Prevalence and Correlates of Smoking among Low-Income Adults Residing in New York City Public Housing Developments—2015

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Abstract To guide targeted cessation and prevention programming, this study assessed smoking prevalence and described sociodemographic, health, and healthcare use characteristics of adult smokers in public housing. Self-reported data were analyzed from a random sample of 1664 residents aged 35 and older in ten New York City public housing developments in East/Central Harlem. Smoking prevalence was 20.8%. Weighted log-binomial models identified to be having Medicaid, not having a personal doctor, and using health clinics for routine care were positively associated with smoking. Smokers without a personal doctor were less likely to receive provider quit advice. While most smokers in these public housing

developments had health insurance, a personal doctor, and received provider cessation advice in the last year (72.4%), persistently high smoking rates suggest that such cessation advice may be insufficient. Efforts to eliminate differences in tobacco use should consider place-based smoking cessation interventions that extend cessation support beyond clinical settings.

Keywords Smoking · Public housing developments · Chronic diseases · New York City · Urban health services · Primary healthcare

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Introduction

Despite substantial declines in smoking prevalence in recent decades [1], cigarette smoking remains the leading preventable cause of disease and death in the USA [2, 3]. Smoking prevalence also remains particularly high among lower-income adults and underserved racial/ethnic groups, likely reflecting the interacting influences of stress [4], discrimination [5], and targeted advertising [6, 7] as well as longstanding economic, physical, and structural barriers to cessation and prevention [8]. As such, current tobacco control approaches are not adequately meeting the health needs of this population [9].

Along with high smoking rates [10–13], public housing developments are increasingly appropriate settings for tobacco policy because of their concentrations of low-income residents, often belonging to underserved

racial/ethnic groups, and of individuals, namely elderly residents and adults with chronic conditions, who are especially vulnerable to risks associated with smoking [14, 15]. In addition to the direct risks of smoking, many public housing residents reside in multi-unit buildings, placing them at elevated risk for second-hand smoke (SHS) exposure from neighboring apartments [16, 17]. This confers a greater chronic disease risk among public housing residents [18], further contributing to health inequities.

A recent ruling by the Department of Housing and Urban Development (HUD) requires all public housing authorities to ban indoor smoking by July 2018 [19, 20]. One fifth of the nation's two million public housing residents reside in New York City (NYC), operated by the New York City Housing Authority (NYCHA) [21]. With consistent evidence that smoking rates are elevated among residents [22, 23], NYCHA faces implementation challenges associated with supporting and enforcing a shift to a smoke-free environment. To ensure the efficacy of implementation efforts and to design a more resident-focused, equitable approach, smoke-free policy efforts must be complemented by multi-faceted, community-specific smoking prevention and cessation support resources [20, 24, 25], informed by local-level data collection and analysis [26, 27].

Thus, we sought to fill a critical local data gap by characterizing pre-ban correlates of smoking, current smokers' healthcare characteristics, and receipt of clinician-delivered cessation advice to facilitate the effective delivery of smoking cessation interventions. In this study, we analyzed population-based data from urban public housing residents in East/Central Harlem to describe the sociodemographic, health, and healthcare use characteristics of adult smokers.

Methods

Data Source

For this study, we used data from a community needs assessment survey conducted between December 2014 and February 2015 to inform a community health worker initiative, involving 1664 adult residents aged 35 and older residing in ten public housing developments in East/Central Harlem [28]. Identified as official residents by the NYC Housing Authority Tenant Data Files, 7500 adults aged 35 and older were selected at random from

the ten developments. Study staff conducted 1600 interviews via telephone in either English or Spanish, while an additional 64 interviews were completed face-to-face. The response rate was 40.5%, and the cooperation rate was 75.7%, using the standard definitions established by the American Association for Public Opinion Research [29]. In all analyses, we statistically weighted survey data by race/ethnicity, gender, and household role to be demographically representative of the selected public housing developments.

Measures

The primary outcome, current smoking, was dichotomized into an indicator for smoking every day or some days using the following question: "Do you now smoke cigarettes every day, some days, or not at all?" Provider advice to quit was assessed with the following question: "During the past 12 months has a doctor, nurse, or other health professional advised you to quit smoking?"

Tobacco smoking correlates examined were selected from previous literature [2]. Sociodemographic characteristics included self-reported age, sex, race/ethnicity, nativity, education, marital status, and employment. Health status variables included weight (underweight, normal, overweight, and obese), and self-reported physician diagnosis of depression and chronic conditions (hypertension, asthma, and diabetes).

For healthcare utilization, participants indicated whether or not (yes/no) they had health insurance, a personal doctor, and a time in the past 12 months when they did not receive needed medical care. Other healthcare use variables included health insurance type (employer-sponsored, Medicaid, Medicare, and other) and sources of regular medical care (private doctor's office, health clinic, emergency room, and other).

Statistical Analyses

All statistical analyses were conducted using SAS 9.4, adjusting for sampling weights. Descriptive statistics described the distribution of independent variables of the total sample and by smoking status. Chi-squared tests were used to investigate significant differences by smoking status for categorical variables. Log-binomial models were used to examine crude and adjusted associations between smoking status and sociodemographic, health, and healthcare use characteristics. Finally, a series of supplementary log-binomial models were used to

Table 1 Resident and smoker characteristics, results of chi-square tests, and results of log-binomial models for factors associated with current smokers.

	Total number (<i>n</i> = 1664)	Smokers (<i>n</i> , %)	Non-smokers (<i>n</i> , %)	RR	95% CI	<i>p</i> value	aRR ^a	95% CI	<i>p</i> value
Smoking total	1657	355 (20.8)	1302 (79.2)						
Selected characteristics									
Demographics									
Age group	1664	355	1302			<0.001***			
35–49	492 (31.7)	114 (31.6)	377 (31.8)	1.00	–	–			
50–64	605 (36.5)	176 (51.2)	426 (32.6)	1.41	1.09–1.83	0.008**			
65+	567 (31.8)	65 (17.2)	499 (35.6)	0.55	0.38–0.78	<0.001***			
Gender	1664	355	1302			0.878			
Female	1289 (73.0)	271 (73.5)	1015 (73.0)	1.02	0.83–1.25	0.847			
Male	375 (27.0)	84 (26.5)	287 (27.0)	1.00	–	–			
Race/ethnicity	1659	353	1299			0.006**			
Non-Latino Black	755 (40.2)	197 (50.0)	553 (37.4)	1.42	1.23–1.65	<0.001***			
Latino	847 (50.3)	147 (44.4)	698 (52.1)	1.00	–	–			
Other	57 (9.4)	9 (5.6)	48 (10.5)	0.67	0.31–1.46	0.317			
Education	1630	353	1271			0.835			
< High school	592 (35.7)	135 (36.7)	453 (35.4)	1.08	0.84–1.40	0.546	1.44	1.19–1.73	<0.001***
High school graduate	529 (31.8)	115 (32.5)	414 (31.8)	1.07	0.91–1.25	0.410	1.24	1.09–1.40	<0.001***
Some college/college graduate	509 (32.5)	103 (32.8)	404 (32.8)	1.00	–	–	1.00	–	–
Nativity	1664	355	1302			<0.001***			
US-born	983 (56.6)	282 (77.9)	697 (51.0)	1.00	–	–	1.00	–	–
Foreign-born	681 (43.4)	73 (22.1)	605 (49.0)	0.37	0.28–0.49	<0.001***	0.39	0.28–0.54	<0.001***
Marital status	1628	346	1275			<0.001***			
Married/unmarried couple	362 (26.6)	58 (17.7)	303 (28.9)	1.00	–	–	1.00	–	–
Divorced/separated	420 (23.9)	96 (29.1)	322 (22.5)	1.83	1.34–2.48	<0.001***	1.67	1.27–2.21	<0.001***
Widowed	317 (17.9)	45 (12.9)	271 (19.2)	1.08	0.66–1.78	0.765	1.35	0.83–2.19	0.226
Never married	529 (31.7)	147 (40.3)	379 (29.4)	1.91	1.29–2.82	0.001**	1.55	1.06–2.27	0.023*
Employment	1629	351	1273			0.751			
Employed	489 (31.9)	113 (33.5)	375 (31.4)	1.10	0.81–1.49	0.538	0.86	0.66–1.11	0.236
Retired/unable to work	818 (48.1)	163 (46.1)	652 (48.7)	1.00	–	–	1.00	–	–
Other	322 (20.0)	75 (20.4)	246 (19.9)	1.07	0.78–1.46	0.694	0.92	0.66–1.29	0.638
Health status									
Body mass index	1579	338	1235			0.007**			

Table 1 (continued)

	Total number (<i>n</i> = 1664)	Smokers (<i>n</i> , %)	Non-smokers (<i>n</i> , %)	<i>p</i> value	RR	95% CI	<i>p</i> value	aRR ^a	95% CI	<i>p</i> value
Underweight	36 (1.9)	11 (3.2)	25 (1.5)		1.28	0.70–2.33	0.420	1.01	0.62–1.65	0.960
Healthy weight	283 (18.2)	79 (24.3)	203 (16.5)		1.00	–	–	1.00	–	–
Overweight	555 (36.3)	106 (32.6)	445 (37.1)		0.67	0.42–1.08	0.103	0.62	0.42–0.93	0.020*
Obese	705 (43.7)	142 (39.9)	562 (44.9)		0.68	0.55–0.84	<0.001***	0.55	0.47–0.66	<0.001***
Depression	1650	354	1289	<0.001***						
Yes	439 (25.9)	123 (34.7)	314 (23.5)		1.53	1.31–1.78	<0.001***	1.44	1.22–1.69	<0.001***
No	1211 (74.1)	231 (65.3)	975 (76.5)		1.00	–	–	1.00	–	–
Diabetes	1617	348	1263	0.080						
Yes	482 (27.6)	91 (23.3)	389 (28.7)		0.80	0.69–0.92	0.002**	0.81	0.70–0.95	0.008**
No	1135 (72.4)	257 (76.7)	874 (71.3)		1.00	–	–	1.00	–	–
Asthma		355	1296	0.110						
Yes	205 (11.9)	51 (13.9)	153 (11.3)		1.26	0.96–1.66	0.096	1.22	0.90–1.66	0.197
Yes, no attacks in past year	274 (16.8)	73 (20.0)	200 (15.8)		1.29	1.04–1.61	0.023*	1.27	1.03–1.57	0.024*
No asthma	1178 (71.4)	231 (66.2)	943 (72.8)		1.00	–	–	1.00	–	–
Hypertension	1652	353	1294	0.980						
Yes	935 (53.7)	199 (53.6)	731 (53.5)		1.00	0.89–1.13	0.962	1.03	0.90–1.19	0.663
No	717 (46.3)	154 (46.4)	563 (46.5)		1.00	–	–	1.00	–	–
Healthcare										
Have health insurance	1650	353	1290	0.966						
Yes	1567 (94.1)	336 (94.3)	1226 (94.3)		1.01	0.50–2.06	0.973	1.13	0.54–2.35	0.747
No	83 (5.9)	17 (5.7)	64 (5.7)		1.00	–	–	1.00	–	–
Health insurance type	1529	329	1195	0.108						
Employer-sponsored	285 (19.0)	64 (17.5)	221 (19.5)		1.00	–	–	1.00	–	–
Medicaid	740 (48.7)	186 (55.6)	552 (46.9)		1.24	1.01–1.52	0.037*	1.28	1.06–1.54	0.012*
Medicare	382 (24.6)	56 (19.7)	324 (25.8)		0.88	0.61–1.26	0.471	1.10	0.84–1.44	0.482
Other	122 (7.7)	23 (7.2)	98 (7.8)		1.02	0.69–1.49	0.937	1.13	0.82–1.56	0.457
Sources of medical care	1630	346	1277	0.009**						
Doctor's office	547 (32.6)	106 (25.1)	438 (34.6)		1.00	–	–	1.00	–	–
Health clinic	694 (42.6)	169 (51.9)	522 (40.1)		1.58	1.16–2.17	0.004**	1.54	1.18–2.02	0.002**
Emergency room	292 (18.3)	54 (17.3)	238 (18.7)		1.22	0.80–1.86	0.349	1.27	0.85–1.90	0.240
Other	97 (6.5)	17 (5.7)	79 (6.6)		1.16	0.74–1.80	0.520	1.32	0.84–2.08	0.229
Have personal doctor	1618	350	1262	0.138						

Table 1 (continued)

	Total number (<i>n</i> = 1664)	Smokers (<i>n</i> , %)	Non-smokers (<i>n</i> , %)	<i>p</i> value	RR	95% CI	<i>p</i> value	aRR ^a	95% CI	<i>p</i> value
Yes	1379 (83.8)	297 (80.3)	1076 (84.6)		1.00	–	–	1.00	–	–
No	239 (16.2)	53 (19.7)	186 (15.4)		1.26	0.96–1.66	0.098	1.41	1.08–1.84	0.012*
Did not receive medical care	1637	351	1279	0.658						
Yes	211 (12.9)	45 (11.9)	163 (13.0)		0.91	0.67–1.25	0.564	0.92	0.69–1.21	0.547
No	1426 (87.1)	306 (88.1)	1116 (87.0)		1.00	–	–	1.00	–	–

CI confidence interval, RR relative risk

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.^aRelative risks adjusted for age, gender, and race/ethnicity

examine the adjusted association between the receipt of provider advice to quit among smokers and two healthcare use variables: having a personal doctor and regular source of care. Log-binomial models were used in lieu of logistic regression to avoid exaggerating effect sizes, since the outcome is considered common [30, 31]. All adjusted models included factors previously linked with smoking, specifically age, gender, and race/ethnicity. The significance level for all tests was set at value of $p < 0.05$.

Results

The majority of residents were female (73.0%), half were Latino (50.3%), 35.7% had less than a high school education, and 43.4% were born outside of the USA. More than half of the residents (53.7%) reported a diagnosis of hypertension, while 27.6% reported diabetes, 28.7% reported current or past asthma, and 25.9% reported having depression (Table 1).

The prevalence of current smoking among adults aged 35 and older was 20.8%. Smokers were more likely to be between the ages of 50 and 64 ($p < 0.001$), non-Latino black ($p = 0.006$), US-born ($p < 0.001$), never married ($p < 0.001$), a healthy weight ($p = 0.007$), and diagnosed with depression ($p < 0.001$). The majority of smokers had health insurance (94.3%), a personal doctor (80.3%), received medical care as needed (88.1%), and used the health clinic for regular care (51.9%).

After adjusting for age, gender, and race/ethnicity, current smoking was positively associated with being divorced/separated (aRR = 1.67; 95% CI = 1.27–2.21) and never married (aRR = 1.55; 95% CI = 1.06–2.27) versus being married/unmarried couple, having less than a high school education (aRR = 1.44; 95% CI = 1.19–1.73) or high school graduate (aRR = 1.24; 95% CI = 1.09–1.40) versus being a college graduate, having depression (aRR = 1.44; 95% CI = 1.22–1.69), and having past asthma (aRR = 1.27; 95% CI = 1.03–1.57). Smoking was inversely associated with being foreign-born (aRR = 0.39, 95% CI = 0.28–0.54) versus US born, overweight (aRR = 0.62; 95% CI = 0.42–0.93) and obese (aRR = 0.55; 95% CI = 0.47–0.66) versus normal weight, and having diabetes (aRR = 0.81; 95% CI = 0.70–0.95).

Having Medicaid (aRR = 1.28; 95% CI = 1.06–1.54) versus employer-sponsored health insurance, using a

health clinic (aRR = 1.54; 95% CI = 1.18–2.02) versus a private doctor's office, and not having a personal doctor (aRR = 1.41; 95% CI = 1.08–1.84) were also associated with current smoking. Last, supplementary analyses showed that 84.0% of current smokers reported having received provider smoking cessation advice over the past year (Table 2). Receiving smoking cessation advice was significantly less likely among smokers without a personal doctor (aRR = 0.68; 95% CI = 0.51–0.91).

Discussion

Among Central/East Harlem public housing residents, 20.8% were current smokers, which is notably higher than the citywide average for adults (13.9%) [32]. Consistent with prior literature, current smoking was associated with reporting being non-Latino black [1], being never married [33], having lower levels of education [34–36], and having depression [37, 38]. Foreign-born adults [39, 40], adults with higher BMIs [41], and adults with diabetes [38] were less likely to be current smokers.

The significant associations between healthcare characteristics and smoking in our study were similar to those reported by other researchers. Similar to Jorm et al., who found that current smokers were less likely to use primary care services overall [42], we found that not having a personal physician was associated with current smoking. Current smokers without a regular doctor were also less likely to report receiving provider

advice to quit in the past year, mirroring a previous study finding that current smokers with a regular physician for healthcare were more likely to receive provider advice to quit and to plan to quit within the next 30 days than individuals without a regular source of care [43]. Smoking was more likely among Medicaid enrollees than among persons covered by employer-sponsored health insurance, similar to national findings [1].

In this study, the majority of public housing residents who smoke (72.4%) had health insurance, a personal doctor, and received provider advice to quit in the last year, which indicates that doctors generally identify smoking behavior in this population. However, persistently high smoking rates suggest that counseling may not translate into treatment and/or address persistent structural, social, and economic triggers to smoke. Previous studies have found that low-income smokers are less likely to use evidence-based cessation aids during a quit attempt compared to high-income smokers, despite their effectiveness [44–46]. In addition, providers may be less likely to engage vulnerable populations in tobacco use treatment [47]. Disparities in delivery of tobacco cessation treatment should be investigated further in the context of low-income and public housing communities [48].

Though these findings indicate that regular primary care providers may increase the likelihood of smoking cessation, increasing access to treatment may also require additional place-based approaches that consider the community context. One such approach would be to link patients to community health workers (CHWs),

Table 2 Results of log-binomial models for factors associated with current smokers who reported provider advice to quit.

	Smokers reporting provider advice to quit (<i>n</i> , %) (<i>n</i> = 355)	aRR ^a	95 CI%	<i>p</i> value
Total	305 (84.0)			
Sources of medical care	298			
Doctor's office	93 (26.5)	1.00	—	—
Health clinic	152 (54.1)	1.01	0.94–1.09	0.770
Emergency room	40 (14.2)	0.80	0.60–1.08	0.144
Other	13 (5.1)	0.90	0.69–1.17	0.439
Have personal doctor	300			
Yes	266 (85.4)	1.00	—	—
No	34 (14.6)	0.68	0.51–0.91	0.010*

CI confidence interval, RR relative risk

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

^aRelative risks adjusted for age, gender, and race/ethnicity

who have been shown to improve patient and clinical coordination [49], ensure linkages to social services [50], and build neighborhood capacity as it relates to social cohesion [51]. The CHW model can also fill gaps in services by facilitating behavior change and extending cessation support beyond clinical settings [52, 53]. Engaging community members in an intervention that embeds CHWs into public housing has been effective in increasing cessation rates [53, 54].

Limitations

This study has several limitations. First, observed associations should be interpreted with caution given that this study used cross-sectional data and lacks the temporal order necessary to make causal inferences. Second, self-reported diagnoses of chronic conditions could lead to misclassification [55], though agreement between self-reported chronic conditions and medical records has been found to be high for diabetes [56–58] and hypertension [56, 58], and intermediate for asthma [59] and depression [60]. Further, in this population with high prevalence of chronic diseases, residents may be hesitant to admit their smoking status [61]. Finally, generalizability of this study may be impacted by a 40.5% response rate and is limited to public housing developments with similar demographic profiles. However, most non-response was due to inability to contact someone during the rapid data collection period rather than refusal (13.0%), and the participating sample was representative of the target population in its demographic profile.

Conclusion

Awareness of local smoking patterns can help identify potentially effective targeted strategies for supporting residents to quit smoking and for preventing smoking initiation. Findings from this study suggest that smoking cessation interventions can take advantage of the high insurance coverage and healthcare-seeking practices, but efforts should be made to increase linkages to primary care and use of evidence-based treatments. Community-based cessation efforts implemented in other settings should incorporate the social context and target treatments to specific groups to achieve more successful cessation efforts. Multi-level, targeted cessation interventions will be fundamental to the effectiveness of the forthcoming smoking ban, and results from

this study can inform smoking cessation efforts to support the policy [25, 27].

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