

Original Research Article

Family matters: the influence of partner and familial encouragement on home and car smoking bans

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ABSTRACT

Background: Secondhand smoke exposure (SHSe) poses health risks to neonatal intensive care unit (NICU) infants after they are discharged; these risks can be mitigated by the implementation of parent-enforced total home and car smoking bans. Understanding the influence that various family members have on household smoking policies may inform interventions to reduce SHSe among vulnerable infants.

Methods: In a cross-sectional, secondary analysis of data collected between 2013 and 2015, mothers of NICU infants who reported smoking or living with a smoker (N=242) were asked about whether members of 9 separate relationship types (e.g., partner, mother, father) encouraged or discouraged smoking in the home and car. The influence of perceived encouragement from each relationship type on the odds of having a total smoking ban in place was estimated.

Results: Participants reported that partners (47%) and siblings (32%) were most likely to encourage smoking in the home/car. In a multivariate model, both partner ($p=0.0002$) and sibling ($p=0.004$) encouragement of indoor smoking decreased the likelihood of having a total smoking home and car ban in place.

Conclusions: Family members have significant influence on SHSe reduction practices. Innovative family-based interventions may be needed in order to reduce SHSe in this particularly vulnerable group of infants.

Keywords: Car smoking ban, Family intervention, Infant, Home smoking ban, Secondhand smoke

INTRODUCTION

Reducing second hand smoke exposure (SHSe) in the home during the postpartum period is especially important for infants discharged from a neonatal ICU (NICU).^{1,2} Families may be highly motivated to reduce SHSe-related risks to fragile infants.² Approximately 40% of children are exposed to SHS in the home and chronic SHSe is linked to adverse health (e.g. compromised pulmonary function, ear infections, two-fold increased SIDS risk).^{3,4} These health consequences are potentially more serious for immuno-compromised NICU children. Many (>25%) NICU infants are discharge to homes where they are exposed to SHS.^{5,6} Implementing an indoor/in-car smoking ban reduces many SHSe risks.⁷

Sociocultural contingencies in place via social networks have considerable influence on SHSe and home/car smoking bans.⁸ Social contingencies may be especially relevant for NICU mothers, especially mothers from disadvantaged backgrounds, as they typically live with a partner and/or nuclear or extended family, are caring for a medically ill child, and are in need of social support.^{9,10} Messages from partners or family related to smoking in the home/car may be especially influential for the implementation of smoking bans.¹¹

Little research exists on how specific family members influence implementation of a total smoking ban (TSB; i.e., home and car). This is especially true for NICU infants who are disproportionately discharged to smoking

households. To address this gap, our primary aim was to quantify partner and family influence on implementing a TSB by exploring associations between mothers' perceptions of partner and family encouragement to smoke in the home/car and having a TSB.⁸

METHODS

Participants

Participants (N=242) were recruited for an ongoing NICU-based, SHSe intervention study at Children's Memorial Hermann Hospital in Houston, Texas (clinicaltrials.gov: NCT01726062). Eligible mothers had an infant in the NICU, lived with ≥ 1 smoker, spoke English or Spanish, and resided within a 50-mile radius of the hospital. Participants provided written informed consent in compliance with our Institutional Review Board and were recruited between October, 2012 and June, 2017.

Study

Full study procedures are published; this paper reports on a cross-sectional secondary data analysis of a randomized clinical trial.¹² For this secondary analysis, mothers' baseline data (i.e., structured interview, computerized self-report), collected by research assistants (RAs) prior to study allocation and infant discharge, were analyzed.

Measures

Participants answered sociodemographic and smoking-related questions. In-home and in-car smoking bans were assessed via a multiple-choice question and two confirmation questions.² Mothers who reported currently banning smoking in both home and car were classified as having a TSB.

Social support for not smoking in the home and car items were adapted from the social support for non-smoking scale.¹³ Mothers were asked to report whether 9 different groups of people (partner, mother, father, siblings, other children, grandparents, aunt(s), uncle(s), friends) "encouraged" (value= +1), "discouraged" (value= -1), or "neither encouraged nor discouraged" (value=0) smoking in the home and car. "Not applicable" was given a value of zero.¹³

Statistical analyses

Bivariate logistic regression models [conducted in SAS 9.4 (Cary, NC)] examined the influence of participant characteristics (e.g., education), smoking-related variables, and family encouragement of smoking variables on TSB. Variables from bivariate models were entered into a multivariate model if $p < 0.25$.¹⁴ Mothers' smoking status, number of smokers in the home and number of cigarettes/day by all household members were

included as these variables are likely to be related to establishment of a TSB.¹⁵

RESULTS

Mothers' mean age was 27 years (SD=5.9). Mean number of cigarettes smoked per household/day was 27 (SD=15) and mean number of smokers per home was 1.7 (SD=1.0). Over half (58%) of mothers live with a smoking partner, 14% live with a smoking mother, 8% live with a smoking father, 4% live with a smoking grandparent, and 15% live with a smoking sibling. A majority (74%) of mothers did not have a TSB. Less than a quarter (21%) of mothers were current smokers (Table 1).

Table 1: Descriptive characteristics of study sample (N=242).

Variables	
Participant age, M (SD)	27 (5.9)
Participant smoking, N (%)	51 (21)
Women with a partner, N (%)	144 (60)
Partner smoking, N (%)	174 (82)
Women living with a Smoker	
Partner	119 (58)
Mother	34 (14)
Father	19 (8)
Sibling	35 (15)
Grandparent	9 (4)
Number of other smokers living in household, N (%)	
One	139 (57)
Two	59 (24)
Three or more	44 (18)
Cigarettes/day all household smokers, M (SD)	27 (14.7)
Race/ethnicity, N (%)	
Hispanic	52 (21)
White	27 (11)
Black	157 (65)
Other	6 (2)
Number of children in home, N (%)	
One	61 (25)
Two	60 (25)
Three or more	121 (50)
Annual household income, N (%)	
<\$25,000	145 (64)
$\geq$ \$25,000	83 (36)
Highest education level, N (%)	
$\leq$ High school	144 (60)
>High school	98 (40)
Current living situation, N (%)	
With partner or alone	160 (66)
With parents/extended family/friends/other	82 (34)
Medicaid recipient, N (%)	213 (88)
Not employed, N (%)	191 (79)

Table 2: Bivariate analysis of encouragement or discouragement for total smoking ban.

Relationship	N (%)	OR (95% CI)	P
Partner		0.40 (0.28-0.57)	<0.0001
Encourage	114 (47)		
Discourage	80 (33)		
Neither	17 (7)		
N/A	31 (13)		
Mother		0.65 (0.45-0.93)	0.02
Encourage	70 (29)		
Discourage	145 (60)		
Neither	11 (5)		
N/A	16 (7)		
Father		0.53 (0.36-0.78)	0.001
Encourage	62 (26)		
Discourage	113 (47)		
Neither	10 (4)		
N/A	57 (24)		
Siblings		0.41 (0.27-0.61)	<0.0001
Encourage	77 (32)		
Discourage	129 (53)		
Neither	16 (7)		
N/A	20 (8)		
Friends		0.54 (0.37-0.78)	0.001
Encourage	72 (30)		
Discourage	121 (50)		
Neither	33 (14)		
N/A	16 (7)		
Children		0.82 (0.47-1.44)	0.48
Encourage	2 (1)		
Discourage	114 (47)		
Neither	41 (17)		
N/A	85 (35)		
Grandparents		0.50 (0.31-0.79)	0.003
Encourage	37 (15)		
Discourage	130 (54)		
Neither	15 (6)		
N/A	60 (25)		
Aunts		0.55 (0.37-0.81)	0.002
Encourage	63 (26)		
Discourage	134 (55)		
Neither	22 (9)		
N/A	23 (10)		
Uncles		0.54 (0.37-0.80)	0.002
Encourage	64 (26)		
Discourage	126 (52)		
Neither	25 (10)		
N/A	27 (11)		

N/A means not applicable. Where percentages don't add to 100 due to rounding. All bivariate models controlled for maternal smoking status, number of smokers living in the home, and number of cigarettes smoked per day by all household smokers.

The majority (81%) of mothers report having one or more immediate or extended family member encouraging smoking in the home/car. Half (47%) of mothers have partners encouraging indoor smoking. Also, 29% of

participants' mothers and 26% of participants' fathers encouraged smoking in the home/car. NICU mothers also reported that their siblings (32%), grandparents (15%), and aunts/uncles (26%) were encouraging of indoor

smoking (Table 2). Bivariate models reveal neither education [OR=0.62, 95% CI (0.34-1.13), $p=0.12$] nor income [OR=1.27, 95% CI (0.69-2.33), $p=0.34$] was associated with having a TSB. Mothers' smoking status also was not associated with a TSB [OR=1.33, 95% CI (0.64-2.80), $p=0.45$]. Total number of smokers in the home was a significant predictor of smoking ban status. With each additional smoker in the home, mothers had 49% lower odds of a TSB [OR=0.51, 95% CI (0.33-0.78), $p<0.002$]. Further, for each additional cigarette smoked by any household member, the odds of having a TSB in place decreased by 7% [OR=0.93, 95% CI (0.90-0.97), $p=0.0005$].

Bivariate models for in-home and in-car smoking social support reveal partner, mother, father, sibling, friend, grandparent, aunt, and uncle encouragement of smoking indoors decreased the likelihood of having a smoking ban (Table 2). In addition to these eight relationship variables, the multivariate model also tested maternal smoking status, number of smokers and number of household cigarettes smoked/day. The final model revealed a significant negative relationship between partner encouragement of smoking and the odds of having a TSB [$p=0.0002$, OR=0.48, 95% CI (0.33-0.71)], as well as a negative relationship between sibling encouragement of smoking and the likelihood of having a TSB [$p=0.003$, OR=0.50, 95% CI (0.32-0.80)]. No other variables were significantly associated with a TSB.

DISCUSSION

Mothers from smoking households with infants in the NICU report familial messages that encourage smoking in the home/car, decreasing the likelihood of having a TSB. Perceived encouragement of inside smoking by partners and siblings was particularly associated with not having a TSB, even after controlling for other smoking-related variables. Mothers, fathers, aunts, uncles, and grandparents may also exert important influence on this SHSe protective practice.

Results revealed a strong, independent relationship between partners' encouragement of indoor smoking and not having a TSB. Our findings highlight the need to engage partners in interventions targeting SHSe, but a review of SHSe trials found no interventions conjointly targeting mothers and partners.¹⁵ The majority of past adult trials of SHSe counselled only mothers, making it their responsibility to alter sources of SHSe in the home; perhaps an unreasonable expectation.¹⁶

Sibling encouragement of smoking was strongly associated with lack of a TSB. Research has begun to document the impact of sibling influence on both prosocial and risky behaviors.¹⁷⁻²⁰ Sibling influence potentially could be harnessed as a source of reinforcement for bans in future interventions. Research on family-focused SHSe interventions is needed.²¹

Interventions inclusive of partner and family targeting other behaviors (i.e., substance use, alcoholism) have shown promising results.^{22,23} Family-based treatments focused on behavioral and systems theories of change are an effective approach for treating substance abuse problems.²⁴

Surprisingly, our findings did not establish associations between maternal smoking status, education, income level, and having a TSB; known risks for child SHSe.¹⁵ This lack of association may indicate increased awareness of child SHSe risks by NICU mothers. Recent efforts to increase population awareness of SHSe risks for children may also have influenced these findings.^{25,26}

Limitations of the paper are noted. Data were cross-sectional; changes over time will be assessed in future investigations. Further, responses were self-reported and subject to social-desirability bias; however, significant proportion of participants reported a lack of a TSB. Finally, smoking status data on all family members (if they lived outside the home) was not collected. Smoking status information was unavailable for family members other than participants and partners. However, our data show that partners and siblings are likely to be smoking at high rates, indicating these two groups may be most critical to engage in SHSe-prevention interventions, without discounting the importance of other household smokers.^{27,28}

CONCLUSION

Findings suggest interventions inclusive of partners/family warrant further investigation as their inclusion may influence child SHSe intervention outcomes. This is consistent with research that found smokers cluster in interconnected social networks, i.e., partners/family engage in smoking cessation together.²⁹ Less is known about which specific mechanisms within relationships impact behaviour; and especially SHSe reduction efforts. An understanding of family constellations/dynamics (e.g., communication styles) is a logical next step to adapt interventions that engage partners/family, maximize SHSe intervention outcomes, and improve health outcomes of NICU children.

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