

Smoking and Smoking Cessation Among Criminal Justice–Involved Older Adults

Tobacco Use Insights
Volume 12: 1–9
© The Author(s) 2019
Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/1179173X19833357



Cyrus Ahalt¹, Timothy Buisker², Janet Myers³ and Brie Williams¹

¹Division of Geriatrics, Department of Medicine, University of California, San Francisco, San Francisco, CA, USA. ²Epidemiology Division, School of Public Health, University of California, Berkeley, Berkeley, CA, USA. ³Center for AIDS Prevention Studies and Prevention Research Center, University of California, San Francisco, San Francisco, CA, USA.

ABSTRACT

BACKGROUND: In jails and prisons worldwide, older adults are among the fastest growing demographic groups. Criminal justice–involved populations smoke tobacco at high rates. Older adults are also disproportionate smokers and have more difficulty quitting smoking than other age groups. Yet, little is known about tobacco use or knowledge and attitudes toward smoking cessation among the growing population of incarcerated older adults.

METHODS: A descriptive, cross-sectional survey study of 102 adults aged 55 years or older recently incarcerated in an urban jail using items from the Global Adult Tobacco Survey (GATS).

RESULTS: More than 70% of participants reported being current smokers despite strong knowledge (95%) of the connection between smoking and serious illness. More than half of current smokers reported a past failed quit attempt (62%) and/or said they would like to quit (60%).

CONCLUSIONS: High rates of tobacco use in this population suggest that correctional institutions represent a critical site for the delivery of appropriate smoking cessation interventions to older adults, including integrated treatment approaches for those with co-occurring behavioral health diagnoses.

KEYWORDS: smoking, cessation, aging, older adults, jail

RECEIVED: January 18, 2019. **ACCEPTED:** February 2, 2019.

TYPE: Original Research

FUNDING: The author(s) disclosed receipt of the following financial support for the research, authorship and/or publication of this article: This research was supported by a Pilot and Exploratory grant from the National Palliative Care Research Center, a grant from the Smoking Cessation Leadership Center at the University of California San Francisco, and a grant from the National Institute on Aging (3P30AG044281–02S1). These funders played no role in data collection or analysis or in the preparation or approval of this manuscript.

DECLARATION OF CONFLICTING INTERESTS: The author(s) declared the following potential conflicts of interest with respect to the research, authorship, and/or publication of

this article: BW has served as an expert witness and as a court consultant in legal cases related to prison conditions of confinement. These relationships have included the National American Civil Liberties Union; Squire Patton Boggs; the Center for Constitutional Rights; and others. No such organization played a role in the design, recruitment, data collection, analysis, or preparation of this manuscript. No other authors have conflicting interests to report. The authors have read and confirmed their agreement with the ICMJE authorship and conflict of interest criteria. The authors also confirm that this article is unique and not under consideration or published in any other publication.

CORRESPONDING AUTHOR: Cyrus Ahalt, Division of Geriatrics, Department of Medicine, University of California, San Francisco, 3333 California Street, Suite 380, San Francisco, CA 94118, USA. Email: cyrus.ahalt@ucsf.edu

Introduction

Older adults are among the fastest growing demographic groups in criminal justice systems around the world.¹ Older adults account for approximately 10% of the population in US jails and prisons—(jails hold those who are awaiting trial or serving short sentences for relatively minor crimes while prisons hold adults serving longer sentences)²—up 80% in the first decade of the 21st century compared with 16% growth in the overall prison population.² Adults in the criminal justice system are generally considered “older” in their 50s due to high rates of chronic illness and disability within this age demographic compared with their non-criminal justice–involved counterparts.³ The early onset, on average, of chronic illness (eg, diabetes, hypertension) in this population may be due in part to behavioral health risk factors that are disproportionately common in criminal justice populations.⁴ One recent study of cancer-related disparities among middle aged and older men recently released from a US jail found high rates of smoking (76%) among a cohort of 259 justice-involved men aged 35 to 67 years (average age of 47 years).⁵ Research also shows that

criminal justice–involved Americans commonly experience risk factors for smoking (eg, mental illness, low educational attainment, low socioeconomic status).^{6,7} Furthermore, older adults, regardless of criminal justice status, smoke at disproportionately high rates and have less success quitting smoking compared with other age groups.^{8,9} Yet, little is known about smoking, and the need for smoking cessation programming, in the rapidly growing population of criminal justice–involved adults aged 55 years or older (“older adults”).

Studies have shown high rates of current or former smoking among individuals incarcerated in US prisons of all ages, with prevalence estimates typically ranging from 60% to 80% compared with 15% of non-incarcerated adults.^{10–12} Rates of smoking in incarcerated populations outside the United States are often even higher.^{13,14} Incarcerated people experience disproportionately high rates of mental illness and substance use disorders (SUD), both risk factors for smoking and smoking-related health outcomes. Approximately 200 000 (45%) of the annual 443 000 tobacco-related deaths in the United States occur in persons with mental illness or SUD, and persons with mental



illness die 25 years earlier than the general population, in many cases due to tobacco-related morbidity and mortality.¹⁵⁻¹⁷ A small number of prison systems have adapted smoking cessation programs for use with incarcerated people, but smoking cessation is rarely, if ever, incorporated as standard practice in correctional settings.¹⁸⁻²⁰ As a result, research describes persistently high rates of post-release smoking relapse among adults of all ages following release from incarceration.²¹⁻²³

Although rates of cigarette smoking among all US adults have fallen since 1964, nearly 1 in 5 (18%) adults aged 45 to 64 years and 1 in 10 (8.8%) adults aged 65 years and older are current smokers.²⁴ In addition, older adults are the age group least likely to report a desire to quit using tobacco and are less likely to reside in smoke-free environments than younger adults, which research shows is positively associated with successful quit attempts.⁸ Among older adults, those with low educational attainment and less knowledge of the harms of smoking, poor access to care, and psychological distress are less likely to quit smoking.²⁵ Incarcerated older adults thus represent a uniquely high-risk population. Yet, a recent systematic review of the existing research on prison-based smoking cessation programs did not report any findings specific to older adults.¹⁸ (The literature describing smoking and smoking cessation in US jails is extremely limited; thus, the research described here predominantly reflects prison-based studies.) To better understand tobacco use and its consequences among older individuals incarcerated in jail, we conducted a cross-sectional study of recently incarcerated older adults' tobacco use, burden of associated health problems, and experiences, knowledge, and beliefs related to tobacco use and cessation.

Methods

Study design and sample

This cross-sectional study was part of a larger longitudinal study of 125 older adults in California who were enrolled in a large urban jail and followed for 6 months. Older adults constituted approximately 10% of the overall jail population in this jail, which was also disproportionately African American and Latino. The longitudinal epidemiologic study was designed to assess the health and health care needs of older adults transitioning from incarceration in a jail to the community. All participants were enrolled and completed a baseline interview between March 1 and August 15, 2014, were English or Spanish speaking, and had been detained for at least 48 hours. The study defined "older adult" as anyone 55 years of age or older to account for disproportionately high rates of health risk behaviors and poor access to health care among the criminal justice-involved which results, on average, in physiological ages approximately 10 to 15 years greater than chronological ages.³ The 48-hour cutoff was used because individuals detained in jail are often in transit or appearing in court and not able to participate in a research study in the brief period following arrest. Individuals were considered ineligible for the study if correctional staff deemed them unsafe to

interview in a private setting. Potential participants were asked by a member of the nursing staff during the routine delivery of care if they would like to be contacted by an independent researcher about potential participation in a research study. Those who agreed met within 1 day with a member of the research staff in a private room reserved for visitation where they reviewed information about the study, including its potential risks and benefits, and were given the opportunity to enroll. For those who chose to enroll, written research consent was obtained by a member of the research team using the teach-to-goal approach, which was developed for use with vulnerable research participants and tests participants' understanding of the study prior to enrollment.²⁶ During enrollment, participants provided contact information as well as permission to contact specified friends, family, and/or local businesses and service providers for the purposes of follow-up. Participants indicated how research team staff should identify themselves in all contacts with third parties. Contact information was reviewed and updated at each follow-up contact.

Native-speaking interviewers read questionnaires to participants in private interview rooms, and research staff abstracted jail medical records. All interviews were conducted by a member of the research team. Baseline interviews were conducted in jail. Follow-up interviews for those who had been released to the community were conducted in a private room of a clinical research office located in an urban neighborhood approximately 1 mile from jail. Consistent with federal regulations governing research with incarcerated people (Code of Federal Regulations Title 45 Part C),²⁷ permitted practice in California,²⁸ and relevant ethical considerations,²⁹ participants were paid US\$ 20 as compensation for their time. The study was approved by the Human Research Protection Program at the University of California, San Francisco (approval number 13-11326).

Measures

Sociodemographics, health conditions, and behavioral health risk factors were assessed at baseline. Sociodemographics included age, sex, race/ethnicity, income, homelessness, food insecurity, and health insurance status. Annual income below US\$ 15 000 was used based on Medicaid income eligibility criteria. Homelessness was defined as having spent one or more nights in the 30 days prior to arrest outside or in a homeless shelter. To measure recent food insecurity, all participants were asked at baseline if there had been a time in the past 12 months when they did not have enough money for food. Participants self-reported health insurance status in response to the following question: "are you enrolled in any type of health insurance such as Medicare, Medi-Cal, Healthy San Francisco, or private insurance?"

Health conditions were determined through a combination of self-report using validated questions from the Health and Retirement Study (HRS)³⁰ and jail medical record review. Self-report was used because many participants may not have seen jail

medical staff at the time of their participation in the study and medical chart review was used to minimize underrepresentation of medical diagnoses for participants who may have been unaware of their health status. The efficacy of self-report is well validated in older populations, including homeless and criminal justice-involved populations.^{31,32} Serious mental illness was determined by self-reported diagnosis or medical chart abstraction, and was defined using the Bureau of Justice Statistics' definition of any major depressive, mania, or psychotic disorder.⁶

Behavioral health risk factors included smoking (described below), problems related to drug abuse, and hazardous drinking. Problems related to drug abuse was assessed using the Drug Abuse Screening Test-10 (DAST-10)³³ and defined as moderate, substantial, or severe problems related to drug abuse in the 12 months prior to baseline (a score of 3 or higher). Problem alcohol use was determined using the 3-item Modified Alcohol Use Disorders Identification Test (AUDIT-C) and defined as having an "active alcohol use disorder" (a score of 4 or higher).³⁴

Questions about participants' smoking, their smoking-related knowledge, and their attitudes about smoking cessation were asked at a follow-up interview 5 months from baseline using items from the internationally validated Global Adult Tobacco Survey (GATS). The GATS was developed and validated by the global tobacco surveillance system, a coordinated effort of the World Health Organization (WHO) and the Centers for Disease Control and Prevention (CDC). It has been used to describe tobacco use among medically vulnerable populations in more than 10 countries.³⁵ Because the jail at which the study was conducted is a smoke-free facility, participants who completed the survey while in jail were asked about their tobacco use and related experiences in the period prior to their current incarceration.

Participants were categorized as current smokers or non-smokers based on self-report using the GATS. Current smokers were asked a series of follow-up questions including how much they smoke on the average week and the age at which they started using tobacco. Current smokers were also asked to estimate their weekly expenditure on tobacco.

All participants were asked questions from the GATS about their experiences and knowledge related to smoking. These questions included items about the connection between smoking and serious illness, including specific health conditions (eg, stroke, heart attack, lung cancer); about whether participants believed the use of tobacco products marketed as "light" were less harmful; and about participants' knowledge of the dangers associated with secondhand smoke. All participants were also asked whether smoking was permitted in their residence. Current smokers were asked about experiences and knowledge related to smoking cessation, including if they had tried to quit previously and if they were interested in quitting in the future. Current smokers were asked if they had used resources for quitting in the 12 months preceding their interview, including

counseling, nicotine replacement therapy, prescription medications, and a telephone quit line. Current tobacco users were also asked if they had noticed any publicly available information (eg, in newspapers, on television or radio, or on billboards) about the dangers of smoking in the last 30 days.

Statistical analysis

We combined data from the baseline and follow-up survey into one dataset and analyzed participant sociodemographics, health status, and smoking and related factors using descriptive statistics. We used chi-square tests to assess the associations between current smoking and sociodemographics, health, and experiences, knowledge, and beliefs related to smoking and cessation. All analyses were conducted using R version 3.1.3. Study data were collected and managed using REDCap electronic data capture.³⁶

Results

Of 145 persons who met eligibility criteria during the enrollment period, 15 (10%) declined to participate (recruitment rate of 90%). Four participants (3%) did not enroll in the study because they were not able to demonstrate comprehension during the teach-to-goal consent process and 1 individual (1%) was dis-enrolled from the study due to a violation of study protocol, resulting in a sample of 125 participants in the overall longitudinal study. Of these, 102 (82%) were retained and completed this study's follow-up tobacco use questionnaire; 13 (13%) completed the survey in jail and were asked about their tobacco use and related experiences prior to their current incarceration.

Participants were predominantly men (93%) and black (62%). Most participants (84%) reported annual income of less than US\$ 15 000, and more than half (53%) were homeless. Approximately 3 in 4 participants (78%) reported having health insurance. Most participants (59%) had high blood pressure or hypertension; 17% had lung disease, 5% reported congestive heart failure, and 6% had suffered a stroke. Many participants (39%) had a serious mental illness. Most screened positive for moderate, substantial, or severe problems related to drug abuse (76%) and/or problem alcohol use (71%) (Table 1).

Nearly 3 in 4 participants (71%) reported smoking, all in the form of cigarettes. Smokers started smoking at an average age of 15.7 years old (range: 6-55) and half of current smokers started smoking when they were younger than 14 years old. Current smokers reported smoking an average of 72 manufactured or hand-rolled cigarettes, or slightly more than 3.5 packs of cigarettes, per week (range: 7-210 cigarettes) (Table 2). Current smokers reported spending an average of US\$ 19.74 per week on cigarettes.

Among all participants, more than 90% reported knowing that smoking causes serious illness and that smoking causes lung cancer. Among current smokers, 94% knew that smoking causes serious illness and 89% knew of the link between smoking and

Table 1. Sociodemographics, smoking-related behaviors, and health status of 102 criminal justice–involved older adults.

	ALL PARTICIPANTS (N=102)
Age, mean (SD)	60.2 (3.9)
Men, N (%)	95 (93%)
Race	
White	19 (19%)
Black	63 (62%)
Hispanic/Latino	7 (7%)
Other	13 (13%)
Education	
Less than a high school diploma	23 (23%)
Completed high school in the community	30 (29%)
Received a GED in the community	7 (6.9%)
Received a GED in jail or prison	9 (9%)
Some college but no college degree	28 (28%)
College degree or higher	5 (5%)
Yearly income <US\$ 15000	86 (84%)
Recent homelessness	54 (53%)
Any health insurance	79 (78%)
Behavioral health risk factors	
Current smoker	72 (71%)
Moderate, substantial, or severe problems related to drug abuse (score of 3 or higher on the DAST-10)	78 (76%)
Problem alcohol use (a score of 4 or higher on the AUDIT-C)	72 (71%)
Health conditions	
Serious mental illness	40 (39%)
High blood pressure or hypertension	60 (59%)
Chronic lung disease such as chronic bronchitis or emphysema	17 (17%)
Heart attack, coronary heart disease, or angina	11 (11%)
Congestive heart failure (CHF)	5 (5%)
Stroke	6 (6%)

Abbreviations: AUDIT-C, Modified Alcohol Use Disorders Identification Test; CHF, congestive heart failure; DAST-10, Drug Abuse Screening Test–10; GED, General Education Development.

Incarcerated older adults in this study were predominantly men and black and reported an annual income under US\$ 15000. Nearly 3 in 4 reported smoking.

lung cancer. Fewer participants—but still most—knew that smoking causes stroke (72%) and heart attack (80%). Three in 4 (75%) knew that secondhand smoke also causes serious illness in non-smokers. Approximately 1 in 4 participants (27%) believed that smoking “light,” “low-tar,” or “mild” cigarettes is less harmful than smoking “regular” cigarettes. One-third of participants (36%) reported that smoking was not allowed where they lived (Table 2).

Among current smokers, only 10% planned to quit smoking in the near future (within the next month) compared with 45% who planned to quit “someday.” Four in 10 current smokers (40%) were not interested in quitting. A similar percentage (38%) reported never having tried to quit. From among the approximately 60% of smokers who reported a past quit attempt, the majority (23, 52%) reported the length of their most recent quit attempt as shorter than 1 month. Approximately 1 in 5

Table 2. Smoking-related knowledge and beliefs among criminal justice-involved older adults.

	OVERALL (N = 102)	CURRENT SMOKERS (N = 72)	NON-SMOKERS (N = 30)	P VALUE
Smoking-related knowledge, beliefs				
Smoking causes				
Serious illness	98 (96%)	68 (94%)	30 (100%)	.15
Lung cancer	93 (91%)	64 (89%)	29 (97%)	.24
Stroke	73 (72%)	49 (68%)	24 (77%)	.24
Heart attack	82 (80%)	57 (79%)	25 (88%)	.74
“Light,” “low-tar,” or “mild” cigarettes are less harmful	28 (27%)	19 (26%)	9 (30%)	.09
Secondhand smoke causes serious illness in non-smokers	76 (75%)	50 (69%)	26 (87%)	.27
Rules about smoking where participant lives				
Smoking not allowed	37 (36%)	20 (28%)	17 (57%)	.002
Smoking allowed	46 (45%)	39 (54%)	7 (23%)	
Homeless	19 (19%)	13 (18%)	6 (20%)	
Experiences with smoking				
Age when started smoking (mean, SD)	N/A	15.7 (8)	N/A	N/A
No. of cigarettes/week (mean, SD)	N/A	71.5 (47)	N/A	N/A
Dollar amount spent/week (mean, SD)	N/A	US\$ 19.74 (US\$ 15.37)	N/A	N/A
Attitudes toward quitting smoking				
Plan to quit within the next month	N/A	7 (10%)	N/A	N/A
Plan to quit someday	N/A	32 (45%)	N/A	N/A
Not interested in quitting	N/A	29 (40%)	N/A	N/A
Don't know	N/A	4 (6%)	N/A	N/A
Experiences with quitting smoking				
Thought about quitting because of health warning on cigarette pack	N/A	19 (26%)	N/A	N/A
Attempted to quit in the past 12 months	N/A	16 (22%)	N/A	N/A
Length of most recent quit attempt				
>1 month	N/A	21 (29%)	N/A	N/A
1 day-4 weeks	N/A	19 (26%)	N/A	N/A
<1 day	N/A	4 (6%)	N/A	N/A
Have never tried to quit	N/A	27 (38%)	N/A	N/A
Don't know	N/A	1 (1%)	N/A	N/A
Used cessation resources	N/A	33 (46%)	N/A	N/A
Seen public information about dangers of smoking in the past 30 days	N/A	58 (81%)	N/A	N/A

Overall, smokers were knowledgeable of the connection between smoking and serious illness and had seen smoking-related public health information in the past 30 days. More than half of smokers planned to quit smoking in the future and nearly half had used smoking cessation resources in the past. Smokers were significantly more likely than non-smokers to live in housing that did not restrict smoking.

current smokers (22%) reported attempting to quit in the 12 months preceding their interview. In describing past cessation attempts, 1 in 4 current smokers (26%) said they had thought about quitting because of the health warning on a pack of cigarettes, and nearly half (46%) reported using cessation resources such as counseling, nicotine replacement therapy, or “other” methods of cessation (most commonly electronic cigarettes). More than 80% of current smokers reported having seen publicly available information about the dangers of tobacco use in the 30 days leading up to their interview (Table 2).

Among sociodemographic, health, and tobacco-related factors assessed in this study, current smokers differed significantly from non-smokers in 2 areas. First, current smokers were more likely to have chronic lung disease such as bronchitis or emphysema (20.8% compared with 6.7%, $P = .04$; Table 3). Second, a higher proportion of non-smokers indicated that smoking was not allowed where they lived compared with smokers (56.7% vs 27.8%, P value = .001; Table 2).

Discussion

This study found that the prevalence of smoking in a population of recently incarcerated older adults was more than 70%, more than 4 times the smoking prevalence in the general US adult population. Participants in this study also reported high proportions of risk factors for tobacco use, including mental illness (39%), problems related to drug abuse (76%), and problem alcohol use (71%). Overall, participants in this study reported high rates of socioeconomic vulnerability and chronic health conditions, including conditions associated with smoking such as chronic lung disease. These high rates of smoking and associated health conditions did not correspond with a lack of knowledge regarding the likely harms of tobacco use—95% of participants said they knew of the link between smoking and serious illness. Nor were current smokers unexposed to public health warnings—more than 80% reported seeing public information on television, in newspapers, or on billboards describing the dangers of smoking in the past 30 days. More than half of smokers reported a prior unsuccessful attempt to quit their use and a similarly high percentage said they planned to quit in the future.

As criminal justice and public health systems face increasing populations of medically vulnerable older adults, these findings suggest a critical need to deploy appropriate smoking cessation resources to meet the needs of incarcerated older adults. The percentage of smokers in this study who reported that they were not interested in quitting (40%) is not substantially greater than the 32% of the general US population of tobacco users who state no interest in quitting.²⁴ This level of interest in quitting in the context of extremely high prevalence suggests that smoking-related public health messages may be insufficient to drive smoking-related behavior change in this population. This pattern also likely reflects unique challenges to successfully quitting smoking in this population. These may include high rates of mental illness, drug abuse, and problem alcohol use,

each of which suggest a need for integrated treatment approaches to smoking cessation that account for mental health and SUD treatment needs, for example, combining pharmacotherapy and engagement in regular cognitive-behavioral therapy over a sustained period of time (eg, 7-10 weeks).³⁷⁻³⁹ The use of integrated treatment approaches in addition to intensive tobacco dependence interventions in this population is further supported by the fact that nearly half of smokers in this study said they had used cessation resources like counseling and the nicotine patch or gum unsuccessfully in the past.

The correctional setting may be uniquely suited to implement smoking cessation in the vulnerable population of criminal justice-involved older adults. Due to a number of factors—high rates of mental illness and addiction and a high proportion of African American men, who have been shown to be less successful in quit attempts than other demographic groups⁴⁰—the criminal justice-involved represent a challenging population for smoking cessation. Forced abstinence in a growing number of jails and prisons that have adopted tobacco-free policies⁴¹ confers health benefits for some people while in custody^{10,42} but such bans are inconsistently enforced, meaning that many continue to smoke while incarcerated,⁴¹ and have otherwise been shown to accomplish little in preventing high rates of smoking relapse following release from custody.^{18,22} Such findings further support the need for integrated treatment approaches to smoking cessation for those managing co-occurring mental illness and/or SUD following return to the community,³⁹ particularly because criminal justice involvement may represent rare or even first-time access to smoking cessation for many who are incarcerated⁴³ and evidence has shown that appropriate interventions in incarcerated settings are effective. For example, one study found that a behavioral intervention combining elements of motivational interviewing with cognitive-behavioral therapy significantly improves the likelihood of continued cessation post-release⁴⁴ and another showed more moderate success with an intervention combining pharmacotherapy with brief in-custody counseling.⁴⁵ Further research should assess the effectiveness of approaches like these with older adults in the criminal justice system given their unique barriers to cessation, the high proportion of participants in this study that reported no desire to quit, and the relative dearth of research on effective smoking cessation in the broader population of criminal justice-involved persons following release.³⁹ Because smokers in this study were significantly less likely to report living in a tobacco-free residence, smoking cessation interventions that focus on the transition back to the community may be of particular value. Furthermore, these findings suggest that smoke-free housing for those returning to the community following a period of incarceration likely serves a critical public health purpose but may be undersupplied. More research is also needed to better understand the role that smoke-free housing can play in promoting smoking cessation among the formerly incarcerated.

Table 3. Differences in sociodemographics, health, and tobacco use or knowledge by tobacco use status.

	CURRENT SMOKERS (N=72)	NON-SMOKERS (N=30)	P VALUE
Age, mean (SD)	60.5 (3.9)	59.5 (4.1)	.25
Men, n (%)	67 (93%)	28 (93%)	.96
Race			
White	12 (17%)	7 (23%)	.65
Black	44 (61%)	19 (63%)	
Hispanic/Latino	6 (8%)	1 (3%)	
Other	10 (14%)	3 (10%)	
Education			
Less than a high school diploma	16 (22%)	7 (23%)	.24
Completed high school in the community	21 (29%)	9 (30%)	
Received a GED in the community	7 (10%)	0 (0%)	
Received a GED in jail or prison	7 (10%)	2 (7%)	
Some college but no college degree	17 (24%)	11 (37%)	
College degree or higher	4 (6%)	1 (3%)	
Yearly income <US\$ 15000	60 (83%)	26 (87%)	.45
Recent homelessness	40 (56%)	14 (47%)	.65
Any health insurance	58 (81%)	21 (70%)	.39
Behavioral health risk factors			
Tobacco use	N/A	N/A	N/A
Moderate, substantial, or severe problems related to drug abuse (score of 3 or higher on the DAST-10)	55 (76%)	22 (73%)	.87
Problem alcohol use (a score of 4 or higher on the AUDIT-C)	54 (75%)	19 (63%)	.28
Health status			
Serious mental illness	29 (40%)	11 (37%)	.76
High blood pressure or hypertension	38 (53%)	22 (73%)	.06
Chronic lung disease such as chronic bronchitis or emphysema	15 (21%)	2 (7%)	.03
Heart attack, coronary heart disease, or angina	9 (13%)	2 (7%)	.34
CHF	4 (6%)	1 (3%)	.61
Stroke	5 (7%)	1 (3%)	.42

Abbreviations: AUDIT-C, Modified Alcohol Use Disorders Identification Test; CHF, congestive heart failure; DAST-10, Drug Abuse Screening Test–10; GED, General Education Development.

On health and sociodemographic measures, smokers and non-smokers in this study differed only by their relative burden of chronic lung disease, which was significantly more prevalent among smokers.

The public health opportunity to engage criminal justice-involved populations in smoking cessation is particularly critical for older adults. Although often overlooked in smoking cessation efforts,⁴⁶ older adults can benefit greatly from smoking cessation^{47,48} while ongoing smoking contributes to costly morbidity and mortality,⁴⁹⁻⁵¹ including raising older adults' risk

of Alzheimer disease and other dementias.⁵² Participants in this study with an average age of 59.5 years reported a diagnosis of chronic lung disease substantially greater than the rate of adults aged 75 years or older in the general population (17% compared with 12.3% in the general population of older adults).⁵³ But evidence shows that even in those with severe

chronic obstructive pulmonary disease, smoking cessation can slow the rate of lung function decline and improve survival.⁵⁴ In addition to health costs, this study found that smoking may pose additional challenges to this population as tobacco users spent an average of US\$ 19.74 per week, or more than US\$ 1 000 annually, on tobacco products despite more than 80% of participants reporting less than US\$ 15 000 in annual income. This level of expenditure likely has a significant impact on socioeconomic well-being in a population also reporting high rates of homelessness (53%). These findings underscore the recent literature showing that a Pigouvian tax on tobacco disproportionately benefits the health and socioeconomic status of the lowest income households⁵⁵ and likely represents a critical tool in addressing high rates of smoking among the formerly incarcerated.

Several limitations should be considered when interpreting these results. First, this study was conducted at one site, potentially limiting generalizability. However, the city in which this study was conducted has an adult smoking rate (13.5%) that is similar to the national rate. In addition, this study did not include an assessment of any unique age-related barriers this population may have to making successful use of smoking cessation resources and programming. However, this is the first study to our knowledge to describe smoking cessation experiences and attitudes in a population of incarcerated older adults and as such constitutes an important first step toward connecting this medically vulnerable population to needed smoking cessation resources and programming. Further research is needed to determine if existing smoking cessation interventions developed for criminal justice populations require adaptation to meet the special needs and preferences of older adults.

Conclusions

Overall, this study found a high prevalence of smoking and co-occurring chronic illness among older adults recently incarcerated in jail despite their strong knowledge of the associated health risks and most smokers reported both past quit attempts and a desire to quit smoking in the future. Criminal justice-involved older adults in this study reported behavioral health risk factors and demographic characteristics associated with increased difficulty in achieving smoking cessation. Criminal justice institutions represent a critical site for the development and delivery to vulnerable older adults of intensive smoking cessation interventions as well as integrated treatment approaches to smoking cessation that can account for commonly co-occurring mental illness and SUD in this population. In the United States, jails may be less optimal than prisons to deliver such care because people incarcerated in jail may remain there for relatively short periods of time (days to weeks). Yet a considerable number of people each year spend months in jail either awaiting trial or serving short sentences, and even those who come into contact with jail-based health services for only a short time often have limited access to health care in

the community and would potentially benefit from even brief interventions. Although further research is needed to determine how existing cessation interventions should be adapted to meet the unique needs of criminal justice-involved older adults, the implementation of appropriate smoking cessation and related integrated treatment approaches for this population represents a public health opportunity with the potential to improve health and quality of life while lowering the cost of care for an often overlooked yet medically vulnerable population.

Author Contributions

All authors listed meet authorship criteria and no persons not listed here provided substantive input to this manuscript. CA and BW conceived of the study and drafted the manuscript. TB and JM analyzed the data and provided critical revisions to the manuscript. All authors reviewed and approved the final manuscript.

REFERENCES

- Williams BA, Ahalt C, Greifinger R. The older prisoner and complex chronic care. In: Enggist S, Galea G, Udesen C, eds. *Prisons and Health*. Copenhagen, Denmark: World Health Organization; 2014:165–172.
- Snyder HN. *Arrest in the United States, 1990–2010* (NCJ 239423). Washington, DC: Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2012:26.
- Williams BA, Stern MF, Mellow J, Safer M, Greifinger RB. Aging in correctional custody: setting a policy agenda for older prisoner health care. *Am J Public Health*. 2012;102:1475–1481.
- Aday RH. *Aging Prisoners: Crisis in American Corrections*. Westport, CT: Praeger Publishers; 2003.
- Valera P, Anderson M, Cook SH, Wylie-Rosett J, Rucker J, Reid AE. The smoking behaviors and cancer-related disparities among urban middle aged and older men involved in the criminal justice system. *J Cancer Educ*. 2015;30:86–93.
- James DJ, Glaze LE. *Mental Health Problems of Prison and Jail Inmates* (NCJ 213600). Washington, DC: Department of Justice, Office of Justice Programs, Bureau of Justice Statistics; 2006:12.
- Ramaswamy M, Faseru B, Cropsey KL, Jones M, Deculus K, Freudenberg N. Factors associated with smoking among adolescent males prior to incarceration and after release from jail: a longitudinal study. *Subst Abuse Treat Prev Policy*. 2013;8:37.
- Messer K, Trinidad DR, Al-Delaimy WK, Pierce JP. Smoking cessation rates in the United States: a comparison of young adult and older smokers. *Am J Public Health*. 2008;98:317–322.
- American Lung Association. *Trends in Tobacco Use: American Lung Association Research Program Services, Epidemiology and Statistics Unit 2011*. <http://www.lung.org/assets/documents/research/tobacco-trend-report.pdf>.
- Binswanger IA, Carson EA, Krueger PM, Mueller SR, Steiner JF, Sabol WJ. Prison tobacco control policies and deaths from smoking in United States prisons: population based retrospective analysis. *BMJ*. 2014;349:g4542.
- Binswanger IA, Krueger PM, Steiner JF. Prevalence of chronic medical conditions among jail and prison inmates in the USA compared with the general population. *J Epidemiol Community Health*. 2009;63:912–919.
- Centers for Disease Control Prevention. Cigarette smoking among adults—United States, 2005–2015. *MMWR*. 2016;65:1205–1211.
- Butler T, Richmond R, Belcher J, Wilhelm K, Wodak A. Should smoking be banned in prisons? *Tob Control*. 2007;16:291–293.
- Baybutt M, Ritter C, Stover H. Tobacco use in prison settings: a need for policy implementation. In: Enggist S, Galea G, Udesen C, eds. *Prisons and Health*. Copenhagen, Denmark: World Health Organization; 2014:138–147.
- Schroeder SA, Morris CD. Confronting a neglected epidemic: tobacco cessation for persons with mental illnesses and substance abuse problems. *Annu Rev Public Health*. 2010;31:297–314 1p following 314.
- Santhosh L, Meriwether M, Saucedo C, et al. From the sidelines to the frontline: how the Substance Abuse and Mental Health Services Administration embraced smoking cessation. *Am J Public Health*. 2014;104:796–802.
- Williams JM, Steinberg ML, Griffiths KG, Cooperman N. Smokers with behavioral health comorbidity should be designated a tobacco use disparity group. *Am J Public Health*. 2013;103:1549–1555.
- de Andrade D, Kinner SA. Systematic review of health and behavioural outcomes of smoking cessation interventions in prisons. *Tob Control*. 2016;26:495–501.

19. Eadie D, MacAskill S, McKell J, Baybutt M. Barriers and facilitators to a criminal justice tobacco control coordinator: an innovative approach to supporting smoking cessation among offenders. *Addiction*. 2012;107:26–38.
20. Kauffman RM, Ferketich AK, Wewers ME. Tobacco policy in American prisons, 2007. *Tob Control*. 2008;17:357–360.
21. Parker DR, Fallone D, Martin RA, et al. The relation between smoking status and medical conditions among incarcerated adults. *J Addict Med*. 2014;8:90–95.
22. Lincoln T, Tuthill R, Roberts C, et al. Resumption of smoking after release from a tobacco-free correctional facility. *J Correct Health Care*. 2009;15:190–196.
23. Valera P, Cook SH, Darout R, Dumont DM. “They are not taking cigarettes from me . . . I’m going to smoke my cigarettes until the day I die. I don’t care if I get cancer”: smoking behaviors of men under community supervision in New York City. *Nicotine Tob Res*. 2014;16:800–806.
24. Centers for Disease Control Prevention. Current cigarette smoking among adults—United States, 2016. *MMWR*. 2018;67:53–59.
25. Honda K. Psychosocial correlates of smoking cessation among elderly ever-smokers in the United States. *Addict Behav*. 2005;30:375–381.
26. Sudore RL, Landefeld CS, Williams BA, Barnes DE, Lindquist K, Schillinger D. Use of a modified informed consent process among vulnerable patients: a descriptive study. *J Gen Intern Med*. 2006;21:867–873.
27. Code of Federal Regulations title 45 part 46 subpart C (§46.305). <http://www.hhs.gov/ohrp/humansubjects/guidance/45cfr46.html#subpartc>. Accessed June 26, 2013.
28. Smoyer AB, Blankenship KM, Belt B. Compensation for incarcerated research participants: diverse state policies suggest a new research agenda. *Am J Public Health*. 2009;99:1746–1752.
29. Hanson RK, Letourneau EJ, Olver ME, Wilson RJ, Miner MH. Incentives for offender research participation are both ethical and practical. *Crim Justice Behav*. 2012;39:1391–1404.
30. Juster F. An overview of the Health and Retirement Study. *J Hum Resour*. 1995;30:S7–S56.
31. Brown RT, Kiely DK, Bharel M, Mitchell SL. Geriatric syndromes in older homeless adults. *J Gen Intern Med*. 2012;27:16–22.
32. Bush TL, Miller SR, Golden AL, Hale WE. Self-report and medical record report agreement of selected medical conditions in the elderly. *Am J Public Health*. 1989;79:1554–1556.
33. Skinner HA. The Drug Abuse Screening Test. *Addict Behav*. 1982;7:363–371.
34. Bush K, Kivlahan DR, McDonnell MB, Fihn SD, Bradley KA. The AUDIT alcohol consumption questions (AUDIT-C): an effective brief screening test for problem drinking. Ambulatory Care Quality Improvement Project (ACQUIP). Alcohol Use Disorders Identification Test. *Arch Intern Med*. 1998;158:1789–1795.
35. Palipudi KM, Morton J, Hsia J, et al. Methodology of the Global Adult Tobacco Survey – 2008–2010. *Glob Health Promot*. 2016;23:3–23.
36. Harris PA, Taylor R, Thielke R, Payne J, Gonzalez N, Conde JG. Research electronic data capture (REDCap)—a metadata-driven methodology and workflow process for providing translational research informatics support. *J Biomed Inform*. 2009;42:377–381.
37. Fiore M, Jaen C, Baker T. *Treating Tobacco Use and Dependence: 2008 Update: Clinical Practice Guideline*. Rockville, MD: U.S. Department of Health and Human Services, Public Health Service; 2008.
38. El-Guebaly N, Cathcart J, Currie S, Brown D, Gloster S. Smoking cessation approaches for persons with mental illness or addictive disorders. *Psychiatr Serv (Washington, D.C.)*. 2002;53:1166–1170.
39. Puljevic C, Segan CJ. Systematic review of factors influencing smoking following release from smoke-free prisons [published online ahead of print May 4, 2018]. *Nicotine Tob Res*. doi:10.1093/ntr/nty088.
40. Matthews AK, Sanchez-Johnsen L, King A. Development of a culturally targeted smoking cessation intervention for African American smokers. *J Community Health*. 2009;34:480–492.
41. Kennedy SM, Davis SP, Thorne SL. Smoke-free policies in U.S. Prisons and jails: a review of the literature. *Nicotine Tob Res*. 2015;17:629–635.
42. Dickert J, Williams JM, Reeves R, Gara M, DeBilio L. Decreased mortality rates of inmates with mental illness after a tobacco-free prison policy. *Psychiatr Serv (Washington, D.C.)*. 2015;66:975–979.
43. Twyman L, Bonevski B, Paul C, Bryant J. Perceived barriers to smoking cessation in selected vulnerable groups: a systematic review of the qualitative and quantitative literature. *BMJ Open*. 2014;4:e006414.
44. Clarke JG, Stein LA, Martin RA, et al. Forced smoking abstinence: not enough for smoking cessation. *JAMA Intern Med*. 2013;173:789–794.
45. Cropsey KL, Clark CB, Zhang X, Hendricks PS, Jardin BF, Lahti AC. Race and medication adherence moderate cessation outcomes in criminal justice smokers. *Am J Prev Med*. 2015;49:335–344.
46. Steinberg MB, Akincigil A, Delnevo CD, Crystal S, Carson JL. Gender and age disparities for smoking-cessation treatment. *Am J Prev Med*. 2006;30:405–412.
47. LaCroix AZ, Omenn GS. Older adults and smoking. *Clin Geriatr*. 1992;8:69–87.
48. Taylor DH Jr, Hasselblad V, Henley SJ, Thun MJ, Sloan FA. Benefits of smoking cessation for longevity. *Am J Public Health*. 2002;92:990–996.
49. Thun MJ, Carter BD, Feskanich D, et al. 50-year trends in smoking-related mortality in the United States. *N Engl J Med*. 2013;368:351–364.
50. Jones R, Nyawo B, Jamieson S, Clark S. Current smoking predicts increased operative mortality and morbidity after cardiac surgery in the elderly. *Interact Cardiovasc Thorac Surg*. 2011;12:449–453.
51. Burns DM. Cigarette smoking among the elderly: disease consequences and the benefits of cessation. *Am J Health Promot*. 2000;14:357–361.
52. Peters R, Poulter R, Warner J, Beckett N, Burch L, Bulpitt C. Smoking, dementia and cognitive decline in the elderly, a systematic review. *BMC Geriatr*. 2008;8:36.
53. Wheaton AG, Cunningham TJ, Ford ES, Croft JB. Employment and activity limitations among adults with chronic obstructive pulmonary disease—United States, 2013. *MMWR*. 2015;64:289–295.
54. Godtfredsen NS, Lam TH, Hansel TT, et al. COPD-related morbidity and mortality after smoking cessation: status of the evidence. *Eur Respir J*. 2008;32:844–853.
55. Summers LH. Taxes for health: evidence clears the air. *Lancet*. 2018;391:P1974–P1976.