



Brief report

Challenges in Enforcing Home Smoking Rules in a Low-Income Population: Implications for Measurement and Intervention Design

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Abstract

Introduction: Smoke-free homes reduce exposure to secondhand smoke, contribute to lower levels of consumption, and help smokers to quit. Even when home smoking rules are established however, they may not be consistently enforced.

Methods: This study uses data from a randomized controlled trial of a brief intervention to create smoke-free homes among callers to the United Way of Greater Atlanta 2-1-1. Participants with partial or full home smoking bans at 6-month follow-up were asked about enforcement challenges, rooms where smoking occurred, and exceptions to the rules. Air nicotine monitors were placed in a subset of homes.

Results: Participants ($n = 286$) were mostly female (84.6%) and African American (84.9%). Most were smokers (79.0%) and reported at least half of their friends and relatives smoked (63.3%). Among those with a full ban, 4.3% reported their rules were broken very often whereas 52.6% stated they were never broken. Bad weather and parties were the most common exceptions to rules. Among nonsmokers with full bans, 16% reported exposure to secondhand smoke in the home 1–3 days in the past week. In multivariate analyses, having a partial ban, being a nonsmoker, and living with three or more smokers predicted higher levels of enforcement challenges.

Conclusions: Findings suggest the majority of households with newly adopted smoke-free rules had no or rare enforcement challenges, but about one-fifth reported their rules were broken sometimes or very often. Interventions to create smoke-free homes should address enforcement challenges as newly adopted rules may be fragile in some households.

Implications: Interventions that promote smoke-free homes should address enforcement challenges.

Introduction

The home is often the primary source of secondhand smoke exposure (SHS) for children and nonsmokers, particularly among those living with a smoker.^{1–5} Although prevalence of smoke-free homes

has increased dramatically over the past two decades, almost half of households with a smoker still allow smoking in the home.^{3,6–8} This suggests that, although smoke-free homes are becoming the norm, it still remains either challenging or a low priority for many households.

Even when home smoking rules are established, they may not be consistently enforced. One study using annual data from the Tobacco Use Supplement of the US Current Population Survey estimated prevalence rates of discordant/concordant parental smoking ban reports by survey period.³ Overall, the percentage of households in which two parents gave discordant reports on a full home smoking ban decreased significantly from 12.7% to 2.8% from 1995 to 2007. These discrepancies, while decreasing over time, suggest possible enforcement challenges in these homes. Discordant reports were more likely to be obtained from households with current smokers. It is possible that while one parent reports a rule, the other may disregard it.

Several factors may make the enforcement of these rules difficult such as having visitors who smoke, being uncomfortable asking visitors to refrain from smoking in the home, and resistance from smokers living in the home.⁹⁻¹¹ Concern over leaving young children alone inside the home may be another barrier, as may outdoor conditions such as bad weather or darkness.^{9,12-14} The purpose of the present study is to describe exceptions to household smoking rules and enforcement challenges and to examine predictors of enforcement challenges.

Methods

Participants and Procedures

The sample for these analyses is from a randomized controlled trial testing the efficacy of a brief intervention to increase household smoking rules.¹⁵ Three waves of data collection included baseline, 3 months, and 6 months, with data collected from June 2012 through July 2013. This study was approved by Emory University's Institutional Review Board.

Participants were recruited by line agents at United Way of Greater Atlanta 2-1-1, a referral hotline that connects callers to needed social services (eg, utilities assistance).¹⁶ Eligible participants were 18 years of age or older, had at least one smoker and one nonsmoker residing in the home, spoke and understood English, and did not have a full smoking ban at baseline. Line agents collected baseline data through an online tracking tool that provided scripts about the purpose of the study, informed consent information and data entry fields for the surveys. University staff collected follow-up data via telephone interviews using the same online tool. Participants received a \$25 gift card for each telephone interview. Those with three waves of data who reported either a partial or a full smoking ban in their home at 6 months were included in these analyses ($N = 286$), as the proportion of participants with home smoking rules was highest at this time point (212 excluded).

Measures

Measures below were collected at 6 months unless otherwise noted below.

We assessed *household smoking rules* by asking, "Which statement best describes the rules about smoking inside your home: smoking is not allowed anywhere inside my home; smoking is allowed in some places or at some times; smoking is allowed anywhere inside my home; or there are no rules about smoking inside my home."¹⁷ To assess *enforcement challenges*, we asked, "How often are your smoking rules broken by someone?"¹⁸ The responses were dichotomized to enforced (rules are never broken) and not enforced

(broken rarely, sometimes, or very often) for some analyses. Based on our prior qualitative work, we asked "In what room or rooms does smoking sometimes occur?" and "Even with a rule, there are sometimes *exceptions* where people smoke inside. Do you allow people to smoke inside the home: when the weather is bad, when it is dark outside, when there is a party or celebration inside the home, when a special guest is visiting, and any other exceptions?"^{9,19} *Household opposition* was assessed with an open-ended question, "Who in your household was against or opposed to establishing rules on smoking in your current home?"¹⁸ We also asked about the *proportion of relatives and friends who smoked*,²⁰ and exposure to SHS in the home in the past 7 days.²¹ Smokers were also asked their intention to quit and how long after waking they have their first cigarette.²² Our *neighborhood safety* measure asked, "How safe from crime is your neighborhood?"²³

Air Nicotine

After the 3-month interview, a passive air nicotine monitor was mailed to all participants who reported a full ban, and half of participants who reported a partial ban ($n = 171$); participants placed the monitors with guidance via telephone.^{24,25} Participants were asked to place the monitor 2–4 feet above the floor and 2–4 feet away from windows or mechanical ventilation, in the room where they and household members spend most of their time, for a period of 7 days.²⁵ The monitors were purchased from and analyzed via gas chromatography by the Johns Hopkins Bloomberg School of Public Health Secondhand Smoke Exposure Assessment Laboratory using previously described methods.^{2,26}

Statistical Analysis

Bivariate associations between ban status, smoking characteristics, demographics, and enforcement challenges were examined using Wilcoxon sign-ranked test for ordinal variables, chi-square tests for categorical variables, and independent t tests for continuous variables. We then conducted binary logistic regression with enforcement as the outcome and variables with significant bivariate associations as the independent variables. All analyses were conducted in SAS 9.3 (SAS Institute, Cary, NC).

Results

The sample was mostly female (84.6%), African American (84.9%), not employed (78.3%), and lived on an annual household income of \$10 000 or less (56.0%; [Table 1](#)). Most were smokers (79.0%) who intended to quit smoking within the next 6 months (85.4%). Almost half of the households had just one smoker (48.1%), and the majority reported at least half of their friends and relatives smoked (63.3%). About half lived in multiunit housing (50.9%). More (59.4%) participants reported that smoking is allowed at some places or at some times (ie, partial ban) than reported a full ban (40.6%).

Among those with a full ban, 52.6% reported their rules were never broken, in contrast to 34.1% of those with a partial ban ($P = .01$; [Table 2](#)). Of those with a full ban, 4.3% reported their rules were broken "very often" and 15.5% reported their rules were "sometimes" broken. In contrast, 9.4% of those with a partial ban reported their rules were broken very often and 21.8% said they were sometimes broken. Among those with a partial ban, the study participant was most often opposed (14.7%) to a ban. Among those with a full ban, a spouse was most often opposed (13.8%).

Table 1. Description of Study Participants and Correlates of Enforcement Challenges

	Univariate		Bivariate		Multivariate ^a	
	N	%	OR	95% CI	OR	95% CI
Total						
Gender						
Male	44	15.4	1.0			
Female	242	84.6	0.6	0.3 to 1.2		
Race/ethnicity						
African American/black/other	242	84.9	1.0			
White	30	10.5	1.1	0.5 to 2.4		
Other	13	4.6	1.7	0.5 to 5.6		
Employment						
Employed	62	21.7	1.0			
Not employed	224	78.3	1.2	0.7 to 2.1		
Income						
\$10 000 or less	158	56.0	1.0			
\$10 001–\$20 000	79	28.0	0.9	0.6 to 1.6		
>\$20 000	45	16.0	1.1	0.5 to 2.1		
Education						
Less than/some high school	65	22.7	1.0			
High school graduate/GED	109	38.1	0.9	0.5 to 1.7		
Higher than high school/GED	112	39.2	1.3	0.7 to 2.4		
Marital status						
Single	160	55.9	1.0			
Married	53	18.5	1.2	0.6 to 2.2		
Not married, living w/partner	73	25.5	1.5	0.7 to 2.0		
Housing						
Single unit/detached house	140	49.1	1.0			
Multiunit housing	145	50.9	0.9	0.6 to 1.5		
Age (Mean/SD)	Mean	SD				
	41.2	11.13	1.0	1.0 to 1.0		
Smoking ban						
Full ban	116	40.6	1.0		1.0	
Partial ban	170	59.4	2.1	1.3 to 3.5	2.3	1.4 to 3.9
Number of smokers in the home	N	%				
1	137	48.1	1.0		1.0	
2	108	37.9	1.5	1.3 to 6.3	1.7	0.9 to 2.9
3 or more	40	14.0	2.9	0.9 to 2.5	3.4	1.5 to 7.9
Children in the home						
Children under 5 in the home	109	38.1	1.0		1.0	
Children between 5 and 18 in the home	117	40.9	0.6	0.3 to 0.9	0.6	0.3 to 1.1
No children in the home	60	21.0	1.5	0.8 to 3.0	1.4	0.7 to 3.0
Number of relatives and friends who smoke						
Fewer than half	105	36.7	1.0			
Half	96	33.6	1.5	0.8 to 2.5		
More than half	85	29.7	1.5	0.8 to 2.7		
Perceived neighborhood safety						
Safe	226	79.0	1.0			
Unsafe	60	21.0	1.3	0.7 to 2.3		
Smoking status	N	%				
Smoker	226	79.0	1.0		1.0	
Nonsmoker	60	21.0	2.3	1.2 to 4.3	2.9	1.5 to 5.6
Time to first smoke after waking up (smokers only)						
Less than 30 minutes	18	8.0	1.0			
30–60 minutes	39	17.3	0.7	0.3 to 1.4		
More than 60 minutes	168	74.7	1.0	0.4 to 2.6		
Intention to quit (smokers only)						
Within 6 months	193	85.7	1.0			
No	32	14.2	0.6	0.3 to 1.3		

CI = confidence interval; OR = odds ratio; GED = General Educational Development.

^aMultivariate analyses only included variables significantly associated with enforcement challenges in bivariate analyses.

Table 2. Description of Full and Partial Home Smoking Bans, Including Exceptions and Secondhand Smoke Levels

	Full ban, N = 116	Partial ban, N = 170	P
Frequency of rules broken			
Never	52.6%	34.1%	
Rarely	27.6%	34.7%	
Sometimes	15.5%	21.8%	
Very often	4.3%	9.4%	.01
Reason for exceptions			
Bad weather	11.2%	69.4%	<.0001
Dark outside	4.3%	46.5%	<.0001
Party	12.9%	52.9%	<.0001
Special guests	4.4%	40.0%	<.0001
Room where smoking sometimes occurs			
Family/living room	12.1%	56.5%	<.0001
Kitchen	6.9%	34.7%	<.0001
Bathroom(s)	18.1%	68.2%	<.0001
Participant's bedroom	12.1%	51.8%	<.0001
Other adult's bedroom(s)	4.3%	23.6%	<.0001
Children's bedroom(s)	0.0%	0.6%	.40
Most opposed to having total ban			
Participant	11.2%	14.7%	.39
Spouse	13.8%	11.8%	.61
Child	9.5%	13.0%	.36
Parent	3.5%	2.9%	.81
Sibling	4.3%	2.4%	.35
Roommate	3.5%	3.0%	.82
Other resident	1.7%	4.1%	.25
Other nonresident	2.6%	4.1%	.49
Number of days exposure to SHS at home in past week, nonsmokers only	N = 50	N = 39	
Mean, SD	0.66 (1.73)	3.10 (2.71)	<.0001
0 days	78.0%	18.0%	
1–3	16.0%	46.2%	
4–6	0%	10.3%	
7	6.0%	25.6%	<.0001
Mean nicotine concentration, $\mu\text{g}/\text{m}^3$	N = 79	N = 92	
Mean (SD)	0.80 (1.43)	4.03 (7.22)	<.0001

SHS = secondhand smoke exposure.

For those with full bans, exceptions were most commonly made for bad weather (11.2%) and for a party (12.9%). Those who were living in multiunit housing were more likely to report making exceptions when there was a party (19.3% vs. 6.9%, $P = .048$) than those living in a single unit or detached house.

Although perhaps inappropriate to classify as exceptions among those with partial bans (ie, their rules may have allowed for these circumstances), bad weather (69.4%) or having a party (52.9%) were commonly reported as reasons to allow smoking in the home. Being dark outside and special guests were also common reasons to allow smoking in the home, at 46.5% and 40%, respectively.

Participants with a partial ban reported higher rates of smoking in all rooms except children's bedrooms compared with those who reported a full smoking ban. The most common rooms where smoking occurred among those with a partial ban were bathrooms (68.2%), family/living rooms (56.5%), and participants' bedrooms (51.8%). Among those reporting a full ban, the relative frequency of the rooms was similar, but the rates were lower than in homes with partial bans.

Those with full bans reported SHS exposure on 0.66 days ($SD = 1.73$) in the past week, in contrast to those with partial bans who reported exposure on 3.1 days ($SD = 2.71$) in the past week (Table 2). The majority of those with a full ban reported no days of exposure at

home (78%), but 16% reported exposure on 1–3 days. Air nicotine levels were assessed in a subset of the households at 3 months, with a significant difference between households with a full ban ($0.80 \mu\text{g}/\text{m}^3$, $SD = 1.43$) and a partial ban ($4.03 \mu\text{g}/\text{m}^3$, $SD = 7.22$).

Predictors of Enforcement Challenges

In bivariate analyses, enforcement challenges were related to having a partial smoking ban, being a nonsmoker, and living with three or more smokers (Table 1). In contrast, participants with "children between the ages of 5 and 18 in the home" reported fewer challenges.

In the multilevel model of factors associated with enforcement challenges, having children between the ages of 5 and 18 was not associated with fewer challenges, but the other relationships remained significant. Having a partial ban ($OR = 2.3$, $CI = 1.4$ – 3.9), being a nonsmoker ($OR = 2.9$, $CI = 1.5$ – 5.6) and living with three or more smokers ($OR = 3.4$, $CI = 1.5$ – 7.9) predicted higher levels of enforcement challenges.

Discussion

This study found that a relatively high proportion of households with newly established rules had at least occasional enforcement

challenges. The situations that made it difficult to enforce bans were similar to those reported in our past qualitative research and other studies, including parties, bad weather, and special guests.^{9,10,19,27} Future research should examine whether exceptions to rules are common as rules are newly integrated into family norms or if they indicate a household likely to return to former indoor smoking practices.

Similar to legislative policies to ban SHS in public areas and work-sites, it is important for homes instituting bans to identify and handle exceptions or enforcement challenges.²⁸ Prior qualitative research examining enforcement issues has produced conflicting results across studies, with some reporting few enforcement challenges and others reporting that difficulties with enforcement were fairly common.^{9,10,14,19} These studies have generally not examined households with newly adopted rules and varied considerably in terms of local tobacco control context. Two reviews of interventions to reduce exposure to SHS smoke in the home demonstrated that many did not address enforcement challenges beyond when visitors smoke.^{29,30} Our findings suggest it is important for interventions to identify situations when exceptions to home bans may occur and problem-solve potential solutions.

Our findings that households with three or more smokers, a non-smoker or a partial ban had greater difficulties with enforcement are not surprising. The number of smokers in the home is associated with the likelihood of rules,³¹ thus when rules are established, it is likely that with more smokers in the home, at least one of them will resist the new rules. Nonsmokers are often the initiators of household smoking rules and may negotiate a tenuous rule not fully accepted by the smoker.¹⁹

Our findings serve as a reminder that asking about household smoking rules is not equivalent to assessing SHS exposure in the home. If the goal of a study is to assess SHS exposure, asking only about a household smoking rule may be less valid than asking directly about exposure and/or measuring exposure objectively through air nicotine monitors or biomarkers.³² If a more complete assessment of household smoking practices is desired, a series of questions will provide more nuanced information.³³

There are limitations to this study. The study sample was comprised mostly of women and African American households who agreed to take part in an intervention study, which limits generalizability to other populations. The data about exceptions to the home smoking ban is based on self-report from one respondent per household. Finally, none of the participants had a full ban at baseline and the study had a follow-up period of 6 months. It is possible that recent ban adopters may still be working through exceptions and how to handle them.

Further research could explore strategies for successful enforcement of household smoking rules over a longer timeframe. Intervention support that continues for a period after initial establishment of a household smoking rule may be useful in helping families to fully and permanently implement smoke-free home rules with no exceptions.

Funding

This publication was also supported by grant number U01CA154282 from the National Cancer Institute. This trial is registered with <http://ClinicalTrials.gov> number: NCT01625468.

Declaration of Interests

None declared.

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