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The smoking behaviors and cancer-related disparities among urban middle aged and older males involved in the criminal justice system

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Abstract

This study examined cancer knowledge, mental health and smoking in formerly incarcerated men. The Cancer-Health Research Study with Formerly Incarcerated Men in New York City used a cross-sectional research design to examine knowledge and cancer prevention (CKP) outcomes among 259 justice-involved males, ages 35–67. CKP was assessed using items from the National Cancer Institute's Health Information National Trends Survey. Psychological symptoms were examined using the Brief Symptom Inventory. Of the 259 men who completed the survey, 76% of the respondents self-reported as current smokers. Current smokers smoked between one and 40 cigarettes per day. The mean number of cigarettes smoked per day was 10.37 ($SD = 6.76$). Sixty-three percent ($n=165$) of the respondents underwent cancer-screening tests. CKP scores ranged from two to 28; the mean was 15.05 ($SD=5.49$), indicating that the men scored very low in terms of CKP. CKP was negatively associated with the number of cigarettes smoked per day, $\tau = -.13$, $p = .01$; participants with high knowledge scores smoked less daily. These results have important implications for enhancing access to cancer-health education in justice-involved settings.

Keywords

cancer; reentry; tobacco

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Introduction

Despite the decline of tobacco use in the general population, health problems caused by cigarette smoking [1-5] remain disproportionately high among men in the United States correctional system. Tobacco use among justice-involved individuals is more than twice that of the general population [1,3]. Concerns about tobacco use in criminal justice populations have been documented in the social science and epidemiology literature; reports suggest that 60-80% of incarcerated individuals in the U.S have a history of smoking cigarettes, compared to 30% in the general population [6-8]. Because of the mounting empirical evidence on the health effects of secondhand smoke and the proliferation of smoke-free policies, most prisons and jails have taken steps to protect inmates, staff, visitors, contractors, and vendors from secondhand smoke [6]. While the measures vary widely across jurisdictions, the majority of correctional facilities have adopted some form of smoke free or tobacco-free policies prohibiting the use of tobacco inside state correctional facilities, including the outdoor grounds of the correctional facility. Violating the tobacco-free policy is deemed as an infraction of a facility's disciplinary rules and regulations. Tobacco is also treated as contraband, and facilities have different enforcement policies and penalties that also apply to visitors, contractors, vendors and staff who smuggle tobacco inside the facility [8].

Although most correctional facilities have enforced tobacco-free policies since the mid-1980s [6-8] 97% of inmates return to using tobacco upon being released from incarceration [4]. This is an alarming statistic, considering tobacco use is associated with an increased risk of a variety of tobacco-related illnesses, such as lung cancer. Lincoln, et al,[4] found that relapse to tobacco was higher among released inmates with heart disease and those with mental health problems than among individuals without mental or physical health conditions. Studies suggest that between 15% and 24% of justice-involved individuals have mental health problems [15]. In addition, about 50% of state and federal offenders meet the criteria for having a substance use disorder [15]. While much of the prevention research has documented that knowledge about cancer is a necessary component for improving health outcomes, disparities in cancer prevention knowledge persist among individuals with criminal justice histories.

In the United States, nearly 4.8 million people, or 1 in every 50 adults, are supervised by the criminal justice system (i.e., on probation or parole) in their communities [1,16]. One in three Black men is expected to serve time in prison or jail during his lifetime [1,16]. Latinos account for 31% of those currently incarcerated in the federal system and have a 1 in 6 probability of being incarcerated in their lifetime [1,16]. In addition to the disproportionate representation of Blacks and Latinos in the criminal justice system, they are also overwhelmingly burdened and over-represented among many disease populations (e.g., those with HIV, Hepatitis C, drug/alcohol addiction and mental health problems) [12-14]. Moreover, Black and Latino men who have been incarcerated continue to experience the highest rates of cancer, including lung cancer, the leading cause of death among Black men and the third leading cause of death for Latino men [9,10].

Using data from the Surveillance, Epidemiology, and End Results (SEER), Matthew and colleagues [11] examined the cancer diagnoses of 1807 incarcerated individuals and found that lung carcinomas were the most common malignancy experienced by the participants (burdening 443 incarcerated patients), followed by non-Hodgkin lymphoma and carcinomas of the oral cavity and pharynx. The majority of the SEER participants who were diagnosed with these cancers had histories of tobacco use.

While significant progress has been made over the past several decades to increase knowledge and awareness of cancer in the United States, racial and ethnic group disparities in cancer knowledge and prevention persist. National surveys, such as the Health Information National Trends Survey (HINTS), developed by the National Cancer Institute, provide population level estimates that document cancer prevention and control disparities by different socio-demographics in the U.S. [17-19]. Data from HINTS about cancer-related outcomes has been used to prioritize public health programs and promote the health and well-being of vulnerable populations [17-18]. However, HINTS' cross-sectional surveys currently do not collect information from institutionalized adults (e.g., a psychiatric hospital or correctional facility) or ask whether the participant has been incarcerated.

Although correctional facilities have strict tobacco-control policies during incarceration, release is often associated with risk for tobacco resumption; little attention has been paid to smoking behaviors and cancer prevention programs among formerly incarcerated populations. To our knowledge, this is the first study that describes cancer-related knowledge, smoking and mental health outcomes among Black and Latino individuals with criminal justice histories. The aims of this study were to: (1) characterize cancer prevention knowledge, attitudes about cancer and smoking behaviors in Black and Latino men released from a New York State correctional facility or Rikers Island, the New York City jail; (2) to examine the associations between knowledge about cancer and prevention and smoking; and (3) to determine whether any specific psychological symptoms were associated with smoking behaviors. Such information could be used to inform the development of targeted cancer prevention education programs for criminal justice populations.

Method

The Cancer-Health Research Study with Formerly Incarcerated Men examined the smoking behaviors related to cancer risk among middle aged and older males involved in the criminal justice system who were released from tobacco-free correctional facilities. Knowledge about cancer and cancer prevention (CKP) were assessed using items from the National Cancer Institute's Health Information National Trends Survey (HINTS) [19]. As stated previously, HINTS is a nationally-representative survey of American adults which was designed to obtain information from the general, non-institutionalized population, aged 18 years, concerning cancer-related information and knowledge. Psychological symptoms were examined using the Brief Symptom Inventory (BSI), a self-report measure [20].

Procedures

Using a venue-based sampling approach [21-22], 259 study participants completed the Cancer-Health Research Study with Formerly Incarcerated Men cross-sectional survey in

Bronx, New York. Venues included community-based organizations, such as medical centers, community health clinics, social services agencies, and criminal court programs that provide health and social services to formerly incarcerated individuals serving sentences through parole or probation. The eligibility criteria for this study were: (1) self-identify as male; (2) self-identify as Black or Latino; (3) aged 35-67 years old; (4) reside in the Bronx; (5) currently under parole or probation; (6) never been diagnosed with cancer; and (7) and provide informed consent. The data collection procedures and recruitment strategies have been described in previous reports [21-22]. Informed consent was obtained from all participants, and the investigators obtained a Federal Certificate of Confidentiality. Trained interviewers administered the cross-sectional surveys. The Albert Einstein College of Medicine of Yeshiva University Institutional Review Board approved the study protocol, and data analyses were approved by Columbia University's Institutional Review Board.

Measures

We obtained demographic and incarceration-related data with a questionnaire developed by the first author to assess age, race and ethnicity, educational attainment, employment status, income, incarceration history, parental status, number of children, and type of facility (prison or jail) from where the respondent was released.

Tobacco Use—We assessed participants' smoking behaviors with questions adapted from Cropsey, et al. [14] to elicit information about the following: participants' smoking status (i.e., non-smoker, former smoker, current smoker); number of cigarettes participants smoked per day; the type of cigarette participants smoked since their release from incarceration; whether they had smoked at least 100 cigarettes in their life times; participants' intentions to quit (if any); and family history of tobacco-related deaths.

Screening, Diagnosis and Attitudes—We asked participants a series of questions in order to assess their experiences with screenings for colon, prostate, and rectal cancer. First, we asked whether the participant had ever had a cancer-screening test. If the participant answered “yes,” he was asked to indicate what type of cancer-screening test (i.e., a fecal occult blood test (FOBT), a prostate-specific antigen (PSA) test, and/or a colonoscopy) he had taken. Second, participants were asked to indicate their levels of agreement (i.e., “strongly agree”; “somewhat agree”; “somewhat disagree”; or “strongly disagree”) with two items taken directly from HINTS: (1) “When I think of cancer, I automatically think of death.”; and (2) “It is likely that I will develop cancer.”

Cancer Knowledge/Prevention (CKP)—We also included questions from the HINTS survey on knowledge about cancer and cancer prevention [25]. The list of items included questions about whether participants thought that certain activities (i.e., smoking, eating a high fat diet, exposure to the sun) increased a person's chances of getting cancer: “Do you think that smoking increases a person's chance of getting cancer?”; “Do you think that eating a high fat diet increases a person's chance of getting cancer?”; “Do you think that exposure to the sun increases a person's chance of getting cancer?”; “Do you think that pesticides or food additives increase a person's chance of getting cancer?”; “Do you think that not eating much fiber increases a person's chance of getting cancer?”; “Do you think that not eating

many fruits and vegetables increases a person's chance of getting cancer?" Responses to these items were "a lot"; "a little"; "not at all" and "no opinion." To create the cancer knowledge and prevention measure, we totaled the number of correct replies to items to obtain scores. Higher scores indicated greater cancer knowledge on the measure; the highest possible score was 68, and the lowest possible score was zero.

Psychological Symptoms—We used the Brief Symptom Inventory (BSI) to examine self-reported psychological symptoms [20]. The BSI consists of 53 items and nine subscales that can be associated with somatization, obsession-compulsion, interpersonal anxiety, depression, anxiety, hostility, phobic anxiety, paranoid ideation and psychoticism. The nine sub-scales can also be used to obtain a global index of psychological distress. The BSI uses the 5-Point Likert scale, ranging from 0 ("not at all") to 4 ("extremely").

Statistical Analysis

We performed descriptive statistics for all study variables; Kendall Tau correlation procedures were conducted between the CKP smoking variables; and independent t-test procedures were used to determine whether BSI subscale scores and CKP scores differed significantly between Blacks and Latinos. In addition, a hierarchical linear regression procedure was conducted to determine whether the BSI subscales had a direct effect on the number of cigarettes smoked per day or whether these subscales moderated the effect of the participants' CKP on the number of cigarettes smoked per day. Prior to running the procedure, variables were assessed for normality. Since BSI subscales were skewed, they were transformed using a natural log function; the transformed variables approached a normal distribution and were thus used in the regression model. In the first step, the main effects were entered into the equation. In the second step, the product term was entered into the equation. The assumption of multivariate normality was fulfilled (as suggested by Tabachnick and Fidell [23] this assumption was fulfilled when the points in a normal probability plot are clustered towards the diagonal). The assumptions of linearity and homoscedasticity were also fulfilled, as the scatterplot of the standardized residuals by the standardized predicted values yielded a random scatter. Statistical analysis was performed with SPSS version 20.

Results

Sample Characteristics

Demographic—As shown in Table 1, all study participants (n= 259) were released from a New York State correctional facility or Rikers Island, the New York City jail. Sixty percent (n=157) of the men were released from a state correctional facility, 40 percent (n=102) were released from Rikers Island. Fifty-one percent had been released within one year of the study. The participants ranged in age from 35-67 years ($M = 47$, $SD = 6.63$). Forty-six percent of participants identified as Latino; 49 percent identified as Black; and 5 percent identified as "Other." Sixty-five percent had not completed high school, and 35 percent completed at least high school or passed General Educational Development (GED) tests (certifying that they have demonstrated levels of knowledge sufficient to earn the equivalent of high school diplomas). Eighty-four percent reported annual incomes of less than \$10,000.

Sixty-eight percent were fathers reporting having between 1 and 14 children ($M=2.58$, $SD=1.94$).

Smoking behaviors—Table 2 describes the smoking behaviors of the survey participants. Eighty-five percent of the participants smoked 100 or more cigarettes in their lifetimes. Of the 259 respondents, 76% were current smokers, reporting smoking 1 to 40 (mean of 10.37; $SD = 6.76$) cigarettes per day. Since released, current smokers ($n = 197$) smoked menthol cigarettes more frequently ($n=186$) than roll loose tobacco ($n=11$). Twenty percent of the survey participants ($n=49$) reported having a family history of tobacco-related deaths.

Cancer Screening, Cancer Diagnosis and Attitudes—As shown in Table 2, 63% ($n=165$) of the respondents underwent cancer screening tests. The most frequent cancer screening tests reported by participants were: a fecal occult blood test (FOBT), followed by a colonoscopy and prostate-specific antigen (PSA) test. Sixty-eight percent ($n=176$) of the participants agreed with the statement that “cancer is a death sentence,” and 42% ($n=104$) of the respondents indicated that they believed that they would develop cancer in the future.

Cancer Knowledge and Prevention (CKP) Scores—As shown in Table 2, the possible range of scores for CKP was two to 28. The mean score was 15.05 ($SD=5.49$), indicating that men scored very low in terms of CKP.

Brief Symptom Inventory (BSI) Scores—The possible response categories for the BSI subscales were 0 (“not at all”) to 4 (“extremely”), and the Cronbach's alpha was 0.97. Participants reported low levels of psychological symptoms on all of the BSI subscales. The mean score of the Somatic symptoms was 1.67 ($SD = .99$). The mean score of the Phobic subscale was 1.35 ($SD = .71$). Respondents reported minimal obsessive-compulsive symptoms, resulting in a low mean of 1.60 ($SD = .82$) on the Obsessive-Compulsive subscale, and 1.80 on the Depression subscale ($SD = 1.05$). Participants also reported minimal Hostility symptoms, with a mean Hostility score of 1.72 ($SD = .91$).

Differences in BSI Scores between Blacks and Latinos—Latinos had significantly higher Phobic scores ($M = 1.46$, $SD = .78$) than Blacks ($M = 1.22$, $SD = .51$), $t(219) = 3.18$, $p = .002$. They also had significantly higher Obsessive-Compulsive scores ($M = 1.71$, $SD = .90$) than Black participants ($M = 1.45$, $SD = .67$), $t(231) = 2.46$, $p = .015$. Finally, Latino males had significantly higher Hostility scores ($M = 1.82$, $SD = .94$) than Black males ($M = 1.59$, $SD = .81$), $t(236) = 2.07$, $p = .039$. An independent-t test yielded no statistical differences in CKP scores between Black and Latino males.

The Association between CKP, BSI and Smoking—We used Kendall Tau Correlations to determine the association between CKP scores and smoking. CKP scores were significantly associated with the number of cigarettes smoked per day, $\tau = -.13$, $p = .01$, with participants with higher CKP scores smoking less daily. CKP, however, was not significantly correlated with the intent to quit smoking ($\tau = .09$, $p = .066$).

Table 4 displays the hierarchical linear regression results for CKP, BSI and Smoking behavior. BSI subscales were not significantly associated with smoking behavior. Two of

the BSI subscales, however, moderated the effect of CKP scores on smoking behavior. First, the Somatic subscale moderated the effect of CKP on smoking behavior ($\beta = .27, p = .007$), and among participants with low Somatic scores. Men with low CKP smoked more cigarettes than participants with high CKP (Figure 1); however, CKP scores did not appear to have an effect on cigarette smoking for participants with high Somatic scores - the number of cigarettes smoked per day was similar, regardless of CKP scores. The Hostility subscale moderated the effect of CKP on smoking behavior ($\beta = -.27, p = .020$). As shown in Figure 2, for men with high Hostility scores, those with low CKP smoked more cigarettes than participants with high CKP.

Discussion

This study examined the relationship between knowledge about cancer and cancer prevention, psychological symptoms and tobacco use among Black and Latino men in New York City with criminal justice histories. Research conducted by Hawkins, Berkowitz and Peipins using the HINTS [24] found that Hispanics; individuals aged 65 and older; persons with lower education; and low-income had the lowest cancer knowledge scores. In our study, we found that the Latino participants were younger (age ranged: 35-62) than those in the Hawkins et al. study, and also scored very low in the cancer knowledge and prevention measures. Black survey participants also scored very low in cancer knowledge. Furthermore, like their Latino counterparts, they faced higher rates of unemployment; made less than \$10,000 annually; and had extremely low education levels. In another study with Latino cancer patients in New York City, close to two-thirds of the sample had considerably low knowledge of the different stages of cancer [26]. Limited knowledge about cancer may have deleterious effects in prevention, treatment and disease management.

Our findings suggest that cancer education for formerly incarcerated men might help reduce daily smoking, an important risk factor for lung cancer and other tobacco-related illnesses. For instance, over three-fourths of the survey respondents self-identified as being current smokers. Given the high prevalence of tobacco use in criminal justice populations, criminal-justice-involved men should be a focus of national surveys and cancer-related research. Tobacco use is a major risk factor for heart disease, respiratory problems (chronic obstructive pulmonary disease, emphysema), and cancer (particularly lung cancer, oral cancer and pancreatic cancer). Smoking tobacco products daily elicits carcinogens that affect bodily tissues, thereby increasing smokers' chances of developing tobacco-related diseases. Given that 76% of the participants were current smokers, increasing cancer knowledge during their incarceration period in efforts to decrease daily smoking consumption could be the first step toward cessation.

While there were no associations between the BSI subscales and smoking behaviors, having low somatic and hostility symptoms moderated the effects of CKP on smoking behaviors. This is an interesting finding, because it suggests that justice-involved men who exhibit low mental health symptoms can experience reductions in cigarette smoking if provided with cancer knowledge and prevention strategies. Additionally, it is worth noting that many formerly incarcerated individuals suffer from multiple traumas, including being victims of physical abuse and/or neglect [25]. Thus, interventions that are attuned to their life

experiences may serve as the foundations for addressing the mental health symptomology of men released from tobacco-free correctional facilities. Furthermore, hostility and somatic symptoms have been positively associated with stress, poor coping skills and depression [25]. Individuals with hostile and somatic symptoms are more likely to have negative affect toward others and often experience intense anger – particularly involving criticism or when feeling threatened [25]. Participants in this study with high hostility and somatic scores might have difficulty controlling their anger and regulating their moods and are likely to use smoking as coping mechanisms. This finding raises interesting questions on how cancer education interventions may be tailored to work for both formerly incarcerated Black and Latino males exhibiting low hostility and somatic symptoms and those exhibiting high hostility and somatic symptoms.

While policy interventions have been developed to achieve smoking cessation in correctional systems [8], none of the programs described focus on promoting knowledge about cancer and cancer prevention in order to decrease tobacco use among formerly incarcerated individuals upon release to the community [12-14]. Cancer education interventions targeting tobacco users involved with the correctional system hold the potential for decreasing the risk of tobacco-related illnesses, including lung cancer. Efforts are needed to assess whether increasing cancer knowledge and cancer prevention in Black and Latino men with criminal justice histories can lead to promoting behavioral changes, such as quitting tobacco use altogether. Considering the growing population of inmates release from tobacco-free correctional facilities, it is possible that a lack of knowledge about cancer and cancer prevention strategies could increase cancer-health disparities and tobacco-related morbidity and mortality among Black and Latino men in the long term.

Limitations

There are several limitations to the present study. First, it is important to note that this study is cross-sectional, so the findings should only be interpreted as associations. Second, we only examined a small number ($n = 259$) of racial and ethnic minority men; there were no White males or female participants in the study. This relatively small sample size and the non-random sampling approach limit the generalizability of our findings.

Conclusions

Nonetheless, this study appears to be the first to include questions from HINTS in order to highlight the importance of examining the relationships among knowledge about cancer and cancer prevention, psychological symptoms and smoking in Black and Latino men with criminal justice histories. Accordingly, the strength of this study is that its data can be used to begin to characterize the needs of criminal justice populations who have been traditionally underserved and overlooked in cancer research and create programs tailored to these needs. A program tailored toward preventing return to tobacco use that includes strategies to increase cancer knowledge and cancer prevention in criminal justice populations ought to be a public health priority. Given the disproportionate rates of Black and Latino males under community supervision, and their risk factors for multiple types of cancer, criminal justice-involved Black and Latino men comprise an appropriate population for these programs.

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Figure 1.
Number of cigarettes smoked per day (transformed variable) as a function of cancer knowledge and somatic symptoms.

Figure 2. Number of cigarettes smoked per day (transformed variable) as a function of cancer knowledge and hostility symptoms.

Table 1
Demographics Characteristics and Cancer Knowledge and Behaviors of Survey
Participants (N = 259)

Variables	<i>N</i>	Range/ percent	<i>M</i>	<i>SD</i>
Age (years)	259	35 to 67	47	6.63
Education				
Less than H.S.	168	64.9%		
Completed H.S. /GED	91	35.1%		
Race/Ethnicity				
Latino	120	46.3%		
Black	127	49.1%		
Other	12	4.6%		
Annual Income				
<\$10,000	218	84%		
>\$11,000	41	16%		
Employment				
Yes	137	53%		
No	122	47%		
Father/# of children	177	1 to 14	2.58	1.94
Prison or Jail Release	259			
---NYS Prison	157	60%		
---NYC Jail	102	40%		

Table 2
Smoking Behaviors, Cancer Knowledge and Prevention of Survey Participants (N = 259)

Variables	N	Range/ percent	M	SD
<i>Cigarettes per day</i> [*]	197	1 to 40	10.37	6.76
<i>Type of Tobacco</i>				
Menthol Cigarettes	186	86%		
Loose tobacco	11	5%		
Smoked 100 Cigarettes	221	85%		
<i>Family History</i> ^{**}	49	20%		
<i>Cancer Screening Test</i>	165	65%		
Prostate-specific antigen	44			
Colonoscopy	60			
Fecal occult blood test	61			
<i>Attitudes Toward Cancer</i>				
Death Sentence (agree)	176	69%		
Develop Cancer (Yes)	104	42%		
Worry (No)	192	75%		
<i>Cancer Knowledge/Prev</i>	254	2 to 28	15.05	5.49
<i>Intent to stop smoking</i>	206	0 to 18	11.27	5.07

^{*} Of the 259 study participants who completed the cross-sectional survey, only 197 reported as current smokers

^{**} Tobacco related deaths

Table 3
Kendall Tau Correlations between the Cancer and Smoking Variables⁺

Variables	1	2	3	4
1 Cancer knowledge				
2 Cigarettes per day	-.13 [*]	.04	-.03	
3 Intent to quit smoking	.09	.11	.01	-.20 ^{***}

⁺Dependent variable = smoking status

^{*}
 $p < .05$.

^{**}
 $p < .01$.

^{***}
 $p < .001$.

Table 4
Hierarchical Linear Regression Results for Cancer Knowledge, Psychological Stress, and Smoking Behavior (N = 191)

Variable	Step 1 β	Step 2 β
Cancer knowledge	-.16*	-.15*
Somatic symptoms	-.05	-.03
Phobic symptoms	-.07	-.01
Obsessive-compulsive symptoms	.09	.13
Depression symptoms	.05	.00
Hostile symptoms	.11	.09
Cancer knowledge x somatic symptoms		.26**
Cancer knowledge x phobic symptoms		.07
Cancer knowledge x obsessive symptoms		.15
Cancer knowledge x depression symptoms		-.20
Cancer knowledge x hostile symptoms		-.27*
R^2 for model	.05	.13
Adjusted R^2 for model	.02	.08
F for model	1.54	2.41**

Note. Tolerance values ranged from .277 to .960.

*
 $p < .05$.

**
 $p < .01$.

 $p < .001$.