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Prevalence of smoking and other health risk factors in people attending residential substance abuse treatment

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Abstract

Introduction and Aims. People attending substance abuse treatment have an elevated risk of developing cardiovascular disease (CVD) and cancer. Consequently, there have been increasing calls for substance abuse treatment services to address smoking. The current study examined smoking behaviours of people attending residential substance abuse treatment. Additionally, the study examined rates of other potentially modifiable health risk factors for the development of CVD and cancer. Design and Methods. A cross-sectional survey was completed by participants attending Australian Salvation Army residential substance abuse treatment services (n = 228). Rates of smoking, exercise, dietary fat intake, body mass index and depression were identified and compared with representative community populations. The relationship between length of treatment and changes in these variables was also examined. Results. When compared with the Australian population, participants were much more likely to be current smokers. They also showed higher rates of dietary fat intake, and having had a previous diagnosis of a depressive disorder. Encouragingly, participants were more likely to be engaging in regular exercise. Over a third of all smokers reported having increased their smoking since attending the residential program, with correlational analysis suggesting that nicotine dependence was increasing the longer participants were in treatment. Discussion and Conclusions. People attending substance abuse treatment show extremely high rates of smoking (77%). With the large majority of participants showing multiple risk factors for CVD, it is important that residential services consider strategies to address smoking and the other potentially modifiable health risk factors in an integrated fashion. [Kelly PJ, Baker AL, Deane FP, Kay-Lambkin FJ, Bonevski B, Tregarthen J. Prevalence of smoking and other health risk factors in people attending residential substance abuse treatment.

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Key Words: Smoking, residential rehabilitation, alcohol and substance abuse, The Salvation Army, and multiple health behaviour change.

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Introduction and Aims: People attending substance abuse treatment have an elevated risk of developing cardiovascular disease (CVD) and cancer. Consequently, there have been increasing calls for substance abuse treatment services to address smoking. The current study examined smoking behaviours of people attending residential substance abuse treatment. Additionally, the study examined rates of other potentially modifiable health risk factors for the development of CVD and cancer.

Design and Methods: A cross sectional survey was completed by participants attending Australian Salvation Army residential substance abuse treatment services (N = 228). Rates of smoking, exercise, dietary fat intake, body mass index and depression were identified and compared to representative community populations. The relationship between length of treatment and changes in these variables was also examined.

Results: When compared to the Australian population, participants were much more likely to be current smokers. They also demonstrated higher rates of dietary fat intake, and having had a previous diagnosis of a depressive disorder. Encouragingly, participants were more likely to be engaging in regular exercise. Over a third of all smokers reported having increased their smoking since attending the residential program, with correlational analysis suggesting that nicotine dependence was increasing the longer participants were in treatment.

Discussion and Conclusions: People attending substance abuse treatment demonstrate extremely high rates of smoking (77%). With the large majority of participants demonstrating multiple risk factors for CVD, it is important that residential services consider strategies to address smoking and the other potentially modifiable health risk factors in an integrated fashion.

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Prevalence of smoking and other health risk factors in people attending residential substance abuse treatment

People with a history of alcohol or substance abuse problems have higher rates of smoking than the general population (1). They also tend to smoke substantially more cigarettes each day, and have higher rates of nicotine dependence (2). In populations with a history of substance abuse problems, tobacco-related causes of death account for higher rates of mortality than alcohol-related causes of death (3). Yet, drug and alcohol treatment providers have traditionally been poor at addressing smoking. For example, in a 2005 Australian survey, substance abuse treatment providers estimated that only 32% of patients received 'adequate smoking advice' (4). Researchers have been increasingly recommending the implementation of smoking cessation interventions within substance abuse treatment (5-7). However, it is not clear if residential substance abuse services are now addressing smoking as part of routine care.

Along with alcohol abuse and smoking, poor dietary habits and low levels of physical activity have been identified as common risk behaviours for the development of both CVD and cancers (8). Participant surveys indicate that once people access residential treatment they tend to report concerns with unhealthy weight gain and the development of obesity (9). Both neurobiological theories of obesity (10) and participant interviews (9) suggest that high-fat diets may be used as a substitute for substance use during recovery. More comprehensive data are needed to examine the prevalence of unhealthy eating amongst substance abuse populations. Likewise, there has been limited research examining exercise habits of people with a history of substance abuse problems. Exercise has been promoted as an important component of substance abuse treatment (11-13), but it is not clear how frequently people attending residential substance abuse services actually engage in regular moderate to vigorous exercise. It is likely that the consumption of high fat diets and low levels of physical

activity contributes to unhealthy weight gain in people attending residential substance abuse treatment. Whilst this weight gain is a risk factor for CVD and cancer in itself (8), it is also likely to significantly influence patient decisions to stop smoking as fear of weight gain is a significant barrier to people quitting (14).

The aim of the current study was to examine smoking behaviours of people attending The Salvation Army residential substance abuse services. The study also examined the dietary fat intake and exercise habits of participants. Self reported Body Mass Index (BMI) and a previous diagnosis of depression were also included as these are known risk factors for CVD (15). Rates were compared to large community Australian populations. The study also examined the potential relationship between length of stay and participants' risk factors.

Method

Participants

A total of 246 people were approached to complete the survey. All participants were attending residential substance abuse treatment at one of eight Australian Salvation Army Recovery Service Centres. These programs were located across Queensland, New South Wales and the Australian Capital Territory. The treatment program is up to 10-months in length and is operated in the form of a modified therapeutic community. Approximately 25 to 30% of participants attend these programs as a result of involvement with the criminal justice system. A requirement of attending these programs was that participants remain abstinent from alcohol and other substances of abuse, but they could continue to smoke cigarettes.

Procedures

The researchers visited each of the sites and provided a brief presentation to the residents regarding the study. Residents were informed that participation was entirely voluntary and that the questionnaire was anonymous. The University of Wollongong Human Research Ethics Committee provided approval to conduct the study.

Measures

Participants completed a detailed questionnaire composed of the following areas:

Background Information: This included demographic details such as gender, age and the length of time that the participant had been attending the Recovery Service Centre. Participants also indicated their primary substance of abuse, years they have had substance abuse problems, and whether they have previously received substance abuse treatment (Yes or No). Participants were also asked if they had "previously received treatment for a mental health problem" (Yes or No) and to identify any previous mental health diagnoses.

Smoking

Participants were asked if they currently smoke tobacco products (Yes or No), the age that they first began smoking, the number of cigarettes they smoked in the last twenty-four hours, and whether they had previously made quit attempts (Yes or No). To examine changes in smoking, participants were also asked if they have smoked "more cigarettes than I normally would", "about the same number of cigarettes that I normally would", or "less cigarettes than I normally would" since attending the Recovery Service Centre. The Fagerstrom Test of Nicotine Dependence (FTND; 16) was used to measure nicotine. This is a validated measure comprised of six items, with a total score ranging between 0 and 10. Scores can be categorised into four categories: 'low dependence' (1-2), 'low to moderate dependence' (3-4), moderate dependence (5-7), and 'high dependence (8-10). In the current study the FTND had adequate internal consistency, with a Cronbach's alpha of 0.61.

Diet, exercise, BMI and depression

The Short Fat Questionnaire (SFQ; 17) was used as a measure of high fat dietary intake by participants. The SFQ is a brief, 17 item questionnaire that has been validated for Australian adults (17). In the current sample the Cronbach alpha was 0.85. The self-administered short version of the International Physical Activity Questionnaire (IPAQ; 18)

was used to assess participant's exercise rates. It measures the frequency and duration of moderate and vigorous intensity exercise in the past 7-days. To facilitate comparison, scoring was based on the procedures used by the Australian National Health Survey (19). BMI was calculated from participants self reported height and weight using the formula: weight (kg)/height (m)^2. Depressive symptoms were measured using the 7-item depression subscale of the Depression, Anxiety, Stress Scale-21 (DASS; 20). The DASS is a widely used scale, measuring the participant's symptom distress over the past week. The Cronbach alpha for the depression scale in the current study was 0.94.

Desire to change

Participants were asked to indicate (Yes or No) if they were: "seriously thinking about quitting smoking", "seriously thinking of increasing your current levels of physical activity", "seriously thinking of improving your diet and nutrition", and "seriously thinking about losing weight".

Statistical Analysis

Reliability alpha co-efficients were calculated. Spearmans correlations were used to examine the relationship between length of treatment and risk factor scores. Odds ratios (OR) and 95% confidence intervals were calculated to compare results from the current study with community based normative data. Smoking, exercise, and BMI variables were compared to participants aged between 18 and 64 who completed the Australian National Health Survey (mean age = 40.2) (21). Depression rates were compared to participants aged between 18 and 64 who completed the National Survey of Mental Health and Wellbeing (mean age = 40.7) (22). As the National Health Survey did not examine dietary fat intake, comparison for the SFQ was made with a community sample that were randomly selected from the Australian electoral roll (mean age = 44.7, age range 20 – 59, n = 490) (23).

Results

Sample

Two hundred and twenty eight people agreed to participate in the study (93%). The majority of participants were male (82.5%), reported that alcohol was their primary substance of abuse (61%) and had previously been diagnosed with a mental illness (60%; see Table 1).

(Insert Table 1 about here)

Smoking

The majority of participants (77.2%) reported that they were current smokers, on average, smoking 20 cigarettes in the past 24-hours (range 2 to 50). Using the FTND, 78.2% of participants were classified as having 'high' or 'moderate' levels of nicotine dependence. Approximately one third of participants reported that they had increased their level of smoking since attending the residential facility (32.2%), 33.3% reported that their smoking had remained the same, and 34.5% reported that they had decreased their smoking. Of all smokers, 74.7% reported that they had tried to quit smoking previously, with 66.5% reporting that they were "seriously thinking about quitting". There was a significant relationship between the length of time the person had been in treatment and the person's score on the FTND (see Table 2). Overall, participants were approximately 13 times more likely to smoke than a community sample (OR = 13.63, 95% CI = 6.92 – 26.84; see Table 3).

Dietary fat intake

The majority of participants (60.7%) were found to be consuming a high fat diet and were approximately twice as likely to be consuming a high fat diet than the community sample (OR = 2.03, 95% CI = 1.15 – 3.57). Of the individuals who were consuming a high fat diet, 55.8% reported that they were "seriously thinking about improving their diet".

Physical activity

In the past 7-days, 44.9% of participants reported engaging in moderate to high levels of physical activity. This rate is approximately 2-times higher than the general population,

where only 27.6% of participants engaged in moderate to high levels of physical activity (OR = 2.04, 95% CI = 1.13 – 3.66). Of the participants who were not engaging in moderate to high levels of physical activity, 81% were "seriously thinking about increasing their fitness levels".

Body Mass Index (BMI)

An examination of BMI scores revealed that 68.2% of participants were overweight or obese (43.3% and 24.9%, respectively). Of those overweight or obese participants, 66.9% were "seriously thinking about losing weight".

Depression

Thirty-six percent of participants reported that they had previously been diagnosed with depression. This was substantially higher than the community sample, with participants approximately 4 times more likely to have previously been diagnosed with depression (OR = 3.90, 95% CI = 1.91 – 7.96). Approximately 54.7% of participants reported moderate (25.6%) or severe to extremely severe (29.1%) levels of depressive symptoms on the DASS. There was a statistically significant negative relationship between the length of time the person had been in treatment and the person's score on DASS-21 depression subscale (see Table 2).

<center>Insert Tables 2 and 3 about here</center>

Multiple risk factors

As highlighted in Table 4, 96.3% of participants demonstrated at least one risk factor. For smokers in the study, 86.4% reported smoking and at least one other additional health risk factor.

<center>Insert Table 4 about here</center>

<center>Discussion</center>

Smoking continues to be a significant concern for this population. The majority of participants report smoking (77%) and demonstrated considerable levels of nicotine dependence. Additionally, the majority of smokers demonstrate at least one other lifestyle risk factor (86%). This is in addition to their extensive history of alcohol or substance abuse, making this population very susceptible to developing CVD and cancers. Encouragingly, 67% of participants reported that they were 'seriously considering quitting' and 75% of participants had previously made quit attempts. This suggests that participants might be more willing to engage in smoking cessation interventions than previously estimated by substance abuse clinicians and management (4). The odds of smoking are 13 times higher for the inpatient sample than people from the general community. Likewise, the odds of previously being diagnosed with depression (4 times higher) or consuming a high fat diet (2 times higher) was higher than the general community. Encouragingly, the odds ratio indicated that participants were twice as likely to be engaging in regular exercise.

Correlations explored the potential relationships between length of stay in the residential program and the participant scores on the risk factors. Results indicated a statistically significant negative relationship between length of treatment and depressive symptoms, such that, depressive symptoms decrease the longer participants are in treatment. In contrast, neither dietary fat intake nor levels of exercise were related to length of stay. This suggests that the residential program is having a limited impact on improving these health behaviours. Of concern is the positive correlation between length of stay and nicotine dependence which raises concerns that the longer the person spends in treatment the more dependent they become on nicotine. This relationship is in line with 33% of participants reporting increases in their level of smoking since attending the residential program. It is important to note that these correlational analyses do not demonstrate causation. Future research is required to examine the mechanisms that underlie these relationships.

The high frequency of smoking and other CVD and cancer risk factors suggests the need for multiple behaviour change interventions (11). Research on the general population now suggests that programs targeting multiple risk behaviours are feasible, effective, and efficient (12). Multi-component healthy lifestyles interventions are now being developed and trialled for people diagnosed with severe mental illness that target smoking, diet, physical activity and alcohol use (24). However, there has been reluctance within the substance abuse field to adopt these practices. This is largely the result of long-standing beliefs amongst service providers that attempting to make too many lifestyle changes will undermine the person's recovery from addiction. This view is at odds with increasing empirical support for the use of multiple behaviour-change interventions (12). For example, a meta-analytic review of smoking cessation interventions suggests that addressing smoking during alcohol and other substance abuse treatment may actually enhance longer-term sobriety outcomes (14). Residential services provide long-term, structured and stable drug free environments. This provides an ideal opportunity to target multiple risks in a systematic fashion. An important area of further study would involve examining the effectiveness of introducing multiple health behaviour change interventions (i.e. healthy lifestyles programs) within residential substance abuse settings. As part of this process it is important to consider strategies to assist the participant to maintain positive changes once they return to their home. With the increasing empirical support for the use of telephone delivered continuing care protocols to enhance substance abuse outcomes (25), it may be useful for researchers to consider how these types of interventions can focus more broadly on other health risk behaviours.

Limitations of the current study include the cross-sectional and self-report nature of the data. Although attempts were made to make comparisons to representative community samples that used a similar age range, the mean age of participants in the current sample was slightly lower than those of the community surveys. Future research would be improved

through the use of clinical interviews, formal diagnostic assessments and the use of biomedical measures. Examining participant's health behaviours longitudinally, both throughout their stay and at follow-up is recommended. Generalisability would also be improved if future research examined multiple service providers, included participants from other treatment settings (e.g. methadone programs, outpatient treatment) and had larger sample sizes. Not withstanding these limitations, the current study provides baseline information on people attending residential substance abuse treatment. It demonstrates that participants are at an elevated risk of developing CVD and cancer as a result of their history of substance abuse problems, smoking and other risk factors. It is important that trials are conducted that examine the most effective ways to target these risks within residential treatment. It may be advantageous for residential substance abuse services to consider the use of computer delivered interventions, such as the Self-Help for Alcohol and other drug use and Depression program (26, 27) (SHADE). There is increasing empirical support for these types of programs and they have the advantage that they are relatively low-cost to deliver and help to ensure that program content is delivered consistently. It may also be important for residential substance abuse services to consider broader organisational change (e.g. smoke free settings, improving availability of healthy foods).

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Table 1

Clinical characteristics of participants attending The Salvation Army residential substance abuse programs (N = 228)

Characteristics	n	%	M	SD
Gender (male)	188	82.5		
Age (years)[1]			38.23	10.53
Length of substance abuse problem (years)			19.08	9.89
Total weeks in residential unit			14.00	14.02
Attended previous D&A treatment (yes)	150	65.8		
Current smokers	176	77.2		
Self reported primary substance of Abuse[2]				
Alcohol	133	58.3		
Amphetamines	40	17.5		
Heroin	18	7.9		
Cannabis	13	5.7		
Other	24	10.5		
Previous mental health diagnosis (Yes)	137	60.1		
Self reported mental health diagnosis[3]				
Mood disorders	83	36.4		

Anxiety disorders	33	14.5
Psychotic disorders	20	8.8
Bi-polar	18	7.9
Other	16	7.0

Note: [1]Age range 18 to 69 years. [2]No participants identified smoking as their primary substance of abuse. [3]Participants could report more than one mental health diagnosis.

Table 2

Spearmans correlations between length of time in treatment and risk factors for CVD and cancer

Risk factor	*M*	*SD*	*Weeks in treatment (r_s)*[1]
Nicotine dependence[2]	5.97	2.14	.16*
Dietary fat intake[3]	29.63	9.35	-.01
Exercise[4]	2126.76	4095.54	.04
Body Mass Index	27.46	4.96	.06
Depressive symptoms[5]	15.35	11.92	-.23**

Note. * $p < .05$, ** $p < .01$. [1]Spearmans Rank Correlation Co-efficient between the number of weeks the participant had spent in treatment and each risk factor. [2]Fagerstrom Test of Nicotine Dependence.[3]Short Fat Questionnaire.[4]International Physical Activity Questionnaire. [5]Depression subscale of the Depression, Anxiety and Stress Scale.

Table 3.

The prevalence of cardiovascular risk factors for people attending residential substance abuse
treatment (n = 223) and for the general population

Characteristic	Residential substance abuse treatment			Community population			OR	95% CI
	Men (%)	Women (%)	Total (%)	Men (%)	Women (%)	Total (%)		
Current smoker	73.9	89.7	77.2	21.8	18.0	19.9	13.63	6.92 - 26.84
Fat content of diet[1]								
High	56.4	43.2	53.6	45.1	28.2	36.3	2.03	1.15 – 3.57
Medium	30.2	24.4	29.3	35.0	38.8	36.9	0.71	0.39 - 1.28
Low	13.4	32.4	17.1	19.9	33.1	26.8	0.56	0.29 - 1.12
Exercise[2]								
Sedentary to low	52.7	72.5	55.1	67.9	75.0	71.4	0.49	0.27 - 0.88
Moderate to High	47.3	27.5	44.9	32.1	25.0	28.56	2.04	1.13 - 3.66
Body Mass Index[3]								
Obese	24.7	27.6	24.9	22.6	20.0	21.3	1.23	0.63 - 2.37
Overweight	45.8	27.6	43.3	40.2	27.21	33.9	1.49	0.84 - 2.64
Normal weight	28.3	41.4	29.8	35.8	49.09	42.2	0.58	0.32 - 1.04
Under weight	0.6	3.4	1.00	1.5	3.73	2.6	0.38	0.04 - 3.86
Depression[4]	33.0	50.0	36.4	9.6	16.0	12.8	3.90	1.91 - 7.96

Notes. OR = Odds Ratio. CI = Confidence Interval. [1]Short Fat Questionnaire: low (0 – 21), moderate (22 – 28), and high (29 – 51). [2]International Physical Activity Questionnaire. Participant scores of 800 or higher were classified as 'moderate to high' and scores less than 800 were classified as 'low to moderate' (19). [3]Body Mass Index cut-off points classified the participants as underweight (less than 18.5), normal weight (18.5 -24.9), overweight (25 – 29.9) or obese (more than 30). [4]Self reported previous diagnosis of depression for the residential substance abuse population. Participants in the community sample completed the Composite International Diagnostic Interview (CIDI).

Table 4.

Percentage of participants who report multiple risk factors

Total risk factors	Men (n = 180) %	Women (n = 37; (%)	Smokers (n = 169) (%)	Total (n = 223) (%)
No risks	6.7	2.7	0	3.7
One	20.6	10.8	13.6	17.4
Two	25.6	24.3	27.8	24.2
Three	35.6	43.2	42.6	40.0
Four	10.0	13.5	13.0	12.1
Five	1.7	5.4	3.0	2.6

Notes. Risk factors included smoking, dietary fat intake, exercise, Body Mass Index and depressive symptoms. People were considered to be at risk if they were: a smoker, were in the 'sedentary to low' range on the International Physical Activity Questionnaire, were in the 'high' range on the Short Fat Questionnaire, were in the 'obese' range on the Body Mass Index, and were in the 'severe' or 'extremely severe' range on the depression subscale of the Depression, Anxiety and Stress Scale.