



Smoking cessation intentions and attempts one year after the federally mandated smoke-free housing rule

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ABSTRACT

The present study examines public housing residents' smoking cessation intentions, expectancies, and attempts one year after implementation of the Department of Housing and Urban Development's mandatory smoke-free rule in public housing. The sample includes 233 cigarette smokers, ages 18–80, who reside in the District of Columbia Housing Authority. Data collection occurred between March and August 2019. Descriptive statistics, chi-square, and Wilcoxon two-sample test analyses assessed smoking cessation intentions, expectancies, and attempts across resident demographics and characteristics. Findings showed 17.2% of residents reported not thinking about quitting, 39.1% reported thinking about quitting, and 48.6% reported thinking about quitting specifically because of the rule. Residents ages 60–80 were more likely to consider quitting because of the rule, compared to residents ages 18–59. Of those thinking of quitting, 58.6% were sure they could quit if they tried. Those thinking of quitting due to the rule (62.0%) were more likely to have made at least one quit attempt in the past 3 months than those not attributing thinking of quitting to the rule. Residents trying to quit reported an average of 2.7 attempts in the last 3 months; most perceived evidence-based cessation supports as not helpful. A majority reported thinking about quitting and attempting to quit but continuing to smoke, indicating a significant gap between intent to quit and successfully quitting. Results suggest that the rule positively influenced smoking behaviors. However, additional interventions are needed to assist public housing residents with successfully quitting smoking.

1. Introduction

Rates of cigarette smoking are much higher among residents living in public housing compared to the general population (about 33% vs. 14%). (Helms et al., 2017; Feinberg et al., 2017) This is indicative of larger trends where individuals of lower socioeconomic status are more likely to smoke cigarettes. (Hiscock et al., 2012) The Department of Housing and Urban Development (HUD) mandated that all HUD-funded public housing authorities become smoke-free as of July 2018, encompassing all lit tobacco products including hookah, and excluding electronic nicotine delivery systems (ENDS), such as e-cigarettes. The rule did not apply to state- and locally-funded public housing, or Section 8

housing. Although the rule prohibits smoking in residential units, it does not prohibit smokers from living in or qualifying for public housing.

A limited number of recent studies indicate that adoption of a voluntary or mandatory smoke-free rule in public housing facilitates residents making positive changes to their smoking behaviors. (Pizacani et al., 2012; Young et al., 2016; Kingsbury et al., 2016; Kennedy et al., 2015; Lathen et al., 2020) Specifically, smoke-free rules in public housing are associated with increased quit attempts, (Young et al., 2016) reduced daily smoking, (Young et al., 2016) and reduced smoking frequency. (Young et al., 2016; Kingsbury et al., 2016; Lathen et al., 2020) A mandatory smoke-free rule in Wisconsin public housing, for example, found that nearly 80% of residents reported a positive change to their

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tobacco consumption explicitly because of the smoke-free rule. (Lathen et al., 2020)

The HUD smoke-free housing rule represents an opportunity to narrow smoking-related health disparities associated with socioeconomic status. (Geller et al., 2016) Cessation is the critical pathway for reducing smoking-related harms among all residents. To be effective, interventions should address resident smokers' preferences, and promote evidence-based methods, including medication such as nicotine replacement therapy (NRT). Interventions should also include outreach, counseling, social support, alongside wrap-around tobacco control policies. (Lathen et al., 2020; Services UDoHaH, 2020; Tobacco, 2008; King et al., 2014) The HUD rule acknowledges the need for voluntary, low- or no-cost cessation support for residents based on Center for Disease Control and Prevention (CDC) guidelines, (King et al., 2014) but does not directly provide these recommended resources. (Instituting smoke-free public housing, 0000) In fact, housing authorities are not required to provide resources to help smokers quit. (Lathen et al., 2020)

Although evidence suggests smoke-free policies can help smokers make positive changes to smoking behaviors, the present study is different because it adds to the limited data confirming the association between the new mandatory HUD rule as implemented and resident smoking and cessation behaviors. The present investigation explored cigarette smoking cessation intentions and attempts among residents of the District of Columbia Housing Authority (DCHA) within one year of the new mandatory HUD rule implementation. Examining resident tobacco cessation intentions and behaviors during the initial policy implementation period, along with their reasons for smoking and perceptions of smoking cessation support, may inform future actions or services to improve HUD's smoke-free rule effectiveness.

2. Methods

2.1. Study sample

Data collection occurred between March and August of 2019 from 448 DCHA residents ages 18–80 across 14 properties (7 family and 7 senior/disabled). Given the rule's focus on lit tobacco products, the present study restricted the analytic sample to residents who indicated smoking cigarettes on one or more days in the past 30 days and who provided data in response to two questions asking if they were thinking about quitting and if they were thinking of quitting because of the smoke-free rule. The majority of resident tobacco users (97.7%, N = 259/265) indicated they used cigarettes; analysis excluded n = 35/259 due to non-response of the intention to quit question, providing a final sample of N = 233 cigarette smokers.

2.2. Procedures

Data collection took place in DCHA community spaces. Study staff and DCHA administrators held survey participation events. DCHA and building staff advertised and told residents about the events. Inclusion criteria required participants be a DCHA property resident (not using Section 8 vouchers) and between the ages of 18 and 80. Eligible residents completed a computer-based survey. The George Washington University Institutional Review Board approved all study procedures.

2.3. Measures

All measures were self-reported unless otherwise noted.

Demographics. Surveys captured demographic information including gender, race/ethnicity, age, length of DCHA property residency, and building type as derived from DCHA classification (e.g., family or senior/disabled).

Tobacco Use. Residents reported if they used any of the following tobacco products in the past 30 days (defined as current use (Ryan et al., 2012)): cigarettes, cigars, little cigars and cigarillos, smokeless tobacco

products, hookah, and e-cigarette and vapor products. Those who indicated they used a tobacco product reported age of initiation (in years), lifetime use (yes/no), and past 30-day use (how many days they used the product and average number of times they used the product each day). Residents who reported smoking cigarettes also indicated whether their usual product was menthol flavored.

Due to some residents not smoking every day, the study used current age, age of initiation, past 30-day use, and average number of cigarettes smoked per day in the past month to estimate pack years based on the National Cancer Institute definition of packs of cigarettes smoked per day times number of years smoked. (National Cancer Institute, 0000)

Reasons for smoking. Residents who reported smoking cigarettes indicated whether they smoked to socialize, to relax, to relieve stress, to escape life's challenges, because important people smoke, and to control weight. Response options range from 1 being strongly agree and 5 being strongly disagree. Building on work by Horn, et al. (Branstetter et al., 2010) and Berlin, et al., (Berlin et al., 2003) these questions corresponded to previously identified subjective reasons for smoking and factors that make quitting difficult, including pleasure or enjoyment, social acceptance, and stress relief. (Tate and Stanton, 1990; Ho, 1989; West and Corrigan, 2006)

Nicotine dependence. The primary nicotine dependence measure asked residents how long after waking did they smoke their first cigarette (within 5 min, 5 to 30 min, 31 to 60 min, or after 60 min of waking). (Heatherton et al., 1991) This measure is a widely used, efficient, and reliable measure of dependence²¹⁻²³ taken from the Fagerström Test for Cigarette Dependence (FTCD), and highly informative for mild-low to high cigarette dependence. (Svicher et al., 2018) The Heaviness of Smoking Index (HSI) (Borland et al., 2010) was not used because residents reported their estimates for this item in an open field, not the categories used in the FTCD.

Cessation intentions, expectancies, and behaviors. First, residents responded to the question "Are you thinking about quitting cigarette smoking for good?" derived from the National Adult Tobacco Survey (NATS) (National Adult Tobacco Survey, 0000) to assess current quit intentions. Next, participants responded to the statement "I have considered quitting the use of lit tobacco products because of the smoke-free rule" on a 5-point scale with 1 being "Strongly Agree" and 5 being "Strongly Disagree." Responses led to the formation of three groups: (1) those who reported they were not thinking of quitting; (2) those who reported they were thinking of quitting but not because of the rule; and (3) those who reported thinking about quitting because of the rule.

Those who said they were thinking of quitting smoking indicated how sure they were they could quit cigarettes if they tried, using a 4-point scale with 1 being "Not at all sure" and 4 being "Very sure." Respondents indicated if they expected to use lit tobacco more, the same, or less because of the rule. Respondents estimated the number of quit attempts they had made in the past three months in an open field. On a 5-point scale with 1 being "Not at all helpful" and 5 being "Very helpful," respondents indicated their perceived helpfulness of the following cessation methods: stopping on their own, nicotine patches, gums or lozenges, medications, quitlines, electronic vapor products, and smartphone applications.

Perceived cessation support. Participants responded to the statement "Since hearing about the smoke-free rule, how much support have you received from the Housing Authority and other organizations (for example, Health Department) to help you quit tobacco use?" on a 4-point scale from "A lot of support" to "No support."

2.4. Statistical analysis

Analyses comprised the three groups for comparison: those not thinking of quitting, those thinking of quitting (for other reasons not specifically because of the rule), and those thinking of quitting because of the rule. Descriptive statistics and chi-square analyses examined differences in cigarette use behaviors across respondent demographics and

characteristics. T-tests assessed the association of dependence and pack years across select characteristics. T-tests and Wilcoxon two-sample tests assessed differences in quit attempts by demographics, dependency, reasons for smoking, cessation perceptions and expectancies, and smoking behaviors. All analyses used SAS 9.4 and included procedures to cluster respondents by site.

Analysis dichotomized time before first cigarette, considering quitting because of the rule, how sure residents were that they could quit if they tried, and reasons for smoking to clarify differences between groups and to compartmentalize similar responses. The recoded time before first cigarette variable indicated whether residents smoked before or after 30 min from waking in accordance with prior research establishing this question as a proxy for high dependence. (Heatherton et al., 1991; Kozlowski et al., 1981; Muscat et al., 2011) The other variables compare residents who agreed and disagreed or were neutral, or sure or not sure. While losing some detail with the dichotomization, (Altman and Royston, 2006; Peacock et al., 2012) the distinct categories (e.g., agree and disagree) capture meaningful differences and make complex comparisons easier to understand. (Peacock et al., 2012)

3. Results

3.1. Sample demographics and characteristics

Table 1 reports the sample characteristics. About half of the respondent sample was female (55.4%, n = 129) and a majority was African American (89.5%, n = 288). About half the residents were ages 18–59 (55.4%, n = 128); the mean age was 55.7 (SD = 12.6) and 60.5% (n = 141) of the residents lived in senior and disabled, multiunit housing buildings. Of the remaining respondents, 19.3% (n = 45) lived in multiunit family buildings and 20.2% (n = 47) lived in multiunit townhome properties. Most of the residents lived in DCHA buildings for more than 5 years (83.8%, n = 171). A majority lived with at least one other person, with 43.9% (n = 101) of the respondents living on their own.

Table 1 also shows the results comparing whether residents were not thinking about quitting, thinking about quitting, or thinking about quitting because of the rule, an indicator of the smoke-free rule influence on resident smokers. Those ages 60–80 were significantly more likely to report thinking about quitting overall and thinking of quitting because of the rule, compared with those ages 18–59 (p < 0.05).

3.2. Cigarette smoking and other tobacco use behaviors

Table 2 describes the resident smoking and other tobacco use behaviors. Fewer than half (45.3%, n = 127) of residents indicated they smoked every day. Residents indicated they smoked an average of 10.7 CPD (SD = 10.2) on days they smoked, with 82.2% (n = 189) smoking less than a pack a day (20 cigarettes). Daily smokers indicated they smoked more CPD on days they smoked (M = 12.66, 95% CI = 11.07, 14.25) compared to non-daily smokers (M = 9.14, 95% CI = 7.11, 11.18), t(124) = -2.70, p < 0.01. Among current smokers, 22.8% (n = 53) reported using at least one other tobacco product with 18.5% (n = 43) using another lit tobacco product and 6.4% (n = 15) using e-cigarettes. Nearly all smokers indicated they usually smoked menthol cigarettes (93.1%, n = 217). Fig. 1 shows residents most commonly agreed or strongly agreed that they smoked to relax (73.1%, n = 152) and to relieve stress (71.6%, n = 149).

For this sample, 65.7% (n = 153) of the residents smoked their first cigarette within 30 min of waking. The mean of pack years was 21.4 (95% CI = 17.49, 25.32) with 59.9% (n = 136) residents having <20 pack years. Based on the number of CPD noted above, the typical participant smoked half a pack a day for 30 years.

Table 1
Sample Characteristics and Intention to Quit Cigarette Smoking.

Characteristic	Overall % (n)	Not thinking about quitting % (n)	Thinking about quitting % (n)	Considering quitting because of the rule % (n)	Chi-Squared p-value
Overall	N = 233	17.2% (40)	39.1% (91)	43.8% (102)	
Gender					0.72
Female	55.4% (129)	18.6% (24)	37.2% (48)	44.2% (57)	
Male	44.6% (104)	15.4% (16)	41.4% (43)	43.3% (45)	
Race/Ethnicity					0.14
Black/African American	89.5% (188)	15.4% (29)	38.8% (73)	45.7% (86)	
Other	10.5% (22)	31.8% (7)	40.9% (9)	27.3% (6)	
Age Group					0.04
18–59	55.4% (128)	18.8% (24)	44.5% (57)	36.7% (47)	
60–80	44.6% (103)	14.6% (15)	32.0% (33)	53.4% (55)	
Building Type					0.22
Family, Multiunit	19.3% (45)	15.6% (7)	37.8% (17)	46.7% (21)	
Family, Townhome	20.2% (47)	25.5% (12)	34.0% (16)	40.4% (19)	
Senior/Disabled, Multiunit	60.5% (141)	14.9% (21)	41.1% (58)	40.4% (62)	
Time in Housing					0.36
Less than 5 years	16.2% (33)	18.2% (6)	48.5% (16)	33.3% (11)	
5 years or more	83.8% (171)	16.4% (28)	38.0% (65)	45.6% (78)	
Housemates					0.21
None	43.9% (101)	18.8% (19)	34.7% (35)	46.5% (47)	
One	22.2% (51)	11.8% (6)	37.3% (19)	51.0% (26)	
More than one	33.9% (78)	16.7% (13)	47.4% (37)	35.9% (28)	

3.3. Cessation intentions and expectancies

Over three-quarters of respondents (82.8%, n = 193) reported thinking of quitting. Of those thinking of quitting, 58.5% (n = 113) were sure or very sure they could quit if they tried. Only 18.7% (n = 42) felt they received a lot of support to quit tobacco use, with 42.2% (n = 95) indicating they received some level of support and 39.1% (n = 88) indicating they received no support to quit.

Clustered Chi-squared tests indicated residents who used e-cigarettes in addition to cigarettes were less likely to be thinking of quitting and thinking about quitting because of the rule (p = 0.01). Additionally, those who indicated they received a lot of support to quit were more likely to be thinking about quitting because of the rule (p < 0.01) than those who indicated they received no support. Residents who indicated they received less support to quit were less likely to be thinking about quitting because of the rule, but a similar proportion was thinking about quitting overall. Fewer respondents who smoked within 30 min of waking said they were sure or very sure they could quit: 76.1% (n = 51) versus 49.2% (n = 62), $\chi^2(3, n = 193) = 17.71, p < 0.01$.

Over half of respondents indicated the rule would impact their overall tobacco use, with 57.8% (n = 115) saying they will use tobacco less compared with 8.0% (n = 16) who said they would use tobacco more. Residents thinking of using tobacco less were more likely to be

Table 2
Tobacco Use Characteristics by Intentions to Quit Smoking.

Characteristic	Overall % (n)	Not thinking about quitting % (n)	Thinking about quitting % (n)	Considering quitting because of the rule % (n)	Chi-Squared p-value
Overall	N = 233	17.2% (40)	39.1% (91)	43.8% (102)	
<i>Tobacco Use Characteristics</i>					
Daily Smoker					0.69
Yes	45.3% (127)	15.8% (20)	37.8% (48)	46.5% (59)	
No	54.7% (105)	19.1% (20)	40.0% (42)	41.0% (43)	
Usually Smoke Menthol					0.18
Yes	93.1% (217)	17.1% (37)	37.8% (82)	45.2% (98)	
No	6.9% (16)	18.8% (3)	56.3% (9)	25.0% (4)	
Time after Waking Before 1st Cigarette					0.35
Within 30 min	65.7% (153)	17.7% (27)	36.0% (55)	46.4% (71)	
After 30 min	34.3% (80)	16.3% (13)	45.0% (36)	38.8% (31)	
Other Tobacco Products					0.05
Any other tobacco product (Yes)	22.8% (53)	20.8% (11)	47.2% (25)	32.1% (17)	
No	77.3% (180)	16.1% (29)	36.7% (66)	47.2% (85)	
Another lit tobacco product (Yes)	18.5% (43)	25.0% (10)	44.2% (19)	32.6% (14)	0.05
No	81.6% (190)	15.8% (30)	37.9% (72)	46.3% (88)	
E-cigarettes (Yes)	6.4% (15)	33.3% (5)	60.0% (9)	6.7% (1)	0.01
No	93.6% (218)	16.1% (35)	37.6% (82)	46.3% (101)	
Support Received to Quit					<0.01
A lot of support	18.7% (42)	11.9% (5)	16.7% (7)	71.4% (30)	
Some support	25.8% (58)	15.5% (9)	36.2% (21)	48.3% (28)	
A little support	16.4% (37)	16.2% (6)	43.2% (16)	40.5% (15)	
No support	39.1% (88)	20.5% (18)	48.9% (43)	30.7% (27)	
<i>Cessation Intentions and Expectancies</i>					
How will Rule affect Tobacco Use					<0.01
Use tobacco less	57.8% (115)	12.2% (14)	29.6% (34)	58.3% (67)	
Use tobacco the same	34.2% (68)	23.5% (16)	54.4% (37)	22.1% (15)	
Use tobacco more	8.0% (16)	31.3% (5)	31.3% (5)	37.5% (6)	
Sure Could Quit If Tried					0.66
Not at all sure/Not sure	41.5% (80)	–	48.8% (39)	51.3% (41)	
		–		55.0% (61)	

Table 2 (continued)

	Overall	Not thinking about quitting	Thinking about quitting	Considering quitting because of the rule
Sure/Very Sure	58.6% (113)		46.0% (52)	
Made at least 1 quit attempt in the past 3 months				0.01
Yes	64.7% (121)	–	38.0% (46)	62.0% (75)
No	35.3% (66)	–	60.6% (40)	39.4% (26)

thinking about quitting because of the rule ($p < 0.01$); those planning to use tobacco about the same or more with the rule in effect were less likely to be considering quitting.

Residents who said they smoked to relax were less likely to say they were sure they could quit: 52.7% ($n = 68$) versus 71.7% ($N = 33$), $X^2(1, n = 175) = 5.03, p < 0.05$. Those who smoked to relieve stress were significantly less sure they could quit smoking: 52.8% ($n = 66$) versus 70.0% ($N = 35$), $X^2(1, n = 175) = 4.33, p < 0.05$.

Fig. 2 presents results from respondents indicating whether they thought selected cessation methods would be helpful to them quitting smoking. The best rated cessation method was quitting on your own where 34.0% ($n = 72$) of respondents said this would be “Helpful” or “Very Helpful.” In most cases, the highest-rated option was “Unsure.” Apart from quitting on your own, respondents rated specific methods as “Helpful” or “Very Helpful”, in the following order: 25.4% ($n = 54$) for nicotine replacement products (patch, gum, lozenge), 20.4% ($n = 43$) for medication, 19.3% ($n = 41$) for quitlines, 14.7% ($n = 31$) for e-cigarettes, and 15.6% (33) saying so for mobile apps.

3.4. Cessation behaviors

After rule implementation, 64.7% ($n = 121$) of smokers indicated they had made at least one quit attempt in the last 3 months. Those who reported thinking about quitting because of the rule were more likely to make at least one quit attempt compared with those who only thinking about quitting ($p = 0.01$). Two outliers who indicated they quit 88 and 90 times in the past 3 months were removed from analysis. Researchers considered these values invalid because they were over 7 standard deviations away from the mean and represented making a quit attempt more often than every other day, which exceeds usual terms for a quit attempt. (Creamer et al., 2019) Overall, respondents reported making a mean number of quit attempts of 2.7 ($SD = 4.1$). Those thinking of quitting because of the rule made a median number of quit attempts of 2 in the past 3 months [IQR 0,5], compared with those only thinking of quitting who made a median number of 1 quit attempts [IQR 0,3], $p < 0.01$. Results from t-tests and Wilcoxon two-sample tests indicated no meaningful differences in quit attempts by demographics, smoking behaviors, reasons for smoking, and other cessation intentions and expectancies.

4. Discussion

A high proportion of sampled resident smokers reported desires to quit smoking and a high number of quit attempts; those who reported they were trying to quit because of the rule were more likely to report a quit attempt than residents only thinking about quitting. While most reported a desire to quit, a little over half of resident smokers believed they could successfully quit if they tried. Over 80% of smokers indicated they wanted to quit, which is comparable to national trends. (Helms et al., 2017; Services UDoHaH, 2020) However, while these findings align with national estimates of quit intentions, they are significantly

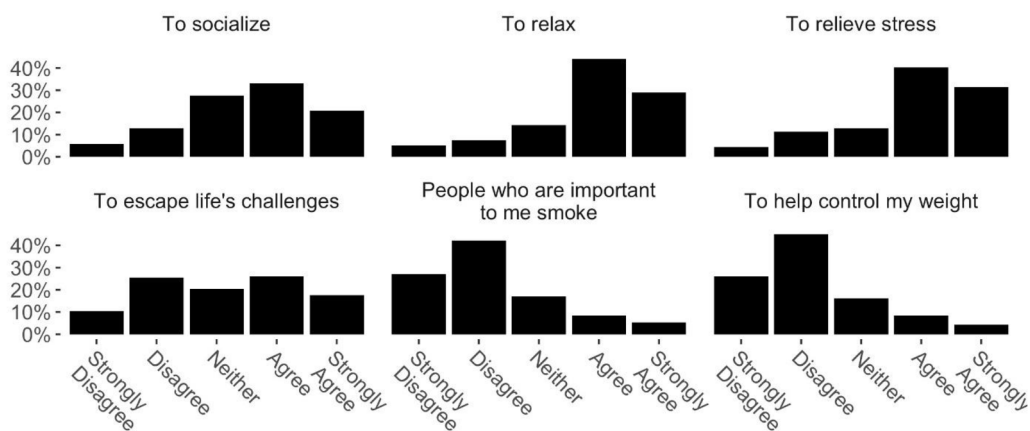


Fig. 1. Reasons for Smoking Cigarettes.

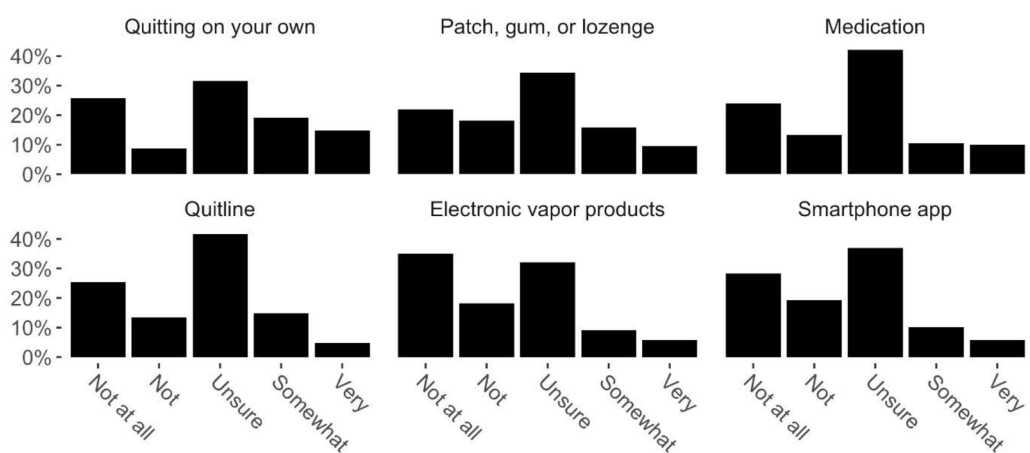


Fig. 2. Perceived Helpfulness of Cessation Methods.

higher than recent nationally representative estimates indicating that 45.8% of low-income African Americans reported thinking of quitting and 45.4% made any quit attempts in the past year. (Keeler et al., 2020) National studies also indicate adult smokers attempt to quit an average of 2 times per year. (Borland et al., 2012) Supporting other studies showing that African Americans are more likely to attempt to quit but less likely to succeed, (Services UDoHaH, 2020) the current study showed this group of primarily African American adults averaged approximately 3 quit attempts in the previous 3 months, which is higher than the previously identified national average. (Borland et al., 2012) Additionally, residents aged 18–59 were more likely to report no intention to quit despite this age group typically having more interest in quitting than those over age 60. (Jamal, 2017) The higher interest in quitting due to the rule among the older age group is also interesting in the context of their lower smoking rates and lower rates of successful cessation compared to younger smokers. (Creamer et al., 2019; Jamal, 2017)

There are several potential reasons residents continued smoking despite reported cessation intentions. First, African Americans smoke fewer CPD overall and are more likely to be non-daily smokers than non-Hispanic Whites. (Trinidad et al., 2009) Likewise, most residents in this study met the definition of light and intermittent smokers because they did not smoke every day and smoked less than a pack on the days they smoked. (Husten, 2009) Intermittent smokers may perceive less urgency to quit but still exhibit dependency symptoms that make quitting difficult. (Husten, 2009)

Second, menthol use may further explain some of the reduced confidence and success in quitting. Results indicate that most (93%) of the

primarily African-American smokers in the analysis used a menthol product, consistent with estimates of use in lower socioeconomic communities. (Mattingly et al., 2020) Menthol increases dependency and lowers the efficacy of individual quit attempts, particularly in African Americans. (Services UDoHaH, 2020; Smith et al., 2020; Okuyemi et al., 2007; Garey et al., 2016) Future research should identify the unique influence of menthol in residents of public housing by comparing results to other smokers in public housing who do not use menthol, particularly as it relates to rule compliance and cessation. (The health consequences of smoking – 50 years of progress: a report of the Surgeon General. In: U. S. Department of Health and Human Services CfDCaP, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking, and Health, eds. Atlanta: US Department of Health and Human Services, 2014)

Third, results indicated that lower confidence in a participant's ability to quit was significantly associated with higher nicotine dependence, and reporting that they smoked to relax and relieve stress. Additionally, those who did not intend to quit were more likely to use e-cigarettes and use tobacco more frequently. These barriers could neutralize perceived or actual impact of the rule on cessation; a possibility worth deeper investigation because they may motivate smokers to overcome the prohibition of smoking in their units.

Given that cessation is not a mandatory rule component, it is not surprising that most residents who continued to smoke after rule implementation indicated they did not receive DCHA support (e.g., programs, tools, or services) to quit pursuant to the smoke-free rule. Those who did not intend to quit because of the rule more commonly said they received no support to quit. While residents rated NRT and

medications to help quit tobacco as potentially useful, the highest-rated quit method used was “on your own” without assistance—a method shown to have lower success for adult smokers in the general population. (Services UDoHaH, 2020) Additionally, it is not clear if currently smoking residents would have taken advantage of cessation interventions offered in tandem with the rule. Results from other investigations indicate DCHA reported that they offered general smoking cessation classes and quitline resources to residents who wanted to quit, but the classes were poorly attended, and many residents reported not knowing about those resources. (Horn et al., 2021;18(17):8908.)

Quitting on one's own is a likely default when individuals do not foresee or feel hopeful about meaningful cessation alternatives. Studies reveal that cessation aids historically have not addressed the structural, social, and economic reasons African Americans smoke. (Feinberg et al., 2017) This may be confounded among public housing residents faced with unique stressors and smoking patterns dictated by smoke-free rules. (Kock et al., 2019) Of relevance to our study population, tailored cessation programs addressing cultural factors (e.g., smoking to relieve stress, preferences for menthol, low confidence in quitting, disbelief in the utility of conventional cessation models, and intermittent to light smoking) for this target population would likely increase the acceptability, participation, and efficacy of interventions and take advantage of high levels of interest in quitting smoking. (Kock et al., 2019; Webb Hooper et al., 2017; Andrews et al., 2007; Liu et al., 2013)

4.1. Limitations

Respondents represented a convenience sample from one Housing Authority, predominantly Black, and may not generalize to the experiences of all DCHA residents or Housing Authorities. They also represented current smokers at the time of their survey. Assessments of whether respondents had quit 8–13 months after the rule implementation may not yield meaningful results since smokers often require multiple attempts to successfully quit. Due to this limitation, analyses focused on other favorable changes to smoking behaviors. Another consideration is that this study focused on cigarette cessation behaviors. While the smoke-free policy applies to all lit tobacco products, most residents who used tobacco were cigarette smokers. In most cases where respondents used another tobacco product, cessation intent and behaviors other products aligned with their cessation intent and behaviors for cigarettes. Although ENDS users were less likely to think about quitting because of the rule, this study does not address switching or substituting non-lit tobacco to replace lit tobacco products in restricted areas. Subsequent research should examine the role of ENDS and other non-lit tobacco products in residents' quit intent or cessation.

4.2. Conclusion

Results suggest the rule influenced most resident smokers to think about quitting, reduce their cigarette consumption, and attempt to quit. However, results indicate barriers to cessation, including stress and perceived lack of support and intervention access. Overall, residents under age 60 and those who used e-cigarettes were more likely to say they did not want to quit smoking despite the rule. To take advantage of these rules as a way to reduce smoking-related health disparities, next steps are to determine (1) what approaches would be effective in moving smokers who are not motivated to quit toward thinking about or taking action to quit with particular attention on dual tobacco users and those aged 18–59, and (2) the extent to which motivated residents' odds of quitting successfully are improved if they are provided evidence-based interventions that are tailored to their specific needs, trusted, and embedded within the rule implementation in positive, continuous ways.

CRedit authorship contribution statement

Kimberly Horn: Conceptualization, Formal analysis, Methodology, Project administration, Resources, Supervision, Writing – original draft,

Writing – review & editing. **Craig T. Dearfield:** Conceptualization, Data curation, Formal analysis, Methodology, Project administration, Software, Writing – original draft, Writing – review & editing. **Sallie Beth Johnson:** Conceptualization, Investigation. **Kevin Krost:** Investigation. **Sofia Rincon Gallardo Patino:** Investigation. **Tiffany Gray:** Investigation. **Ian Crandell:** Formal analysis, Methodology, Software, Investigation. **Debra H. Bernat:** Conceptualization, Formal analysis, Methodology, Project administration, Resources, Supervision, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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