



Full length article

Relapse to smoking following release from smoke-free correctional facilities in Queensland, Australia

Cheneal Puljević^{a,i,j,*}, Dominique de Andrade^{a,b,c}, Ross Coomber^a, Stuart A. Kinner^{a,d,e,f,g,h}^a Griffith Criminology Institute, Griffith University, 176 Messines Ridge Rd., Mt. Gravatt, Queensland, 4122, Australia^b School of Psychology, University of Queensland, Sir Fred Schonell Dr., St. Lucia, Queensland, 4072, Australia^c Centre for Youth Substance Abuse Research, School of Psychology and Counselling, Institute of Health and Biomedical Innovation, Centre for Children's Health Research, Queensland University of Technology, Brisbane, Queensland, 4072, Australia^d Melbourne School of Population and Global Health, University of Melbourne, 235 Bouverie St., Carlton, Victoria, 3053, Australia^e School of Public Health and Preventive Medicine, Monash University, Scenic Blvd., Clayton, Victoria, 3800, Australia^f Mater Research Institute-UQ, University of Queensland, Aubigny Place, Raymond Terrace, South Brisbane, Queensland 4101, Australia^g Centre for Adolescent Health, Murdoch Children's Research Institute, 50 Flemington Rd., Parkville, Melbourne, Victoria, Australia^h Netherlands Institute for the Study of Crime and Law Enforcement, PO Box 71304, 1008 BH, Amsterdam, Netherlandsⁱ Queensland Alcohol and Drug Research and Education Centre, School of Public Health, University of Queensland, 288 Herston Rd, Herston, Queensland, 4006, Australia^j Institute for Social Science Research, University of Queensland, 80 Meiers Rd, Indooroopilly, Queensland, 4068, Australia

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ABSTRACT

Background: Smoke-free prison policies are increasingly common, but few studies have investigated relapse to smoking after release from prison. This study investigated return to tobacco smoking and correlates of smoking at reduced levels after release among adults recently released from smoke-free prisons in Queensland, Australia. **Methods:** A cross-sectional survey of 114 people at parole offices within two months of release from prison was used. The survey measured health, social, and criminological factors related to tobacco smoking. We used logistic regression to identify factors associated with reduced post-release smoking levels compared to pre-incarceration levels.

Results: 94% of participants relapsed to smoking within two months of release; 72% relapsed on the day of release. 62% of participants smoked significantly less per day after compared with before incarceration. Living with a partner (Odds Ratio (OR) 2.77, 95%CI 1.02–7.52), expressing support for smoke-free prison policies (OR 2.44, 95%CI 1.12–5.32), intending to remain abstinent post-release (OR 4.29, 95%CI 1.88–9.82), and intending to quit in the future (OR 3.88, 95%CI 1.66–9.07) were associated with reduced smoking post-release. Use of illicit drugs post-release was negatively associated with reduced smoking post-release (OR 0.27, 95%CI 0.09–0.79). In multivariate analyses, pre-release intention to remain smoke-free was associated with reduced smoking post-release (AOR 2.69, 95%CI 1.01–7.14).

Discussion: Relapse to smoking after release from smoke-free prisons is common, but many who relapse smoke less than before incarceration, suggesting that smoke-free prison policies may reduce post-release tobacco smoking. There is a need for tailored, evidence-based tobacco cessation interventions for people recently released from prison.

1. Introduction

Tobacco smoking is a major cause of illness and death globally (World Health Organization (WHO), 2013). While tobacco use has been declining in most countries due to decades of tobacco control measures (GBD 2015 Tobacco Collaborators, 2017), some population groups continue to smoke at high levels, including people who experience incarceration. Prisoners smoke tobacco at a rate two to six times that of

the general population (AIHW, 2014a; Baybutt et al., 2014); point prevalence is estimated at 56% for American prison entrants in 2014 (Binswanger et al., 2014) and 74% for Australian prison entrants in 2015 (AIHW, 2015). A major reason for this high rate of tobacco use among people entering prison is that population groups in which the prevalence of smoking is high in the community (e.g., people from disadvantaged socio-economic backgrounds (AIHW, 2015; Twyman et al., 2017), Indigenous people (AIHW, 2014b; AIHW, 2013), people

* Corresponding author.

E-mail address: c.puljevic@griffith.edu.au (C. Puljević).

with mental illness (Fazel and Seewald, 2012; White and Whiteford, 2006), and people with substance use problems (AIHW, 2015; Butler et al., 2003; Richter et al., 2002) are over-represented among correctional populations (AIHW, 2015; Baker et al., 2006; Belcher et al., 2006). Tobacco smoking is also entrenched in prison culture, serving a variety of purposes such as stress relief, boredom alleviation, or as a common ground for socialising (AIHW, 2013; Butler et al., 2007). A study of people released from prison in the United States (US) found that each additional five years of history of incarceration was associated with 1.3 times greater odds of smoking, suggesting that exposure to incarceration may be an important determinant of smoking (Howell et al., 2015).

In an attempt to improve the health of smokers, and non-smokers exposed to second-hand smoke, tobacco smoking has been banned in many correctional facilities around the world, including in New Zealand (Bonita and Beaglehole, 2013), most states and territories of Australia (Butler and Yap, 2015), several European countries (Baybutt et al., 2014; Hartwig et al., 2008), Canada (Collier, 2013), and most states of the US (Kennedy et al., 2015). Smoke-free policies are also currently being introduced across prisons in England and Wales (Woodall and Tattersfield, 2017). There is evidence for the health benefits of correctional smoking bans (Clarke et al., 2015; Dickert et al., 2015), with one study reporting a 9% decrease in smoking-related deaths in US prisons that had implemented tobacco bans (Binswanger et al., 2014). However, studies conducted in the US (Clarke et al., 2013; Frank et al., 2016; Howell et al., 2015; Lincoln et al., 2009; Thibodeau et al., 2010; Valera et al., 2016) have found that the majority of people resume smoking upon release from smoke-free prisons; between 60% (Clarke et al., 2013; Lincoln et al., 2009) and 74% (Frank et al., 2016) resume smoking on the day of release, and 97% relapse within six months of release (Lincoln et al., 2009). A recent systematic review of this literature (de Andrade and Kinner, 2016) confirmed that correctional smoking bans result in short-term smoking cessation only and are insufficient to promote long-term smoking abstinence following release from prison. These high rates of tobacco relapse among people leaving prison are especially discouraging given evidence that correctional populations experience particularly poor physical (Binswanger et al., 2007; Morrow, 2009) and mental (Borschmann et al., 2016; Thomas et al., 2016) health outcomes following release from prison, including significantly higher rates of smoking-related illness (Binswanger et al., 2007; Rosen et al., 2008) and mortality (Binswanger et al., 2016) compared to the general community. People leaving prison also experience numerous challenges to successful community re-entry, such as finding housing and employment (Baldry et al., 2003; Porter, 2014), re-establishing relationships (Massoglia et al., 2011), and dealing with substance use disorders (Farrell and Marsden, 2008; Winter et al., 2015), so tobacco smoking cessation may not be a high priority among this vulnerable population (Thibodeau et al., 2010).

Currently, the literature investigating rates of smoking relapse following release from smoke-free prisons is exclusively US-based, and these studies all report absolute post-release smoking status only; none have compared pre- and post-incarceration daily tobacco smoking rates to examine the effect of incarceration in smoke-free correctional facilities on levels of tobacco use after release from prison. Using a sample of adults recently released from smoke-free prisons in Queensland, Australia, this study aimed to (a) investigate time to tobacco smoking relapse following release from prison, (b) compare pre- and post-incarceration daily smoking rates, and (c) identify correlates of smoking at reduced daily levels following release from prison.

2. Methods

This study measured return to tobacco smoking among ex-smokers released from smoke-free prisons in Queensland, Australia in two phases: a cross-sectional survey and a two-month telephone follow-up.

2.1. Participant recruitment

Participants were recruited from 12 Probation and Parole offices across South-East Queensland. Participants were eligible to take part in the study if (1) they were daily smokers on entry to prison, (2) they had been released from prison within the past two months (as the majority of relapses occur within two months of a quit attempt (Hughes et al., 2004)), (3) they were on parole and reporting in person to a Probation and Parole office, (4) they had been out of prison for at least one full day (24 h), and (5) their most recent period of imprisonment was longer than one week (≥ 8 days), to provide sufficient exposure to the smoking ban. The Australian correctional system consists of prisons only, and the median expected time to serve for sentenced prisoners is 1.8 years (Australian Bureau of Statistics, 2017a). Twenty-one percent of people serving community-based corrections orders in Australia have been released from full-time prison custody to parole (Australian Bureau of Statistics, 2017b).

2.2. Data collection

In phase one of the study, parole officers identified potentially eligible participants and referred them to meet with the primary researcher in a private room within the parole office. Following screening for eligibility, the researcher explained the study and provided a written, plain language information sheet. Those who agreed to participate provided written consent. Surveys typically took 20 minutes to complete, and participants were provided with a \$20 supermarket voucher as a reciprocity payment.

In phase two, participants who did not report having returned to smoking at the time of the survey were asked for their telephone number, and the researcher contacted them two months after their prison release date to assess their smoking status at that time. Ethical clearance for the study was granted by Griffith University's Human Research Ethics Committee.

2.3. Measures

Time to smoking relapse and daily smoking rates for those who reported relapse were measured using the timeline follow-back method (Brown et al., 1998; Sobell and Sobell, 1992), where a calendar was used to record the number of cigarettes smoked on each day since release from prison. The survey examined potential correlates of reduced tobacco use following release across five domains: socio-demographic, mental and physical health, incarceration history, tobacco use, and other drug use. Exposed and unexposed categories for each variable and the data source are described in the Supplementary Table.

2.4. Data analysis

First, for participants who reported relapse to smoking, we calculated time to smoking relapse following release from prison. Next, we compared the number of cigarettes smoked per day before and after their most recent period of incarceration using a paired samples *t*-test. We performed univariate and multivariate logistic regression analyses with post-release tobacco use (reduced vs. same or more) as the outcome. Variables significant at $p < 0.05$ in univariate analyses were included in a multivariate logistic regression model. An additional variable controlled for the amount of time between prison release and participation in the study. Statistical analyses were conducted using Stata version 13.1 (Stata, 2013).

3. Results

3.1. Sample

A total of 114 participants completed the survey. The sample

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