Predicting Adoption of Home Smoking Restriction by Inner-city Black Smokers

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Objective: To identify predictors of future adoption of home smoking restriction (HSR), given that 40% of inner-city smokers report current HSR.

Design: Secondary analysis of data on smokers enrolled in a double-blind, placebo-controlled, randomized trial of bupropion hydrochloride for smoking cessation.

Setting: Community health center in Kansas City, Kan, from August 1, 2000, to December 31, 2001.

Participants: Six hundred eligible black smokers, at least 18 years old, who smoked at least 10 cigarettes per day and were interested in quitting within the next 30 days. Enrollment was limited to 1 smoker per household.

Main Outcome Measure: Adoption of HSR by 6 months by those who did not have it at baseline.

Result: Baseline HSR was reported by 36% of all smokers. Of 383 smokers without baseline HSR, 311 smokers had complete baseline and 6-month data. Thirty-seven percent of households without HSR at baseline had adopted HSR by 6 months. Adoption was associated with a nonsmoking adult or children in the home, progress in stage of change, and smoking cessation. Odds of adopting HSR increased with progress in stage of change (odds ratio [OR], 4.20), baseline preparatory stage of change (OR, 3.28), and having a nonsmoking partner (OR, 2.35) or children (OR, 1.75) in the home.

Conclusions: A smoker's motivation to quit and the presence in the home of a nonsmoking adult or of children predict adoption of HSR by inner-city black smokers. Therefore, health professionals should motivate the smoker toward HSR and the nonsmoking partner toward advocating home smoking bans, thereby eliminating environmental tobacco smoke in the home.

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HOME SMOKING restriction (HSR), the practice of limiting or banning cigarette smoking in the home, is reported by approximately 60% of all smokers and 40% of inner-city smokers. Although specific reasons for this practice are not known, it is acknowledged that HSR may reduce or eliminate environmental tobacco smoke (ETS) in the home. Exposure of children to ETS from smoking by caregivers contributes to respiratory tract diseases, ear infections, low birth weight, and sudden infant death syndrome. Close adult contacts of smokers are at greater risk of adverse reproductive health outcomes, cardiovascular disease, and lung cancer.

Social and environmental factors in the home influence the adoption of HSR. In large cross-sectional multiethnic population studies, the rates of adoption of HSR are higher among smokers who live with children or with nonsmoking partners than among those who live with neither. These adoption rates increase significantly when both children and a nonsmoking partner are present in the home. These findings are similar to those from inner-city, predominantly black, populations, prompting the speculation that smokers and nonsmokers alike are more concerned about health effects of ETS on children than on other adults.

Until now, all reports on variables associated with HSR used data obtained from cross-sectional studies. As a result, the variables identified thus far are associated with “current” practice of HSR and may not predict future adoption of one. Consequently, it is unknown whether the same factors, or directional changes of factors, associated with current HSR will predict future adoption of one.

Knowing which factors predict adoption of HSR will assist in developing targeted intervention strategies that facilitate its adoption by households that would otherwise not have adopted one, especially in the inner city, where the prevalence of smoking is high and the living con-
ditions crowded. Therefore, we analyzed data from inner-city black smokers enrolled in a smoking cessation study and tested the specific hypothesis that, in households of smokers without HSR at enrollment, the presence of children or a nonsmoking partner in the home will predict the future adoption of one.

**METHODS**

**STUDY PARTICIPANTS**

Participant recruitment took place at a community health center, during a 16-month period, with the use of previously described clinic- and community-based strategies. Eligible smokers described themselves as “African American or black,” were at least 18 years old, smoked at least 10 cigarettes per day, and were interested in quitting within the next 30 days. Enrollment was limited to 1 smoker per household.

Exclusion criteria included pregnancy, contraindications to sustained-release bupropion hydrochloride, use of psychoactive medications, other forms of tobacco or nicotine replacement in the preceding 30 days, and treatment for drug abuse or major depression. Of 1498 people screened, 981 met eligibility criteria and were interested in quitting within the next 30 days. Enrollment was limited to 1 smoker per household.

**MEASURES**

The assessment included demographic measures (age, sex, and education) and environmental influence such as presence in the home of children and other adult smokers. Smokers rated their readiness to change in terms of motivation and confidence to quit smoking (“On a scale of 1 to 10, how motivated/confident are you to quit smoking (i.e., on target date/stay quit?)."") They also rated their readiness to quit in the Transtheoretical Model’s Stages of Change. We assessed depressive symptoms with the Center for Epidemiological Studies Depression Scale and perceived psychological stress with the Perceived Stress Scale. We recorded the number of cigarettes smoked per day at baseline and at 6 months (7-day point prevalence), confirmed self-reported abstinence with expired carbon monoxide testing, and resolved discrepancies with salivary cotinine levels. Other investigators have described these measures comprehensively. Adoption of HSR was assessed by a question, modified from the 1998 Current Population Survey Tobacco Use Supplement: “Which statement best describes the rules about smoking in your home?” Smokers who reported some restriction (“smoking is allowed in some places or at some times”) or a complete restriction or ban (“no one is allowed to smoke anywhere”) were considered to practice HSR.

**DATA ANALYSIS**

We “double-entered” the data into an Access database (Microsoft Corp, Redmond, Wash), exported it to SAS version 8, and subsequently range- and logic-checked it when the 2 versions of the database were identical. To make the regression coefficients of depression and stress scores comparable, we scaled these measures to fall between 0 and 1. Specifically, we divided the depressive symptoms (Center for Epidemiological Studies Depression Scale score by its maximum possible score of 60, and the Perceived Stress Score by its maximum possible score of 56. With the use of χ² tests, we tested for associations of HSR at baseline and at 6 months (subset of smokers without baseline HSR) with baseline characteristics and with changes (from baseline to 6 months) in behavioral characteristics. We summarized the percentage reporting HSR by categorical variables and compared the mean values of quantitative variables by groups reporting presence or absence of HSR by means of the 2-sample t test. Finally, we developed a model that adjusted for effects of demographic and significant variables by using the backward elimination process of the SAS program. The level of statistical significance for inclusion in the multivariable logistic regression model was P<.10 and for all other analyses was P<.05.

**RESULTS**

The study population of 600 participants was predominantly female (70%) and had a mean ± SD age of 44±11 years. Smokers who reported HSR at baseline differed from those who did not report one in environmental and smoking behaviors (Table 1). At baseline, 383 smokers were not practicing HSR. In this cohort, 311 smokers had complete information at baseline and at 6 months, with the following characteristics: 28% male, 38% with children, and 15% with a nonsmoking adult in the home. Thirty-seven percent (n=114) of smokers who did not have HSR at baseline had adopted one by 6 months. Adopters of HSR at 6 months were similar to nonadopters in age (45±12 years vs 45±11 years; P=.91), depres-

<table>
<thead>
<tr>
<th>Variable</th>
<th>No HSR</th>
<th>HSR</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. (%) of subjects</td>
<td>383 (64)</td>
<td>217 (36)</td>
<td></td>
</tr>
<tr>
<td>Age, y</td>
<td>45 ± 11</td>
<td>43 ± 11</td>
<td>.07</td>
</tr>
<tr>
<td>Sex, No. (%)</td>
<td></td>
<td></td>
<td>.10</td>
</tr>
<tr>
<td>Male</td>
<td>106 (28)</td>
<td>74 (34)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>277 (72)</td>
<td>143 (66)</td>
<td></td>
</tr>
<tr>
<td>Motivation to quit smoking (0-1)</td>
<td>0.85 ± 0.17</td>
<td>0.85 ± 0.17</td>
<td>.99</td>
</tr>
<tr>
<td>Confidence to quit smoking (0-1)</td>
<td>0.81 ± 0.20</td>
<td>0.85 ± 0.18</td>
<td>.01</td>
</tr>
<tr>
<td>Depressive Symptoms Score (0-1)</td>
<td>0.21 ± 0.15</td>
<td>0.18 ± 0.14</td>
<td>.03</td>
</tr>
<tr>
<td>Perceived Stress Score (0-1)</td>
<td>0.39 ± 0.15</td>
<td>0.36 ± 0.15</td>
<td>.02</td>
</tr>
<tr>
<td>Children in the home, No. (%)</td>
<td></td>
<td></td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Present</td>
<td>221 (58)</td>
<td>162 (75)</td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>162 (42)</td>
<td>55 (25)</td>
<td></td>
</tr>
<tr>
<td>Stage of change, No. (%)</td>
<td></td>
<td></td>
<td>.23</td>
</tr>
<tr>
<td>Contemplation</td>
<td>149 (39)</td>
<td>74 (34)</td>
<td></td>
</tr>
<tr>
<td>Preparation</td>
<td>234 (61)</td>
<td>143 (66)</td>
<td></td>
</tr>
<tr>
<td>Nonsmoking partner in the home, No. (%)</td>
<td></td>
<td></td>
<td>.001</td>
</tr>
<tr>
<td>Present</td>
<td>66 (17)</td>
<td>62 (29)</td>
<td></td>
</tr>
<tr>
<td>Absent</td>
<td>317 (83)</td>
<td>155 (71)</td>
<td></td>
</tr>
<tr>
<td>Degree of smoking</td>
<td></td>
<td></td>
<td>.005</td>
</tr>
<tr>
<td>(cigarettes/d), No. (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Light (10)</td>
<td>35 (9)</td>
<td>35 (16)</td>
<td></td>
</tr>
<tr>
<td>Moderate (11-19)</td>
<td>155 (40)</td>
<td>100 (46)</td>
<td></td>
</tr>
<tr>
<td>Heavy (≥20)</td>
<td>193 (51)</td>
<td>82 (38)</td>
<td></td>
</tr>
</tbody>
</table>

Abbreviation: HSR, home smoking restriction.

*Data are given as mean ± SD unless otherwise indicated.
of families with low socioeconomic status, found that motivational interviewing for adult care providers, smokers and nonsmokers alike, significantly reduced the quantity of ETS in homes. Behavioral interventions, such as motivational interviewing, could play an important role in increasing the proportion of smokers adopting HSR and lead to a reduction or elimination of in-home ETS exposure of children and others in the household.

The nonsmoking partner appears to significantly influence home smoking behavior and may have an unheralded role in safeguarding the environmental health of the home. Unfortunately, there is currently no documented role for nonsmoking relatives of smokers in smoking cessation and ETS reduction programs; this is a gap in current intervention strategies by public health and other practitioners who are trying to help smokers quit comprehensive smoking in general and home smoking in particular. We speculate that addressing this deficit by including nonsmoking relatives when smoking addiction is treated may significantly improve the effectiveness of current interventions. Fortunately, health practitioners are developing an increasing appreciation for obtaining the smoking history as the “fifth vital sign.” However, our results support an expansion of this inquiry to include information about the smoking status of significant adult members of the household or family.

Unlike the strong effect demonstrated by the presence of a significant nonsmoking adult, the presence of children in the home only weakly predicts future adoption of HSR in this cohort of smokers. This finding is surprising, and, on the surface, appears counterintuitive, given the powerful effects in trends from various cross-sectional studies. In this study, there was no specific focus on raising awareness of risks to children from smoking in the home. Smokers are more likely to engage the support of another adult than of a child in the household to quit smoking, an interaction that may contribute to the adoption of HSR. Perhaps, given the strong influence of children in the baseline reporting of HSR, this subset of smokers may have characteristics not measured in this study that diminish the effect on adopting HSR from having children in the home.

There are a number of limitations to this study. First, the primary focus of the study was not the adoption of HSR. Consequently, there is no information on the reasons for or the initiators of the HSR. With this dearth of information, we can only speculate on some of the observed associations with HSR. The higher rate of HSR associated with progression along the stage of change for smoking cessation suggests that its adoption may follow increases in the smokers’ motivation to quit smoking.

Second, 19% (n=72) of smokers without HSR at baseline, and not demographically different from the analyzed cohort, did not have complete data and therefore could not be analyzed. While including this sample may affect the magnitude of significance, it is unlikely that the main findings of the study would have changed significantly, given the consistency of the results with previous cross-sectional studies.

Home smoking restriction offers significant short- and long-term benefits to the health of the community. It eliminates direct ETS exposure and thereby reduces a community’s direct socioeconomic burden from ill-

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In this study of inner-city black smokers, a number of factors predicted which smokers adopted HSR, specifically, the smoker’s baseline stage of change, progression along the stages of change, and the presence of children or a nonsmoking adult partner in the home. Smokers who progressed along the stage of change, were at a higher stage of change, or had a nonsmoking partner or children in the home were more likely to adopt HSR than were smokers who failed to progress, were at an earlier stage of change, and did not have a nonsmoking adult or children in the home. These findings support and extend those of other investigators.

There is additional evidence from our study that adoption of HSR is associated with current level of motivation as well as an increase in the level of motivation over time. The latter finding is novel and suggests that smokers who are able to increase their motivation to quit smoking also may be willing to adopt HSR even if they do not quit smoking altogether. Emmons et al, in a study of...
Home smoking restriction is least practiced by inner-city smokers, and cross-sectional studies show the practice to be associated with lighter levels of smoking and the presence in the home of a nonsmoking adult or children.

There are no longitudinal studies available that identify predictors of future adoption of HSR. The question is, “Which smokers are we likely to have most success with getting to adopt an HSR if they do not already have one?”

Although not the focus of the main study, adoption of HSR increased significantly, irrespective of the treatment received, to levels observed in the general population. Therefore, when smokers are engaged in antismoking socialization, whether in research or clinic discussions, smokers can be motivated to adopt behaviors that reduce their risk (decreased number of cigarettes per day, changes in the stage of change) and the risk for household members (HSR) from cigarette smoking. The likelihood for success in behavioral change increases significantly when there is a child or a nonsmoking adult in the home.

Data from a secondary analysis of this clinical trial show a significant increase in HSR rates during a 6-month period in a high-risk population. The final reported HSR rates approached those currently observed in populations at lower risk for adverse health behaviors.

This finding indicates that HSR is feasible in disadvantaged populations. For the smoker, home smoking cessation may be more attainable and less anxiety provoking than comprehensive smoking cessation. Thus, there is a need for further studies to explore the mechanisms and reasons for HSR and to assess the impact on this behavior of interventions that increase smokers’ motivation. In the meantime, health care professionals should use each encounter to motivate the smoker to home smoking cessation and to empower the nonsmoking partner to advocate home smoking bans, thereby eliminating ETS in the home.

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REFERENCES


