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Characteristics of Smoking Used Cigarettes among an Incarcerated Population

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Abstract

Little is known about smoking behaviors involving shared and previously used cigarettes, which we refer to as “smoking used cigarettes.” Examples include: cigarette sharing with strangers, smoking discarded cigarettes (‘butts’), or remaking cigarettes from portions of discarded cigarettes. The current study focuses on the prevalence of and factors associated with smoking used cigarettes prior to incarceration among a US prison population. Questionnaires were administered to 244 male and female inmates at baseline. Prevalence of smoking used cigarettes was assessed using three questions; one about sharing cigarettes with strangers, one about smoking a “found” cigarette, and one about smoking previously used cigarettes. Factors associated

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with those who engaged in smoking used cigarettes were then compared to those who did not engage in smoking used cigarettes. A majority of participants (61.5%) endorsed engaging in at least one smoking used cigarette behavior in the past prior to incarceration. Those who engaged in these behaviors were more likely to have a higher degree of nicotine dependence, to have started smoking regularly at a younger age, and to have lived in an unstable living environment prior to incarceration. Our results indicate that a history of smoking used cigarettes is common among incarcerated persons in the US. Consistent with our hypothesis, engaging in smoking used cigarettes was found to be associated with a higher degree of nicotine dependence.

Keywords

smoking; smoking used cigarettes; inmates; nicotine dependence

Cigarette smoking is a serious public health concern that has contributed to over 480,000 deaths annually in the United States (US) and to over 20 million deaths in this country since the first Surgeon General's report on smoking and health in 1964 (US Department of Health and Human Services, 2014). Despite increased public knowledge of the negative health consequences of smoking cigarettes, in 2010 approximately 45.3 million American adults were smokers, accounting for 19.3% of the general population (Centers for Disease Control and Prevention [CDC], 2011). The prevalence of smoking cigarettes among incarcerated individuals has been estimated to be nearly three times higher than that of the general population (CDC, 2006).

Factors that have been associated with higher rates of cigarette smoking and lower quit rates among incarcerated persons include lower socioeconomic status (Franks et al., 2007), higher rates of other substance use (National Center on Addiction and Substance Abuse at Columbia University, 2010; Prochaska, Delucchi, & Hall, 2004), and lower levels of educational attainment (CDC, 2011). Similarly, lower socioeconomic status, lower levels of educational attainment (Siahpush, McNeil, Borland, & Fong, 2006; Sheffer et al., 2012) and other substance use (Substance Abuse and Mental Health Services Administration, 2011) have also been associated with higher levels of nicotine dependence.

Little is known about smoking behaviors involving shared and previously used cigarettes for which we use the term "smoking used cigarettes." When considering the economic reality of those who pass through correctional facilities, satisfying a nicotine craving can be a substantial economic burden. Consequently, individuals prior to becoming incarcerated may have engaged in smoking used cigarettes due to the rising costs of cigarettes. In addition, some cigarette smokers may save used cigarettes for later smoking. Nicotine dependence may be driving these behaviors for immediate relief and/or for avoidance of future discomfort. Examples of smoking used cigarettes include: cigarette sharing with strangers, smoking discarded cigarette butts, and remaking cigarettes from discarded cigarettes (Aloot, Vredevoe, & Brecht, 1993; Okuyemi et al., 2006).

Currently, the only studies that address smoking used cigarettes have focused on homeless populations (Aloot, Vredevoe, & Brecht, 1993; Okuyemi et al., 2006). In their seminal article, Aloot and colleagues (1993) found that among a homeless population, sharing

cigarettes (86%), smoking cigarettes remade from discarded cigarette butts (71%), and smoking discarded cigarette butts (63%) were the most commonly used alternative smoking behaviors. However, that study was limited since the authors only reported the frequency of such practices, and did not assess other variables that may be associated with, or predictive of, engaging in such practices.

The current study focuses on the prevalence of smoking used cigarettes among a US prison population prior to their incarceration, and a number of different variables that may be associated with such behaviors. Data were drawn from a randomized controlled trial (RCT) of a smoking cessation intervention conducted in a tobacco-free prison (Clarke et al., 2013). We hypothesized that the practice of smoking used cigarettes prior to incarceration would be associated with greater nicotine dependence.

Methods

Participants

Data were collected from inmates in a large state correctional facility that is smoke-free located in the northeastern region of the US who participated in a RCT. The RCT was designed to evaluate the effectiveness of a six-session smoking cessation intervention using cognitive-behavioral therapy enhanced with motivational interviewing versus a control condition. The control condition involved participants watching health videos, not related to smoking cessation. Both conditions were equivalent in frequency and duration of participant contact. Detailed study design and outcomes of the RCT are published elsewhere (Clarke et al., 2011; Clarke et al., 2013). Methods were reviewed and approved by the Memorial Hospital of Rhode Island Institutional Review Board, the Office of Human Research Protections, and the Medical Research Advisory Group at the Rhode Island Department of Corrections.

Procedures

Inmates who met study eligibility criteria (18 years of age or older, report smoking ten or more cigarettes per day prior to incarceration, able to speak and understand English, and scheduled to be released from prison within eight weeks of study enrollment) were invited to participate in the study. Trained research assistants administered informed consent to all eligible individuals who were interested. This process included an explanation of the study, reading the consent form to the participant, answering questions from participants, and signing the consent form. All participants (regardless of condition) received an American Heart Association smoking cessation pamphlet, a list of community resources, and the telephone number for a quit line to use post incarceration at the end of the study.

Measures

After obtaining consent, questionnaires were administered by an Audio Computer-Assisted Self-Interview (ACASI) in which participants listened to questions on headphones, viewed questions on the computer screen and used the computer to input their responses at baseline. Questionnaires assessed past smoking behaviors, pros and cons of smoking, nicotine dependence, plans for smoking upon post-release, smoking used cigarettes and other

substance use, impulsiveness and demographics. Past smoking behaviors included asking participants to identify how many cigarettes they smoked on a daily basis the month before they were incarcerated and time since they had last smoked a cigarette. The pros and cons of smoking were assessed using the short-form of the Decisional Balance Scale (Velicer, DiClemente, Prochaska, & Brandenburg, 1985). The Fagerstrom Test for Nicotine Dependence (FTND) was used to assess nicotine dependence (Heatherton, Kozlowski, Frecker, & Fagerstrom, 1991). The FTND was modified to reflect time prior to incarceration with higher scores indicating greater dependence. A modified version of the Ladder of Change was used to identify plans for smoking behaviors upon post-release with higher scores (range = 0 – 10) indicating a plan to remain smoking abstinent (Biener & Abrams, 1991). The Barratt Impulsiveness Scale (BIS) was used to assess impulsiveness on three factors: Attentional, Motor, and Non-planning. These items are scored on a 4-point scale with higher scores indicating greater impulsiveness (Spinella, 2007). Demographic characteristics included age, gender, race/ethnicity, education, and living situation prior to incarceration.

Smoking used cigarettes was assessed at baseline only, using the following three questions answered on a “yes” or “no” scale: “Have you ever shared a cigarette with a stranger?”, “Have you ever smoked a cigarette that you found?” and “Have you ever smoked a cigarette that someone else has used [a cigarette butt]?” that were developed by the research team based upon their prior work with smokers and with incarcerated populations. Smoking used cigarettes included anyone responding ‘yes’ to at least one of the three questions.

Data Analysis

All analyses were performed using SPSS statistical software version 20. Descriptive statistics (e.g., frequencies, means, and standard deviations) were used to describe sample characteristics including demographics, smoking-related variables, and other substance use. The three smoking used cigarettes questions were examined in aggregate and also dichotomized into ‘engaged in at least one of these behaviors’ or ‘engaged in none of these behaviors’. Odds ratios were used to examine the associations between smoking used cigarettes and demographics, smoking-related variables, and other substance use.

Results

In total, 312 people were screened during the RCT, of whom 273 met eligibility criteria and 262 agreed to participate and completed the consent process. Of the 262 enrolled at baseline, data were excluded from nine participants due to a technical error in the ACASI system resulting in loss of some baseline data, and six more participants were eliminated from analyses because they became ineligible for the study after baseline. There are also three additional participants who were excluded from analysis because they did not respond to the “Smoking Used Cigarettes” questions. The final sample included 244 participants.

The final sample was 52.0% Caucasian, 20.1% Hispanic, and 17.6% Black. The majority (65%) were male, had a mean age 35.6 years of age ($SD=9.2$). Approximately 65% of participants had not completed high school, 20% had graduated from high school, and 15% had education beyond high school. The mean age participants began daily smoking was 15.7

years ($SD=4.5$), and the mean number of years of smoking prior to incarceration was 19.4 ($SD=10.0$). The mean number of cigarettes that participants smoked per day in the month prior to incarceration was 21.7 ($SD=11.7$). Mean scores on the modified FTND were 5.1 ($SD=2.3$).

Frequencies of the items measuring smoking used cigarettes were as follows: A majority of participants (61.5%) engaged in at least one of these behaviors prior to incarceration. Nearly half (48.4%) endorsed ever sharing a cigarette with a stranger; 46.3% indicated they had ever smoked a cigarette that they found, and 43.9 % indicated that they had ever smoked used cigarette butts that they had found prior to their incarceration.

Significant differences in demographic characteristics and smoking-related variables were found between those who engaged in smoking used cigarettes and those who did not. Those who engaged in these behaviors were more likely to have a higher degree of nicotine dependence (OR 1.17; 95% CI 1.04-1.32), to have started smoking regularly when they were younger (OR .94; 95% CI .89-.99), have a shorter period of time since they last smoked regularly (OR .70; 95% CI .56-.87), and lived in an unstable living environment prior to incarceration (OR 2.05; 95% CI 1.09-3.87) than those who did not engage in these behaviors. Participants who endorsed the perceived benefits of smoking (pros; OR 1.44; 95% CI 1.07-1.93) were also more likely to engage in smoking used cigarettes. There was also a positive association between smoking used cigarettes and non-planning impulsiveness (OR 1.11; 95% CI 1.03-1.21).

However, smoking used cigarettes was not significantly associated with level of education, socioeconomic status, the average number of cigarettes smoked the month prior to incarceration, plans to resume smoking or remain quit post-release, or engaging in other substance use behaviors including intravenous drug use. See Table 1 for details.

Discussion

The majority of the inmates in the present study engaged in some form of smoking used cigarettes prior to incarceration, similar to the behaviors previously reported among a homeless population (Aloot et al., 1993). Consistent with our hypothesis, we found that engaging in these behaviors prior to incarceration was associated with a greater degree of nicotine dependence. Thus, these individuals may have engaged in smoking used cigarettes to satisfy an immediate nicotine craving or to save them for later use to avoid future discomfort.

Our finding that smoking used cigarettes was not significantly associated with socioeconomic status and level of education was somewhat surprising. However, it is possible that since the majority of incarcerated persons tend to come from lower socioeconomic and educationally-deprived environments (Franks et al., 2007), the differences in socioeconomic status and educational level between those who engaged and did not engage in smoking used cigarettes in this study may be too small to detect significant differences in these behaviors. Alternatively, it may be that engagement in smoking used cigarettes may be more strongly associated with level of dependency than with not having

higher educational attainment or greater economic means to purchase new or previously unused cigarettes. That is, a higher degree of dependency may greatly influence engagement in smoking used cigarettes than an individual's current financial or educational circumstances.

Our finding that smoking used cigarettes was not significantly associated with higher levels of other substance use was also interesting. One explanation for this non-significant finding may be that in the present study we examined substance use in general rather than investigating substance abuse or dependence specifically. A more detailed assessment of degree of substance use/abuse/dependence may have revealed a relationship to smoking used cigarettes. Also, similar to socioeconomic status, since we are looking at an incarcerated population, substance use in general is much higher among people who are incarcerated than those in the general population (Compton, Dawson, Duffy & Grant, 2010) and as a result, substance use may be too highly prevalent for any statistically significant differences to be found among those who engage in smoking used cigarettes and those who do not.

Results from this study not only suggest an association between nicotine dependence and smoking used cigarettes, but an association between other variables believed to be related to greater nicotine dependence. For example, we found that participants who began smoking at a younger age were significantly more likely to engage in baseline smoking used cigarettes. This finding is consistent with past research that have shown that earlier onset of regular smoking is associated with greater nicotine dependence later in life (Kendler, Myers, Damaj, & Chen, 2013; Breslau, Fenn, & Peterson, 1993).

While our study is the first to examine smoking used cigarettes among an incarcerated population in the US, our results suggest that future research on the different types of smoking used cigarettes (cigarette sharing with strangers, smoking discarded cigarette butts, and remaking cigarettes from discarded cigarettes) is needed to evaluate the short- and long-term adverse effects of these behaviors on a variety of health outcomes including cardiovascular disease, respiratory disease, and cancer. Additionally, there is a need for research on more detailed measures of the frequency of smoking used cigarettes to facilitate estimates of the morbidity/mortality associated with this practice. This is particularly important when considering the medical costs for prisoners is approximately 11% of all correctional budgets (Lamb-Mecganick & Nelson, 2000) in large part because inmates suffer disproportionately from health disparities due to tobacco-related illnesses.

Our measure of smoking used cigarettes examined whether a participant had ever engaged in these behaviors prior to incarceration. However, these behaviors were not assessed at different time points (e.g., one-week or one-month pre-incarceration, after post-release) and therefore cannot be generalized beyond the baseline characteristics presented here. Future research should consider exploring these behaviors post-release and then comparing this data to post-release nicotine dependence at follow-up.

This study has some limitations. First, as mentioned earlier, the three questions on smoking used cigarettes were developed by the research team based upon past clinical observations of

earlier comments made by inmates. Conducting qualitative research could help to extend our understanding of smoking used cigarettes and to support the development of validated multi-item scales to assess these behaviors more fully. Also, future research should consider assessing earlier time points (e.g., one-week or one-month) for pre-incarceration rates of smoking used cigarettes rather than ‘ever’ use prior to becoming incarcerated. The more recent use could help to reduce some recall bias and provide greater validity as an assessment of these behaviors. Second, our findings may not generalize to inmates in prisons that allow smoking as we conducted this study within a tobacco-free prison in the US.

In spite of these limitations, the strength of our study is that we introduce the notion of smoking used cigarettes among an incarcerated population in the US, and are the first to examine the relationship between smoking used cigarettes and nicotine dependence. Professionals working with inmates to eliminate or reduce their smoking behaviors might benefit from assessing inmates' perceptions of smoking in relation to their nicotine dependence and what that dependence may lead them to do, such as engaging in smoking used cigarettes.

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Table 1

Means, standard deviations, frequencies, and odds ratios examining differences between those who engaged in smoking used cigarettes (n=150) and those who did not engage in smoking used cigarettes (n=94) for demographics, smoking-related variables, and other substance use

Characteristic	Engagers		Non-Engagers		Odds Ratio [95% CI]	P
	Group N	Mean (SD) or Count (%)	Group N	Mean (SD) or Count (%)		
Demographics						
Age	149	36.21 (8.81)	93	34.58 (9.72)	1.02 [.99-1.05]	.180
Gender (male)	150	93 (62.0%)	94	66 (70.2%)	1.45 [.83-2.51]	.191
Race/ethnicity (non-white)	150	67 (44.7%)	94	50 (53.2%)	.71[.42-1.19]	.195
Living situation (unstable)	140	44 (31.4%)	93	17 (18.3%)	2.05 [1.09-3.87]	.027*
Income (prior to incarceration)	131	1147.07 (2491.40)	86	2205.93 (6546.21)	1.00 [1.00-1.00]	.143
Education (12 th grade or less)	149	122 (81.9%)	94	84 (89.4%)	.54 [.25-1.17]	.118
Smoking-Related Variables						
Age started smoking	149	15.27 (4.24)	93	16.46 (4.76)	.94 [1.89-.99]	.047*
# of cigarettes smoked prior to incarceration	150	22.55 (11.35)	94	20.20 (12.23)	1.02 [.99 – 1.04]	.131
Time since last cigarette	148	0.43 (5.10)	91	0.83 (2.91)	.70 [1.56-.87]	.001*
Decisional balance (pros of smoking)	150	3.46 (.895)	94	3.17 (.890)	1.44 [1.07-1.93]	.015*
Nicotine dependence	141	5.44 (2.29)	90	4.61 (2.29)	1.17 [1.04-1.32]	.009**
Plans to Quit post-release	149	69 (46.3%)	94	49 (52.1%)	.79 [47-1.33]	.377
Impulsivity (non-planning)	150	14.47 (3.26)	94	13.37 (3.05)	1.11 [1.03-1.21]	.011*
Other Substance Use						
Any drug use	150	143 (95.3%)	94	86 (91.5%)	1.90 [1.67-5.43]	.230
Injection drug use	150	37 (24.7%)	94	15 (16.0%)	1.72 [1.89-3.35]	.108

Note.

* $p < 0.05$,

** $p < 0.01$