Title: Factors associated with concurrent tobacco smoking and heavy alcohol consumption within a socioeconomically disadvantaged Australian sample.

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Glossary:

Community service organisation: non-government, not for profit organisations that provide a wide range of services to clients including crisis relief (for example financial aid to pay electricity bills), food vouchers, employment services, and interpersonal counselling.

Concurrent use: Use of two or more substances, although not necessarily at the same time (simultaneously).

Heavy drinking: In this study refers to scores on the Alcohol Use Disorders Identification Test – Consumption version (AUDIT-C). Scores of four or more for males and three or more for females indicate heavy drinking.

Socioeconomically disadvantaged: Social and/or economic disadvantage arising from lower income, material or cultural deprivation, and social exclusion.

ABSTRACT

Background: Tobacco use and heavy alcohol consumption occur more frequently in socioeconomically disadvantaged groups. Little is known about the sociodemographic and psychosocial factors associated with use of alcohol and tobacco in disadvantaged groups in comparison to low risk users.

Objectives: This study aimed to compare the characteristics of low risk users with: disadvantaged smokers only; disadvantaged heavy drinkers only; and disadvantaged concurrent smokers and heavy drinkers.

Methods: A cross-sectional survey of socioeconomically disadvantaged adult clients attending a community welfare agency assessed tobacco use, alcohol use, demographic and psychosocial variables. Multivariable analysis using multinomial logistic regression was carried out.

Results: The sample consisted of 835 participants; 40% (n = 331) were concurrent users, 31% were smokers only (n = 252), 11% were heavy drinkers only (n = 93) and 18% were low risk users (n = 149). Compared with those who neither smoked nor consumed alcohol heavily, concurrent users were more likely to be younger, have only some contact with family, have more friends and family who were smokers, have no fixed home address, live alone, and have higher levels of financial stress. Most of these factors were shared by individuals who were smokers only. Factors associated with heavy drinkers only were frequent contact with family and having more friends and family who were smokers.

Conclusion: Among those Australians who suffer severe economic hardship, being a concurrent smoker and heavy drinker appears to be associated with more isolated living conditions and financial stress but some contact with family.

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1. INTRODUCTION

Smoking and excessive alcohol consumption are both major avoidable risk factors for morbidity and mortality (Bauer, Briss, Goodman, & Bowman, 2014). Concurrent use of alcohol and tobacco compounds the risk of negative health outcomes (Bobo, 1992; Pelucchi, Gallus, Garavello, Bosetti, & La Vecchia, 2006), for example the risk of developing mouth and throat cancer is six times greater for those who use alcohol, seven times greater for those who use tobacco and 38 times higher for those who use both substances concurrently (Zacny, 1990).

People who smoke tobacco also drink alcohol more frequently and more heavily than non-smokers (Anthony & Echeagaray-Wagner, 2000; Chiolero, Wietlisbach, Ruffieux, Paccaud, & Cornuz, 2006; Falk, Yi, & Hiller-Sturmhofel, 2006). Drinkers are also more likely to be smokers (Bien & Burge, 1990; Falk et al., 2006; Kahler et al., 2008) with higher rates of drinking often co-occurring with higher rates of smoking (Dawson, 2000; Falk et al., 2006; John et al., 2003; Kahler et al., 2008). A population survey in the USA found that 22% of adults were concurrent heavy drinkers and smokers (Falk et al., 2006). In an international sample of current smokers, 6% were heavy drinkers (Kahler et al., 2009). This relationship is also found in clinical samples with smoking rates high amongst people receiving treatment for alcohol dependence (Hughes & Kalman, 2006). In an Australian study conducted with large sample of adults aged 45 years and older, younger age (45-64 years compared with 65 and over), being male, and reporting higher levels of psychological distress was associated with concurrent use (Bonevski, Regan, Paul, Baker, & Bisquera, 2014).

Both heavy drinking and smoking are associated with socioeconomic position (SEP) (Droomers, Schrijvers, & Mackenbach, 2004). Groups who experience multiple forms of

disadvantage such as low educational attainment, unemployment, homelessness, social isolation and mental illness (McLachlan, Gilfillan, & Gordon, 2013; Scutella, Wilkins, & Horn, 2009) experience the highest rates of smoking and heavy drinking, when measured independently. Limited research has examined concurrent smoking and heavy drinking in socioeconomically disadvantaged populations, especially as they might relate to psychosocial factors and in comparison to use of either substance alone or use of neither substance. One study found being male, younger and having a secondary school or lower level of education was associated with greater likelihood of smoking and heavy drinking in a sample of community service organisation clients (Bryant, Bonevski, Paul, & Lecathelinais, 2013).

This study aims to 1) describe the smoking and drinking behaviours in a socioeconomically disadvantaged sample and 2) examine the socio-demographic and psychosocial factors associated with a) concurrent smoking and heavy drinking, b) smoking alone, and c) heavy drinking alone, in comparison to non-heavy drinking and no smoking. The target group is a socioeconomically disadvantaged sample because previous research has shown that rates of each of smoking or heavy drinking are high amongst disadvantaged groups. Identifying those factors associated with concurrent use, as well as use of one substance, has important implications for the design of public health campaigns and interventions within socioeconomically disadvantaged groups.

2. METHODS

2.1 Study design

A cross-sectional survey was conducted from February 2012 to December 2013 in a non-government community based welfare agency in New South Wales, Australia. This community based welfare agency provides a wide range of material and financial assistance to clients experiencing high levels of disadvantage. CSOs offer help with issues such as mental

illness, homelessness, alcohol and other drug problems, Aboriginal health, at risk youth and family support. They provide a wide range of services to clients including crisis relief (for example financial aid to pay electricity bills), food vouchers, employment services, and relationship counselling. Clients of CSOs represent some of the groups most likely to experience socioeconomic disadvantage, including sole parents, people living with a disability, people who are of Aboriginal or Torres Strait Islander origin and people who are currently unemployed (Australian Council of Social Service, 2011).

2.2 Sample

Welfare agency staff identified eligible participants as those who were a) clients of the welfare agency, b) aged 18 years or older, and c) not presenting with an uncontrolled mental illness or under the influence of alcohol or other drugs. This survey included a range of questions for a number of sub-studies. The larger sample size was required for all the analyses.

2.3 Procedure

Eligible clients attending the service were informed about a health research survey being conducted in the centre. A Research Assistant (RA) assessed potential participants for eligibility. Participants completed a 62 item survey administered via a touchscreen computer, using Digivey software (Creoso Corporation, 3.1.36.0). The use of touchscreen computers is a valid and acceptable method of collecting data in this setting (Bryant, Bonevski, Paul, & Lecathelinais, 2011). The mean completion time was 14 minutes (range 5-21). The RA provided assistance in completing the survey where necessary. Completion of the survey was taken as consent (The National Health and Medical Research Council the Australian Research Council and the Australian Vice-Chancellors Committee, 2007). Participants were reimbursed for their time with a $20 supermarket voucher. Ethics approval for this study was granted by the University of Newcastle Human Research Ethics Committee.

2.4 Outcome Measures

Smoking status: Self-reported smoking status was assessed using the following two items 1) “Do you currently smoke tobacco products? ” with the following response options: a) Yes daily b) Yes at least once a week c) Yes but less often than once a week and d) No, not at all and 2) “Have you smoked at least 100 cigarettes or a similar amount of smoking in your life?”: a) Yes b) No or c) Not sure. Current smokers were defined as self-reported daily or occasional smokers who had smoked at least 100 cigarettes in their lifetime.

Alcohol use: The Alcohol Use Disorders Identification Test – Short form (AUDIT-C) was used to measure alcohol use (Bush, Kivlahan, McDonell, Fihn, & Bradley, 1998). Scores of four or more for males (Bush et al., 1998) (sensitivity = 99%, specificity 60%) and three or more for females (Bradley et al., 2003) (sensitivity: 66%, specificity 94%) indicated heavy drinking.

2.5 Explanatory variables

Sociodemographic variables: Age, gender, highest level of education, marital status, weekly net income amount, type of housing, and Indigenous status were assessed.

Financial stress: The financial stress scale (Siahpush & Carlin, 2006) assesses participants’ experience of financial stress in terms of six measures of financial or material deprivation for example “being unable to heat home”. Scores on this scale range from zero to eight, with higher values indicating higher levels of financial stress.

Depression and anxiety: The Patient Health Questionnaire – 4 (PHQ4) was used as an ultra-brief screening measure for both anxiety and depression. Higher scores indicate higher likelihood of underlying depressive or anxiety disorder (Kroenke, Spitzer, Williams, & Lowe, 2009).

Social contact: Social contact was measured using two items “How often are you in contact with any members of your family- including visits, phone calls, letters, or emails?” and “How often are you in contact with any friends- including visits, phone calls, letters, or

emails?". Response options were: a) Nearly every day b) 3-4 days per week c) 1 -2 days per week d) 1 -3 days per month e) Less than once a month f) Never g) No family/friends (Australian Bureau of Statistics, 2007).

Social support: Social support was measured using two items "How many family members can you rely on if you have a serious problem?" and "How many friends can you rely on if you have a serious problem?". Response options were: a) No family/friends I can rely on b) 1-2 family members/friends c) 3 – 4 family members/friends d) More than 5 family members/friends (Australian Bureau of Statistics, 2007).

Friends and family who were smokers: The smoking status of friends and family members was assessed by asking participants "How many of your friends and family smoke?". Response options were: a) None, b) A few/less than half, c) About half, or d) Most or all of them.

Resilience: Resilience was measured using the Brief Resilience Scale (BRS) (Smith et al., 2008). The BRS comprises 6 items and conceptualises resilience as an individual's way of "bouncing back" after adversity. Higher scores indicate higher levels of resilience.

2.6 Data analysis

Participants were classified into one of four groups based on self-reported smoking and alcohol use.

Concurrent users

Participants who were self-reported smokers (either daily or occasional) who met AUDIT-C cut off scores for heavy drinking were classified as concurrent users. Daily and occasional smokers were grouped together because there is evidence that even occasional smoking is associated with negative health outcomes (Hyland et al., 2006).

Smokers only

Self-reported smokers who did not meet the AUDIT-C criteria for heavy drinking were classified as smokers only.

Heavy drinkers only

Participants who met the criteria for heavy drinking but who reported being a non-smoker were classified as heavy drinkers only.

Low risk users

Participants who reported being non-smokers and who did not meet the criteria for heavy drinking or who abstained from alcohol were classified as low risk users. Low level alcohol drinkers were included with those who abstained from alcohol because this level of alcohol consumption does not lead to adverse health and social consequences.

Descriptive statistics are presented as counts and percentages for categorical variables and means (standard deviation) or median (interquartile range; IQR) for continuous variables, depending on distribution. The prevalence of smoking and alcohol use and the concurrent use of both substances were estimated as percentages with 99% confidence intervals. Comparison of characteristics between groups was performed using Chi-squared (categorical), ANOVA or Kruskal-Wallis (continuous) tests as appropriate.

The following variables were examined in analyses: age, gender, education, Indigenous status, housing, marital status, income amount, social contact with friends and family, social support from friends and family, total financial stress score, depression and anxiety (PHQ4 score), total resilience score and estimated amount of friends/family who smoke. Multinomial logistic regression was used to examine the socio-demographic and psychosocial variables associated with the four outcome groups. All variables of interest were included in regression modelling and a backwards selection method was used to create a parsimonious model. Variables were only removed if their removal did not negatively affect either the fit of the model (measured by significant change in likelihood

ratio test or more than four point increase in AIC) or change the estimates for remaining variables. To account for the number of comparisons made in the analysis, the significance level was set at α=0.01; SAS 9.3 (SAS Institute Inc., Cary, NC, USA) was used to for all analyses.

3. RESULTS

3.1 Characteristics of participants

Of the 861 eligible clients, 846 consented to participate and 825 completed the survey in full (96% completion rate). Table 1 provides the smoking and drinking profiles of participants. Overall, 63% (n = 518) of the sample were daily smokers and a further 8% (n = 8%) occasional smokers. Around half of the sample (51%, n = 424) met AUDIT-C criteria for heavy drinking. Concurrent smokers and heavy drinkers made up 40% of the sample (n = 331).

Table 2 provides the demographic information for the sample overall and by alcohol/smoking status. The sample was highly socioeconomically disadvantaged. The sample displayed exceptionally low levels of income, with 82% (n = 647) reporting income well below the Australian single-person 'poverty line' of $500 per week (Melbourne Institute of Applied and Social Research, 2014). The majority of participants received government welfare as their main source of income (92%, n = 767) and 18% had completed less than a secondary school level of education (n = 153). Aboriginal and Torres Strait Islander peoples were overrepresented, making up 15% of the sample compared to 2.2% of the population in New South Wales (Australian Bureau of Statistics, 2006).

Table 3 provides psychosocial information for the sample overall and by alcohol/smoking status. Over half of the sample had at least weekly contact with family (59%, n = 498) and friends (61%, n = 541). Slightly less than a third of participants reported

having no friends (31%, n = 260) or family (30%, n = 252) to rely on. Mean depression symptom scores on the PHQ4 and mean financial stress scores on the financial stress scale were higher than those found in general population samples (Kroenke et al., 2009; Siahpush, Borland, & Scollo, 2003), while total resilience scores were lower than those found within general population samples (Smith et al., 2008).

3.2 Factors associated with concurrent use, smoking only, or heavy drinking only compared to low risk users

The results of the multinomial regression are presented in Table 4. Compared to low risk users, concurrent users were younger (OR = 0.96, 99% CI = 0.93, 0.98), had more friends and family who were smokers (ORs ranged from 2.9 to 19.4), were homeless or reported their housing status as "Other" (compared to owning their own house; OR = 5.8, 99% CI = 1.1, 31.2) and were not living with a partner (OR = 2.2, 99% CI = 1, 4.8). For every one unit increase in financial stress, the odds of being a concurrent user increased by 25% (99% CI = 1.1, 1.5). 99% Factors associated with being a smoker only compared to being a low risk user were higher financial stress score (OR 1.24, 99% CI = 1.04, 1.47) and more friends and family who were smokers (ORs ranged from 2.5 to 12.9).

Participants who had higher odds of being heavy drinker than being a low risk user reported that most/all of their friends and family were smokers (compared to none of their friends/family being smokers; OR = 6.4, 99% CI = 1.5, 27). All other factors were non-significant.

4. DISCUSSION

To our knowledge, this is the first study to investigate factors associated with smoking, heavy drinking, and the concurrent use of both substances in comparison to participants who were low risk users within a socioeconomically disadvantaged group.

Measured separately, the prevalence of smoking and heavy drinking in this sample were considerably higher than estimates found within the general population in Australia (smoking 12.8%, lifetime risky alcohol use 18%) (Australian Institute of Health and Welfare, 2014) and comparable to rates found in homeless populations (Baggett & Rigotti, 2010; Fazel, Khosla, Doll, & Geddes, 2008), people with a mental illness (Grant, Hasin, Chou, Stinson, & Dawson, 2004; Lawrence, Mitrou, & Zubrick, 2009) and in a sample of Australian welfare recipients (Bryant et al., 2013). High levels of concurrent use were identified in the current study compared to national estimates from the USA (22%) (Falk et al., 2006) and Australia (24%) (Degenhardt & Hall, 2003). Consistent with previous research, individuals who were concurrent users had higher odds of: being younger; reporting more family and friends as smokers (Christakis & Fowler, 2008; Rosenquist, Murabito, Fowler, & Christakis, 2010); being homeless (Baggett & Rigotti, 2010; Fazel et al., 2008); living alone/without a partner (Benzies, Wangby, & Bergman, 2008; Lindstrom, 2010; Osler, McGue, Lund, & Christensen, 2008); and having higher levels of financial stress (Shaw, Agahi, & Krause, 2011). Most of the factors associated with concurrent smoking and heavy drinking were also associated with smoking alone. Individuals who were heavy drinkers had higher odds of reporting higher proportions of friends and family that were smokers.

While alcohol use status of family and friends was not assessed in the current study, estimates of the amount of family and friends who were smokers showed consistent relationships to concurrent use, smoking and drinking. Higher numbers of smokers and heavy drinkers within individuals' networks may reflect higher levels of acceptability and perceived norms surrounding the use of these substances.

This study did not find expected significant relationships between gender, social support, social contact, anxiety, depression, or resilience and concurrent use. While some studies report males being more likely to engage in heavy drinking and smoking than females (Australian Institute of Health and Welfare (AIHW), 2010), gender was not statistically significantly associated with concurrent use compared to use of neither substance in this sample. Social support may be more important during attempts to stop smoking or reduce drinking or may be mediated by the smoking and alcohol use profile of those family and friends relied on for support (Hanson, Isacsson, Janzon, & Lindell, 1990). Symptoms of anxiety and depression (mean PHQ4 scores) were higher than those found in general population studies (Kroenke et al., 2009) and the levels of resilience were lower than those found in general population studies (Smith et al., 2008), regardless of participants' smoking and alcohol use status. PHQ4 score was retained in the final model as removal of this variable affected the fit of the model and estimates for other variables. This suggests that there may be an underlying relationship between depression and anxiety and smoking/alcohol use status in this study. This study was only adequately powered to detect moderate to large associations.

4.1 Implications for interventions and public health campaigns

The results of this study indicate that multiple approaches including public health campaigns and interventions targeted at socioeconomically disadvantaged individuals are needed in order to encourage smoking cessation. Given the interrelationships between smoking and heavy alcohol use, there is an opportunity to implement sustained social marketing campaigns that are targeted to disadvantaged groups, ~~and~~ that address both smoking and heavy alcohol use at the same time. Such campaigns may be effective at creating awareness of the synergistic health effects of concurrent smoking and heavy drinking and at enhancing motivation to change these behaviours. However, such campaigns must be

implemented and evaluated in a methodologically rigorous way (Guillaumier, Bonevski, & Paul, 2012).

Evidence from smoking cessation literature suggests that while disadvantaged smokers make attempts to quit smoking at rates similar to those within the general population, the success rates of these quit attempts are lower (Hyland et al., 2006; Kotz & West, 2009). Therefore, there is a need for targeted, evidence based interventions that address both behaviours and promote sustained behaviour change. Interventions that treat smoking and heavy alcohol use together result in similar, if not improved outcomes for individuals (Hughes & Kalman, 2006; Prochaska, Delucchi, & Hall, 2004) compared to interventions that treat the behaviours separately. However, further research is required to determine the treatment preferences of concurrent users in socioeconomically disadvantaged groups; the timing of treatments (either simultaneous or sequential) and the effectiveness of either method in disadvantaged groups.

Considering the association between contact with family and number of friends and family who were smokers, such interventions may benefit from inclusion of peer support (Ford, Clifford, Gussy, & Gartner, 2013). A systematic review of peer support programs found that disadvantaged groups may benefit more from peer programs that provide support that would otherwise not be available (Ford et al., 2013). Family and community based approaches to reducing tobacco and heavy alcohol consumption may also be considered. Family based interventions involving intensive have shown potential to help prevent adolescents and young people initiating smoking (Thomas, Baker, Thomas, & Lorenzetti, 2015) and to decrease exposure to secondhand smoke (Baxi et al., 2014). Further research should examine how best to design interventions that address the social context of smoking and alcohol use within disadvantaged groups (Paul et al., 2010).

CSOs may be well placed to address smoking and heavy drinking with their clients in tandem with the other issues clients present with (including unemployment and financial

stress) (Christiansen, Brooks, Keller, Theobald, & Fiore, 2010). Addressing smoking in CSOs has been identified as acceptable and feasible by both CSO staff and clients (Bryant, Bonevski, & Paul, 2011; Bryant, Bonevski, Paul, Hull, & O'Brien, 2012). However, careful planning and involvement with CSO staff is necessary in order to ensure they have the capacity to address these behaviours, as evidence suggests CSOs are already struggling to meet demand for services (Australian Council of Social Service, 2014).

4.2 Strengths and limitations

This study is one of the first to examine a wide range of factors associated with smoking, heavy drinking and concurrent use of both substances in a socioeconomically disadvantaged sample in Australia. It provides valuable data regarding the concurrent and separate rates of tobacco and alcohol use in a sample of disadvantaged individuals and prompts further research into multiple substance use within clients of community service organisations. However, the present study did not collect data on participants' other substance use or mental health functioning. Illicit drug use or psychopathology may have driven the association between the psychosocial correlates and thus may account for some of the group differences observed. Obtaining accurate numbers of client presentations to the service in which this study was carried out was not possible. This limited the ability to provide an estimate of eligibility rates in this convenience sample. However the prevalence of smoking and heavy alcohol use in this survey are very close to those found in studies conducted in similar settings where consent rates were between 69% and 96% (Bryant et al., 2013; Lisha, Carmody, Humfleet, & Delucchi, 2014). Smoking and alcohol use were assessed using self-report. Self-reported smoking status within socioeconomically disadvantaged samples using a touchscreen survey has been shown to be reliable and valid (Bryant, Bonevski, Paul, et al., 2011) and under-reporting of alcohol consumption does not appear to vary with socioeconomic position. Therefore, estimates of the prevalence of use of these substances are

unlikely to have been heavily biased by the use of self-report. Additionally, the measures used within this study were brief indices of the constructs measured (compared to other available measures for these constructs). Use of longer or more comprehensive measures of these constructs may have provided different results.

4.3 Conclusion

Even among socioeconomically disadvantaged individuals, there is a subset of people who are at greater risk of health issues due to concurrent smoking and heavy drinking. This subset also experiences multiple forms of disadvantage including being homeless, being single, having more smokers in their social networks, and having higher levels of financial stress. Interventions aimed at smoking cessation and reducing heavy drinking may be strengthened by addressing both behaviours together. Addressing factors associated with disadvantage including low income, and housing status should also be a focus of research aimed at increasing the health profile of disadvantaged individuals.

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