alcohol, cannabis, and drugs other than cannabis. We assessed the burden of ever having experienced (often at close quarters) various secondhand alcohol and other drug harms. We aimed to (a) investigate the psychometrics of the seven-item ADH burden scale, since the burden items had not previously been applied in this framework of secondhand alcohol and drug harms; and (b) analyze associations of the burden score with several kinds of harms experienced, given that perceived burden might differ by the specific types of harms and substances perceived to have been used by the other person.

Methods

Data

The ADHTO web survey of adults aged 18 years or more was conducted from December 2023 to January 2024. We report results based on those with relevant data in the complete web-based dataset (total $n = 8,311$). The survey used probability sampling of mailing addresses to invite people to complete a web survey ($n = 3,931$, including 193 mail-back responses, offered in a follow-up mailing to non-responders), as well as non-probability, proprietary web panels ($n = 4,380$). The panel survey included an oversampling of individuals identifying as sexual or gender minorities (SGM; 3.8%), and both the mail and panel samples included oversamples of Black and Hispanic respondents. While some differences in compositions of the address-based and proprietary web panel samples are expected and commonly observed, propensity scores from a multinomial logistic regression model were used to calculate a non-response adjustment for the address-based sample (ABS) to calculate a non-probability weight, and to combine the samples using the probability of observing the

respondent in the ABS or web panel. Propensity scores were estimated from the model, including age, gender, race/ethnicity, marital status, educational attainment, region, sexual orientation, presence of children in the household, and general health (ICF, 2024). Sample weights also adjusted the data to represent the US adult household population at the time of data collection. Weighting for complete cases took account of non-response, and as a reference sample utilized the 2023 National Household Interview Survey (NHIS) weighted to the US population in turn involving the American Community Survey (United States Census Bureau, 2020). Web-based data collection was undertaken by ICF Inc. of Fairfax, Virginia. The Institutional Review Boards of the Public Health Institute (Approval #I21-022) and ICF approved the study protocol.

A subset of survey participants reported secondhand ADH. Only participants who reported lifetime harms from others' drinking, marijuana (hereafter cannabis), or other drugs besides cannabis, completed the burden items (our focus here, $n = 5,991$). Table 1 provides the unweighted and weighted sample characteristics of included cases. For the unweighted sample, 63.3% were cisgender women and 34.4% identified as a man, with 2.4% identifying as a gender minority (including trans woman, trans man, gender queer, nonconforming and non-binary) derived from a gender identity question. In terms of ethnicity, 9.8% identified as Hispanic or Latinx (in response to the question: *Are you Hispanic, Latino/a, or of Spanish origin?*). Weighting procedures (described earlier) balanced the sexes, increased the Hispanic/Latinx group, and somewhat increased the never-married group.

Burden Variables

Data on seven items depicting the different kinds of ADH burdens experienced from other peoples' alcohol or drug use (e.g., had to change personal plans, family frictions or arguments) using a four-point response scale (*not at all, a little, some, a lot*). Burden data were provided by 73.8% of all participants, i.e., those reporting at least some lifetime harm due to someone else's use of alcohol and/or another drug. We excluded harm from coworkers, and included those who completed at least six of seven burden items. Verbatim items and rates of endorsing each of the four levels are provided in Table 2. All items were preceded by: *Here are some things which other people have found to happen to them because of another person's alcohol, marijuana or other drug use. Have you ...* (the use of the word *ever* in Table 1 indicates use of a lifetime frame).

We constructed a summative Alcohol and Drug Burden Scale score ranging from 7 (items all rated as *none* = 1) to 28 (all items rated as *a lot* = 4). The resultant scale showed high internal consistency (see Results).

Key Independent Variables

For secondhand alcohol and other drug harms we first asked about a series of harms based on the six standard secondhand harms included in the National Alcohol Survey (NAS) and the US National ADHTO Survey (Greenfield et al., 2009; Greenfield et al., 2015; Nayak et al., 2019). For alcohol,

cannabis, and drugs other than cannabis (queried separately), we initiated the series by first asking a question about *ever* being harmed, e.g., *Have you ever been pushed, hit, assaulted or physically harmed by someone who had been drinking/after they had been using marijuana/after they had been using a drug other than marijuana?*

Table 1
Sample Characteristics: Percentage or Mean (Standard Deviation) for Continuous Variables

Variable	Unweighted $n = 5,991$	Weighted $n = 5,991$
Age in years	50.76 (16.99)	48.01 (17.70)
Current gender		
Cis Man	34.4	49.5
Cis Woman	63.3	49.2
Gender Minority	2.4	1.2
Race/ethnicity		
Non-Hispanic White	70.7	63.3
Non-Hispanic Black	11.8	11.3
Hispanic	9.8	16.4
Other race or ethnicity	7.7	8.9
Marital status		
Married or living with partner	50.5	51.7
Windowed/Divorced/Separated	24.0	20.0
Never married	25.4	28.3
Years of education after 9th grade	5.73 (2.50)	5.02 (2.44)
Ever threatened/afraid by others' alcohol or drug use		
No	57.9	61.7
Yes	42.1	38.3
Ever emotionally hurt/neglected by others' alcohol or drug use		
No	60.3	65.8
Yes	39.7	34.2
Ever physically harmed by others' drinking		
No	68.0	68.2
Yes	32.0	31.8
Ever family/marital problems from others' drinking		
No	65.2	67.1
Yes	34.8	32.9
Ever physically harmed by others' marijuana use		
No	93.9	93.2
Yes	6.1	6.8
Ever family/marital problems from others' marijuana use		
No	89.8	90.3
Yes	10.2	9.7
Ever physically harmed by others' other drug use		
No	90.0	89.9
Yes	10.0	10.1
Ever family/marital problems from others' other drug use		
No	83.1	84.8
Yes	16.9	15.2

In this initial analysis of associations between burden and secondhand harms, we focused on two key harms for each of the three substance groups involved, i.e., alcohol, cannabis, and drugs other than cannabis: (a) *ever assaulted/physically harmed*, and (b) *ever experienced family problems or marriage difficulties*. We additionally considered two items with a reference to others' alcohol or drug use: (c) *Have you ever felt threatened by, or afraid of, someone who had been drinking or using drugs?* and (d) *Have you ever been emotionally hurt or neglected because of someone else's drinking or drug use?* Following these lifetime questions, respondents were asked about the timing of the harm (not reported here). Participants were then asked, e.g., *Who emotionally hurt or neglected you after they had been drinking or using drugs*, with a large set of non-exclusive response options, such as parent, stepparent, child, other family member, friend, stranger, etc. For harm questions focused on or including other drugs besides cannabis, participants were asked follow-up questions about what substance/s the other person was perceived to have been using, with multiple possible responses from a detailed list including up to seven specific types of substance/s said to have caused the harm, with multiple-choice options

including alcohol, cannabis, opioid pain pills, Fentanyl or heroin, cocaine, methamphetamine or stimulants, some other drug, and “don't know”, though these details will be presented in another paper yet to be published. The first author may be contacted for these results.

Covariates

Main analyses adjusted for covariates including age (continuous from 18 years), and dummy variables for the gender categories cis woman and gender minority (GM; trans woman, trans man, gender queer, and nonconforming); Black/African American race and Hispanic/Latinx ethnicity, with Other race or ethnic group (reference non-Hispanic White group); two marital status dummy variables (married or living with a partner, and never married); and years of education (minus nine years) such that 1 = less than high school, 3 = high school Diploma/GED, 4 = technical qualification/some college but no degree, 5 = Associate 2-year degree, 7 = 4-year undergraduate degree, and 10 = graduate degree (a compromise between masters, PhD, MD, etc.).

Table 2

Verbatim Items with Response Distribution (Percentages) and Summary of Maximum-Likelihood Factor Analysis Statistics

Item	Distribution (percent)				Factor Statistics	
	Never	A little	Some	A lot	Communality	Loading
Had to change your personal plans like taking a new job, going to school, or going on vacation	85.7	6.7	5.0	2.6	0.039	0.678
Had to neglect other family members' needs because of another person's alcohol or drug use	84.1	8.5	4.9	2.5	0.528	0.672
Experienced family frictions or arguments because of another person's alcohol or drug use	62.0	16.2	12.8	9.0	0.657	0.810
Experienced frictions with neighbors, friends, or relatives outside the home because of another person's alcohol or drug use	73.6	13.9	8.7	3.8	0.510	0.714
Felt trapped in a caregiving role because of another person's alcohol or drug use	78.8	8.7	6.8	5.7	0.629	0.793
Found the stigma of the other person's alcohol or drug use to be upsetting	66.7	14.4	10.3	8.6	0.624	0.790
Been emotionally drained or become exhausted because of another person's alcohol or drug use	61.7	15.9	10.5	12.3	0.705	0.840

Analyses

A negative binomial regression analysis estimated the seven-item ADH burden score (dependent variable) based on the group of eight harms and covariates. Negative binomial regression is appropriate because the burden scale data are skewed (in other words, the ADH burden score has a greater number of lower values than higher values) and so is over-dispersed, such that the conditional variance is greater than the conditional mean; it represents a generalization of the Poisson regression approach with loosened restrictive assumptions (Hilbe, 2007). The eight lifetime secondhand harms and all demographic covariates were predictors, and

analyses were weighted to be nationally-representative. Psychometric analyses used SPSS V20 (IBM Corp., Released 2011), and the negative binomial regression analysis used Stata Release 17 (StataCorp, 2021).

Results

Psychometrics of Burden Scale

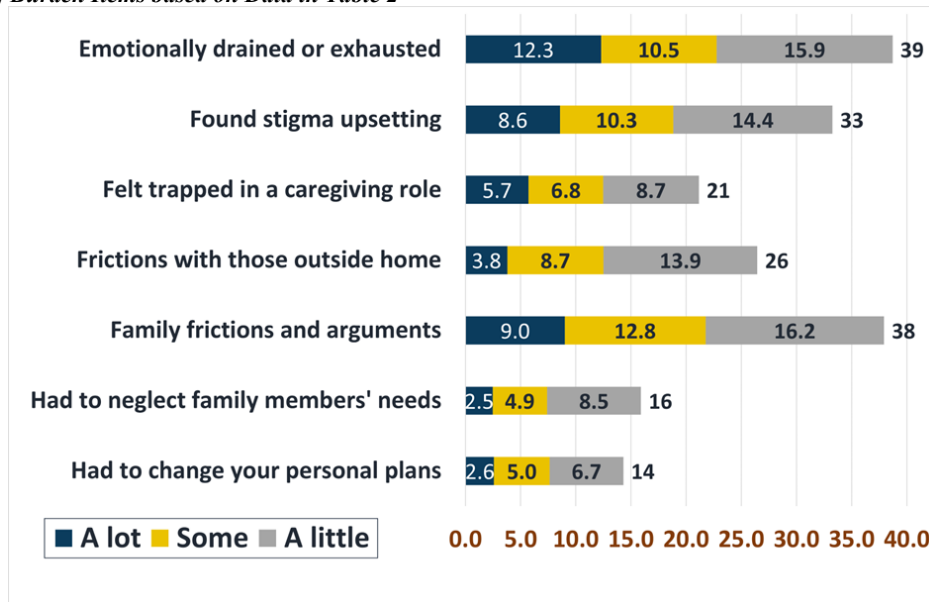
An exploratory factor analysis of burden items using Maximum Likelihood Extraction yielded a single factor in four iterations, accounting for 58.7% of the total variance. Table 2 provides item communalities and factor loadings.

Communalities ranged from 0.46 (Had to change personal plans) to 0.71 (Emotionally drained or became exhausted). Factor loadings ranged from 0.67 (Had to neglect family needs) to 0.84 (Emotionally drained or became exhausted). The ADH Burden Scale showed good internal consistency (Cronbach’s alpha = .91; Streiner, 2003). Reliability analysis indicated that alpha was reduced by the removal of any single item, with item-to-corrected total (total minus item) correlations all high: 0.649 to 0.790. Table 2 also presents the verbatim burden items and response distributions, with endorsements illustrated visually in Figure 1. Due to second-

hand alcohol/drug use, two items (feeling emotionally drained/exhausted and family friction/arguments) were endorsed by 38-39% of participants (9-12% responded indicating they experienced each a lot); 33% endorsed finding the stigma of the other person’s substance use upsetting (with 9% indicating this happened a lot). Fewer participants endorsed feeling trapped in caregiving roles (22%; 6% a lot), problems outside the family (26%; 4% a lot) and having to change plans (14%; 3% a lot). See Table 2 and Figure 1 for distributions.

Figure 1

Distributions of Burden Items based on Data in Table 2



Note: Distributions of burden items (percentages for ‘a little’, ‘some’, and ‘a lot’) are based on data in Table 2 (which also provides percentages for ‘never’)

Levels of Lifetime Secondhand Harms

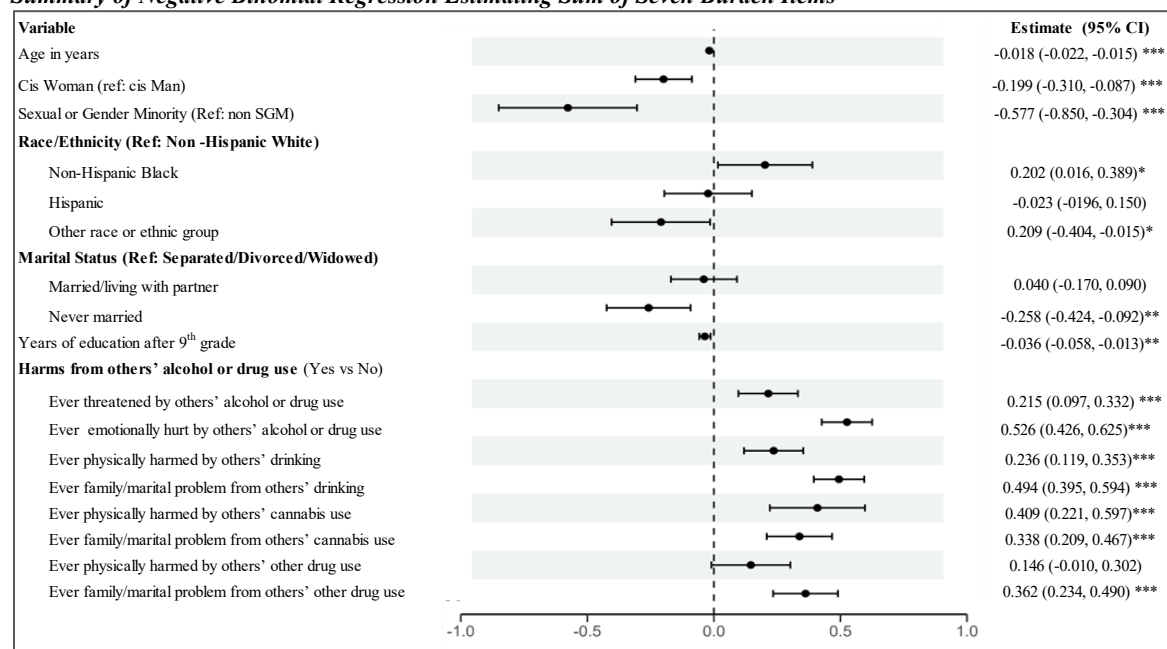
Considering the weighted column of Table 1, assault/physical harm and family/marriage problems attributed to others’ drinking alcohol were reported by 32% and 33% of the burden sample (those who completed harm items and the burden scale), respectively; the same two harms attributed to cannabis were reported by 7% and 10%, respectively; and ever being harmed by people using drugs other than cannabis were reported by 10% and 15%, respectively. The two further lifetime secondhand harms attributed to other people’s alcohol or drug use (*threatened/afraid* and *feeling emotionally hurt/neglected*) were reported by 38% and 34%, respectively.

Negative Binomial Regressions

Figure 2 presents the regression on the summative burden scale of substance-attributed lifetime secondhand harms. The coefficients (estimates) are presented in the central figure and detailed on the right-hand side of the figure with 95% confidence intervals and significance levels. For the eight secondhand harms, two had especially high associations with the dependent burden scale – *ever emotionally hurt/neglected* and *ever family/marital*

problems due to someone else’s drinking, with estimates of approximately 0.5 ($p < .001$). *Ever experiencing family/marital problems due to others’ cannabis use* and *due to drugs other than cannabis* also were associated with burden (0.34–0.36; $p < .001$), as was *ever physically harmed by others’ cannabis use* (0.41; $p < .001$) and by *others’ drinking* (0.24; $p < .001$). Similarly, *ever threatened/afraid by someone using alcohol or drugs* was also associated with the dependent burden scale (2.2; $p < .001$). Note that all these ever-harmed relationships control for the remaining harms and covariates. Only *ever physically harmed by others drug use besides cannabis*, though also in the positive direction regarding burden, was not significantly associated with burden. Burden declined with age and was lower for cis women and for people who reported being a gender minority vs. cisgender men (all $p < .001$). Those identifying as Non-Hispanic Black tended to report higher degrees of burden ($p < .05$), while those reporting being of another race or ethnic group tended to have lower burden scores ($p < .05$), both referenced to non-Hispanic White people. Finally, those who were never married and who had more years of education tended to have lower burden scores ($p < .01$).

Figure 2

Summary of Negative Binomial Regression Estimating Sum of Seven Burden Items

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$; $n = 5,927$ with complete data.

Discussion

Having developed a brief seven-item single-factored ADH Burden Scale with good psychometric properties, we found that about two in five people in our US adult sample with various secondhand AOD harms expressed feeling emotionally harmed or neglected or had family friction-related burdens from others' AOD use. About a third reported stigma-related burdens, and 14-26% reported the remaining burden types of the seven asked. Degree of burden was associated with high adjusted likelihood of ever experiencing family or marital problems caused by someone else's use of alcohol, and somewhat less so, but still significantly, with others' use of cannabis, or drugs besides cannabis. Feeling emotionally hurt/neglected due to someone else's drinking/drug use also was strongly associated with degree of burden, with being threatened/fearful also significant, but less so. Being assaulted or physically harmed was associated with degree of burden for alcohol and cannabis, and not on account of drugs besides cannabis (although in the positive direction) – in each case controlling for the other harms and covariates. Implicitly, findings suggest that all other factors equal (including harm's experienced), cis men had a relatively higher burden from others' substance use than cis-women, as did younger individuals. However, this does not speak to the relationship between particular harms and gender or age, which is not examined here.

There are limitations in our work. First, as in all such surveys, we relied on self-report of all variables, which may introduce unknown biases, including sampling bias (given the combined probability and non-probability samples) and recall limitations; given the web-based survey may have under-represented certain racial and ethnic groups, with

these designations being only broadly defined, and not recognizing heterogeneity within such groups. Second, this analysis was based on cross-sectional data. Third, the negative binomial regressions used complete data for all variables with 5,927 cases, whereas the ADH burden scale was completed by 5,991, although only a 1% difference. Fourth, the seven-item burden scale is highly skewed as an 'outcome', addressed by negative binomial regression, and included all secondhand harm exposure variables together (i.e., controlling for one another as well as covariates). Results with each of the harm items entered individually showed little difference (results not shown). A noteworthy strength of this work is that we have begun to examine the metric of ADH burden associated with experiencing lifetime secondhand harms from several specified substances beyond (but including) alcohol's harm to others. We acknowledge that the substance groups reported are perceptions and might not reflect the actual substances used by the other. We did not delve into perpetrators and timing of the harms, a topic for a further paper.

In thinking about how to reduce burden, it is important to examine what family supports and interventions (Orford, 1990; Orford et al., 2005) might be effective, and which policy remedies – such as those considered for reducing harm associated with men's heavy alcohol use (Karriker-Jaffe et al., 2023) – might be adapted to the wider array of substances to reduce the burden from someone else's substance use. Because our focus has been primarily on initial results, it is beyond the scope of this paper to closely examine policy approaches and family interventions to offset burdens experiences owing to the wide range of alcohol, cannabis and other substances reported by our participants, which should be the focus of a further paper. Strategies developed for alcohol-related harms are likely to differ from those for specific other substances and their

combinations. However, we should mention that it remains important to position whatever approaches are developed in a public health framework in order to reduce further stigmatization of people who use substances (Karriker-Jaffe et al., 2018b; Wilkinson & Ritter, 2021).

Conclusions

This study extended the paradigm of secondhand harms beyond those due to alcohol alone, to include harms resulting from others' use of other substances such as cannabis, cocaine, methamphetamine, and opioids among other substances. The prevalence of the secondhand alcohol and drug harms we studied here ranged from about two in five (ever felt threatened or afraid due to someone else's alcohol or drug use), to around a third (ever had family/marital and physical harms from another's drinking), and to as low as one fifteenth (ever experienced physical harm from someone's cannabis use). We developed a psychometrically sound seven-item burden scale and used it as a metric for the impacts of others' use of alcohol, cannabis and other drugs. We found that adjusting for demographic and other factors, ever being threatened/made afraid, emotionally harmed/neglected, or having had family/marital difficulties due to someone else's alcohol and other substance use were each significantly associated with the burden score. Similarly, ever experiencing physical harm from others' alcohol or cannabis use was associated with burden.

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