

1-1-2017

## An Exploration of Smoking Among People Attending Residential Substance Abuse Treatment: Prevalence and Outcomes at Three Months Post-Discharge

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### Recommended Citation

Ingram, Isabella; Kelly, Peter James; Deane, Frank P.; Baker, Amanda; Lyons, Geoffrey C.; and Blackman, Russell J., "An Exploration of Smoking Among People Attending Residential Substance Abuse Treatment: Prevalence and Outcomes at Three Months Post-Discharge" (2017). *Faculty of Social Sciences - Papers*. 2814.

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# An Exploration of Smoking Among People Attending Residential Substance Abuse Treatment: Prevalence and Outcomes at Three Months Post-Discharge

## Abstract

Smoking continues to be a major health concern for people with a history of alcohol or other substance use problems. The current research is aimed to (a) describe the prevalence of smoking in residential addictions treatment services and (2) compare characteristics of people who had or had not quit smoking. Methods: Participants were attending residential substance abuse treatment provided by the Australian Salvation Army. These programs are up to 10 months in length and offer a range of low-intensity smoking cessation supports. Measures of smoking, substance use, and clinical characteristics were collected from 2008 to 2015 at baseline and three months post-discharge from treatment (N = 702). Results: At baseline, 86% of people were smokers (n = 606). At follow-up, only 48 participants who were smokers at baseline (7%) had quit smoking. Participants who had quit smoking at follow-up also reported higher rates of abstinence from alcohol or other substances at follow-up (72%) than people who had not quit smoking (46%; OR = 2.95, 95% CI [1.52, 5.74]). Conclusions: There is potential for smoking cessation to be better addressed as part of routine care in substance abuse treatment settings. Future research should evaluate the provision of more systematic smoking cessation interventions within these settings.

## Disciplines

Education | Social and Behavioral Sciences

## Publication Details

Ingram, I., Kelly, P., Deane, F., Baker, A., Lyons, G. & Blackman, R. (2017). An Exploration of Smoking Among People Attending Residential Substance Abuse Treatment: Prevalence and Outcomes at Three Months Post-Discharge. *Journal of Dual Diagnosis*, Online First 1-6.

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An exploration of smoking amongst people attending residential substance abuse treatment:  
Prevalence and outcomes at 3-months post discharge

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An exploration of smoking amongst people attending residential substance abuse treatment:

Prevalence and outcomes at 3-months post discharge

**Brief Article**

Author's Accepted Manuscript

## Abstract

**Objectives:** Smoking continues to be a major health concern for people with a history of alcohol or other substance use problems. The current research is aimed to: 1) describe the prevalence of smoking in residential addictions treatment services; and 2) compare characteristics of people who had or had not quit smoking.

**Methods:** Participants were attending residential substance abuse treatment provided by The Australian Salvation Army. These programs are up to 10-months in length and offer a range of low-intensity smoking cessation supports. Measures of smoking, substance use, and clinical characteristics were collected from 2008 to 2015 at baseline and 3-months post discharge from treatment ( $N = 702$ ).

**Results:** At baseline, 86% of people were smokers ( $n = 606$ ). At follow-up, only 48 participants who were smokers at baseline (7%) had quit smoking. Participants who had quit smoking at follow-up also reported higher rates of abstinence from alcohol or other substances at follow-up (72%), than people who had not quit smoking (46%;  $OR = 2.95$ , 95% (CI) [1.52 – 5.74]).

**Conclusions:** There is potential for smoking cessation to be better addressed as part of routine care in substance abuse treatment settings. Future research should evaluate the provision of more systematic smoking cessation interventions within these settings.

**Key Words:** Smoking, cessation, prevalence, addiction, substance abuse treatment, and The Salvation Army.

An exploration of smoking amongst people attending residential substance abuse treatment:

Prevalence and outcomes at 3-months post discharge

People attending residential substance abuse treatment are 13-times more likely to smoke than the general population (Kelly et al., 2012), with smoking rates up to 84% (Guydish et al., 2015). Within substance abuse treatment populations, more people die from smoking-related causes of death than alcohol or other substances of abuse (Bandiera, Anteneh, Le, Delucchi, & Guydish, 2015). Historically it was believed that addressing smoking during substance abuse treatment would compromise participants' recovery from alcohol or other substances of abuse (Ziedonis, Guydish, Williams, Steinberg, & Foulds, 2006). However, there is now a growing body of evidence to suggest that smoking cessation may be associated with improved broader recovery outcomes (McKelvey, Thrul, & Ramo, 2017; Stuyt, 2014).

There have been repeated calls to address smoking cessation as part of routine substance abuse treatment (Knudsen, 2016; McClure, Acquavita, Dunn, Stoller, & Stitzer, 2014). It is recommended that service providers offer access to smoking cessation counseling and pharmacotherapy (Baca & Yahne, 2009; Bowman & Walsh, 2003; The Royal Australian College of General Practitioners, 2011; Wilson et al., 2016). There is growing evidence that service providers are beginning to provide smoking cessation support, however this is rarely delivered as part of routine care (Knudsen, 2016). For example, Wilson et al. (2016) conducted qualitative interviews with substance abuse treatment workers. The workers reported that Nicotine Replacement Therapy (NRT) use was often discussed with clients, however was sometimes inconsistently addressed (Wilson et al., 2016). Whilst it is a positive step that service providers are beginning to address smoking cessation, it remains unclear whether these low intensity approaches are effective in reducing smoking rates.

The aim of the current study was to describe smoking behaviors of people who attended residential substance abuse treatment provided by The Australian Salvation Army. The primary focus of these programs are on the person's alcohol or illicit substance use, however, the organization also used a range of smoking cessation strategies. The study examined participants accessing these centers over a 7-year period. Rates of smoking and smoking behaviors were assessed at entry to treatment. Telephone follow-up was completed with participant's 3-months after they had left the residential facility. This provided an opportunity to examine potential changes in smoking rates and to compare characteristics of people who had or had not quit smoking.

### *Methods*

#### *Participants*

All participants were accessing residential substance abuse treatment services in New South Wales, Queensland, and the Australian Capital Territory. These programs operate in the form of a modified therapeutic community and participants can stay up to 10-months in the program (see Kelly et al., 2015 for further details). During the study period smoking was only permitted in designated, signposted areas. Smoking status was recorded on file for each participant and all participants were required to complete a 'smoking awareness' educational component during the group program. Participants were encouraged to commence NRT and to access the free National telephone service, Quitline.

The current study combined data collected between 2008 and 2015. The Salvation Army Recovery Services routinely collected information from participants at entry to treatment. Three-month follow-up was completed with a proportion of these participants. For the purpose of this study, participants who had provided smoking status information at both

baseline and follow-up were used. The total sample included 702 people (79% males, 21% females), 6% of whom identified as being from Aboriginal or Torres Strait Islander descent. Participants who had completed a smoking cessation program, as part of another study conducted by the research team (Kelly et al., 2015) were excluded from the current study. The average age of participants was 44 years ( $SD = 10.78$ ). Alcohol was identified as the primary substance of abuse for 68% of participants.

### *Measures*

*Addiction Severity Index 5<sup>th</sup> Edition (ASI) (McLellan et al., 1992):* Only the demographic, psychiatric, employment and substance abuse sections of the ASI were used. Smoking status was determined at both baseline and follow-up by the item, “How many days in the past 30 have you used nicotine?”. Participants were classed as ‘smokers’ if they reported smoking on any days in the past 30. Smoking status was not biochemically verified at baseline or follow-up. Participants were asked “How many days in the past 30” they had used specific types of alcohol or other drugs (e.g. heroin, methamphetamines) at both baseline and follow-up. Alcohol, drug, and psychiatric 30-day composite scores were calculated at baseline, in order to determine the severity of substance use and psychiatric symptoms. Higher composite scores indicate a greater problem severity (McGahan, Griffith, Parente, & McLellan, 1986).

*Additional smoking measures.* At baseline and at follow-up participants were asked to indicate whether they had used NRT in the past 30 days. Based on the transtheoretical model of behavior change (Prochaska & DiClemente, 1982), readiness to quit smoking was assessed at baseline and follow-up using four statements (see Table 1 for the statements). Years of nicotine use was measured using the question “How many years of your life have you regularly used nicotine?”. Age of first use was measured by asking “At what age did you start using nicotine?”.

## *Procedure*

At entry to the program all participants completed the ASI and additional smoking items with The Salvation Army staff. Informed consent was obtained from participants. Three-month telephone follow-up data was collected as part of a wider collaborative research initiative between The Salvation Army and the research team (see Deane et al., 2014 for further details).

## *Statistical Analyses*

At follow-up, quit status was determined for only those participants who identified as smokers at baseline. Participants were classed as having quit smoking ('quitters') if they were smokers at baseline, but non-smokers at follow-up. Smoking status at follow-up was also recorded for people who identified as non-smokers at baseline ( $n = 96$ ), in order to determine whether these individuals continued to identify as non-smokers. Participants were classed as 'abstinent' from drugs or alcohol if they reported having not used any drugs or alcohol (other than nicotine) in the 30 days prior to follow-up. Chi-squared analyses, t-tests, Odds ratios (*OR*) and 95% confidence intervals (*CI*) were calculated to examine differences between people who had quit or had not quit smoking at 3-months post-discharge (see Table 2).

## *Results*

*Smoking at baseline.* Rates of baseline smoking did not differ significantly over the years between 2008 and 2015. At baseline, 86% of participants were smokers ( $n = 606$ ). Of the 96 people who were non-smokers, 34 reported that they had previously been a smoker (35%). Thirteen percent of the sample reported using NRT in the past 30 days. There were no differences in smoking status based on gender, identification as being from Aboriginal or Torres Strait Islander Decent, recent employment or psychiatric scores on the ASI. Non-smokers were more likely to identify 'alcohol' as their primary substance of abuse (80%)

compared with smokers (66.5%),  $\chi^2(1, N = 676) = 6.86, p < .01$ . Readiness to quit smoking, average age of first nicotine use and years of nicotine use at baseline are shown in Table 1.

Insert Table 1 here

*Smoking at follow-up.* The average length of stay in the program was 16 weeks ( $SD = 13.35$ , range 0.14-53.14), and follow-up was completed with participants an average of 10 months ( $M = 9.81, SD = 5.17$ ) after baseline. Of the people who were smokers at baseline ( $n=606$ ), 48 people reported that they had quit smoking at follow-up (7%). Nine percent of people followed-up reported having used NRT in the past 30 days ( $n = 60$ ), and three of these individuals were non-smokers. At follow-up thirty-three percent of the participants were ‘not ready to stop smoking’, 38% were ‘thinking about stopping’, 10% had ‘decided to stop’, and 19% wanted to ‘remain a non-smoker’. Of those who were smokers at follow-up, 2% ( $n = 16$ ) had started smoking since baseline.

*Differences between people who did or did not quit smoking at follow-up.* Table 2 presents baseline characteristics and abstinence rates at follow-up for participants who had or had not quit smoking at follow-up. There was a significant difference in years of nicotine use and age of first nicotine use between people who had or had not quit smoking at follow-up (see Table 2). People who had quit smoking at follow-up were almost three times more likely to be abstinent from all drugs and alcohol at follow-up than those who had not quit smoking,  $OR = 2.95, 95\% CI[1.52-5.74]$ .

Insert Table 2 here

### *Discussion*

The current study demonstrates very high and sustained rates of smoking amongst people attending substance abuse treatment. Eighty-six percent of participants were smokers at baseline, a figure that is consistent with recent reviews (Guydish et al., 2015). Findings

suggest that there is a significant difference between people who quit smoking and those who do not quit, in terms of the age they began smoking and how long they have been smoking for. Whilst there was a statistically significant reduction in smoking rates from intake to follow-up, only a small proportion of participants had quit smoking (7%) and 2% had commenced smoking. The 81% of people smoking at follow-up is still much higher than the Australian population average (13%; Australian Bureau of Statistics, 2015), and continues to reinforce the need to improve the way that smoking is addressed within this population.

Encouragingly, people who had quit smoking were significantly more likely to be abstinent from alcohol and other substances at follow-up than those who had not quit smoking. These findings support an emerging body of research suggesting that quitting smoking does not pose a risk to treatment outcomes (McKelvey et al., 2017; Satre, Kohn, & Weisner, 2007; Toneatto, Sobell, Sobell, & Kozlowski, 1995). For example, a review by McKelvey et al. (2017) found no reports of an increase in substance use as a result of smoking cessation, and concluded that smoking cessation often had a positive effect on substance use outcomes. While the current study was observational, the findings are consistent with previous research that has suggested a reciprocal relationship might exist between smoking and substance use, and that addressing one of these behaviors is likely to lead to improved abstinence from the other (Bien & Burge, 1990; McKelvey et al., 2017; Prochaska, Delucchi, & Hall, 2004; Stuyt, 2014).

The current study has a number of limitations. It is based on self-report data. Future research should include biochemical validation of smoking status in order to improve validity. It was not possible to determine the specific smoking cessation treatment that each individual was offered, thus limiting our understanding of the strategies that may have been helpful for the 7% of the sample who quit smoking. Nonetheless, the current study had a

large sample size with participants who were recruited from across two Australian States and one Territory.

Results from the current study suggest that low intensity approaches to smoking cessation used by service providers may provide some benefit. However, there remains a very large proportion of people who continue to smoke following residential treatment (81%). One explanation for these findings is that quit attempts made during treatment might be undermined by the continued smoking of other participants' onsite at the residential services (Bonevski et al., 2016; Stuyt, 2014). Another explanation arises from the inconsistent approaches to smoking cessation, where staff members might decide on a case-by-case basis the frequency, duration and intensity of smoking cessation treatments that their clients receive (Bonevski et al., 2016; Walsh, Bowman, Tzelepis, & Lecathelinais, 2005). Given that smoking cessation is likely to be beneficial to broader recovery outcomes (McKelvey et al., 2017), it is essential that treatment providers offer more rigorous, systematic and widespread smoking cessation approaches. This could include counseling, provision of NRT, and the introduction of smoke-free policies (Guydish et al., 2012; Lawn & Champion, 2013; Stockings et al., 2014; Stuyt, 2014; Ziedonis et al., 2007). The Australian Salvation Army Recovery Services have now begun to implement a smoke-free policy across their residential treatment services. This is in conjunction with the provision of group-based smoking cessation counseling and access to NRT (Kelly et al., 2015). These efforts to adopt a more rigorous and systematic approach to smoking cessation are likely to have a positive impact on the prevalence of smoking amongst people accessing their services.

#### *Acknowledgements*

The authors would like to sincerely thank the management, staff and participants of The Salvation Army services for supporting this work. Preliminary results from this work

were presented at the Conference of the Australasian Professional Society on Alcohol and Other Drugs, Sydney, New South Wales, Australia, 31<sup>st</sup> October to the 2<sup>nd</sup> December, 2016.

#### *Disclosures*

The research team have an ongoing research consultancy with The Salvation Army to evaluate their program activities and help to guide service improvements. There are no restrictions placed on publication by The Salvation Army.

#### *Funding*

This research was partially funded by The Salvation Army, Australia as part of a research consultancy with the University of Wollongong, NSW, Australia.

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Table 1

*Baseline characteristics for participants*

Baseline characteristics	Total ( <i>N</i> = 702) <i>M</i> ( <i>SD</i> )	Smokers ( <i>n</i> = 606) <i>M</i> ( <i>SD</i> )	Nonsmokers ( <i>n</i> = 96) <i>M</i> ( <i>SD</i> )
Age	43.58 (10.78)	42.92 (10.52)	48.14 (11.52)
Identify as being from Aboriginal or Torres Strait Islander decent	6%	7%	4%
<i>Gender</i>			
Male	79%	79%	80%
Female	21%	21%	20%
<i>Employment Status</i>			
Employed	15%	16%	12%
Not Employed	85%	84%	88%
<i>Primary Substance</i>			
Alcohol	68%	66.5%	80%
Other Drugs	32%	33.5%	20%
ASI Alcohol Composite Score	0.62 (0.22)	0.62 (0.22)	0.61 (0.19)
ASI Drug Composite Score	0.14 (0.13)	0.15 (0.13)	0.08 (0.10)
ASI Psychiatric Composite Score	0.44 (0.23)	0.44 (0.22)	0.39 (0.23)

Smokers	86%	-	-
Non-Smokers	14%	-	-
<i>NRT use at baseline</i>			
No	87%	85%	-
Yes	13%	15%	-
<i>Readiness to Quit at baseline</i>			
I am not ready to stop smoking	24%	28%	-
I am thinking about stopping	49%	57%	-
I have decided to stop smoking	13%	15%	-
I want to stay a non-smoker	14%	-	-
Years of nicotine use	-	21.29 (10.28)	-
Age first nicotine use	-	15.24 (5.04)	-

*Note. Addiction Severity Index (ASI), Nicotine Replacement Therapy (NRT). Participants were classed as having paid employment if they had received any income from paid employment in the 30-days before entry into the program. Participants' primary substance of abuse was obtained from the ASI and categorized as 'alcohol' or 'other drugs'. NRT use and readiness to quit smoking were measured for the past 30-days at baseline.*

Table 2. Baseline variables, abstinence at follow-up, and differences for people who had or had not quit at follow-up.

Baseline characteristics and abstinence at follow-up	Quitters (n = 48) M(SD)	Not Quitters (n = 558) M(SD)	$\chi^2$ , t, p and Odds Ratios
Age	43.00 (11.83)	42.92 (10.48)	NS
Identify as being from Aboriginal or Torres Strait Islander decent	9.5%	6.5%	NS
<i>Gender</i>			
Male	83%	79%	NS
Female	17%	21%	NS
<i>Employment Status</i>			
Employed	17.5%	16%	NS
Not Employed	82.5%	84%	NS
<i>Primary Substance</i>			
Alcohol	69%	66%	NS
Other Drugs	31%	34%	NS
ASI Alcohol Composite Score	0.68 (0.22)	0.62 (0.22)	NS
ASI Drug Composite Score	0.17 (0.13)	0.15 (0.13)	NS
ASI Psychiatric Composite Score	0.48 (0.24)	0.44 (0.22)	NS
<i>NRT use at baseline</i>			

No	71%	86%	NS
Yes	29%	14%	NS

*Readiness to Quit at baseline*

I am not ready to stop smoking	20%	28.5%	NS
I am thinking about stopping	60%	57%	NS
I have decided to stop smoking	20%	14.5%	NS
Years of nicotine use	17.94 (11.19)	21.59 (10.15)	$t(601) = 2.37, p = .018$ $OR = 0.96, 95\% CI [0.93-0.99]$
Age first nicotine use	16.75 (5.29)	15.10 (4.99)	$t(595) = -2.18, p = .03$ $OR = 1.05, 95\% CI [1.00-1.10]$
Abstinence at follow-up	72%	46%	$\chi^2 (1, N = 587) = 11.07, p = .001$ $OR = 2.95, 95\% CI [1.52-5.74.]$

*Note. Addiction Severity Index (ASI), Nicotine Replacement Therapy (NRT). NS = Not Significant. Participants were classed as having paid employment if they had received any income from paid employment in the 30-days before entry into the program. Participants' primary substance of abuse was obtained from the ASI and categorized as 'alcohol' or 'other drugs'. NRT use and readiness to quit smoking were measured for the past 30-days at baseline. Abstinence at follow-up refers to 30-day abstinence from alcohol and other drugs (this does not include tobacco).*