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Understanding motivation to implement smoking bans among mothers with a hospitalized infant

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HIGHLIGHTS

- NICU mothers were in different stages of change for establishing a home smoking ban.
- Fewer NICU mothers were in action for a smoking ban in their car vs. home.
- Early stage women were not sufficiently using cognitive–affective change processes.
- Family encouragement of indoor smoking was associated with early stages of change.
- Reducing child secondhand smoke exposure requires intervention at multiple levels.

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ABSTRACT

Objective: Secondhand smoke exposure (SHSe) poses risks to hospitalized children upon discharge and no uniformly effective interventions have been identified. Understanding change-related processes and social-contextual factors related to motivation for implementing home and car smoking bans may inform interventions to reduce infant SHSe among mothers with a hospitalized infant.
Methods: In this cross-sectional, secondary analysis, mothers of neonatal ICU infants who reported smoking or living with a smoker (N = 205) were assigned to stages of change (pre-contemplation, contemplation, preparation, or action) based on behaviors and intentions for establishing smoking bans in their homes and cars. Processes of change (POC) for SHSe reduction practices, self-efficacy, depressive symptoms, generalized anxiety, and social support for not smoking in the home were examined across all four stages.
Results: The majority of mothers were in the action stage for having a home smoking ban in place (55%); only 35% of participants were in action for a car smoking ban. POC use differed across the stages of change for having a home ban ($p = 0.004$) and car ban ($p = 0.02$), with earlier stages using fewer overall and relatively fewer cognitive/affective processes. Earlier stage women also reported lower self-efficacy to change, less familial and partner support for in-home smoking bans, and more depressive symptoms.
Conclusions: Novel intervention targets were identified, including cognitive/affective change processes, mental health, and familial/social contingencies for implementing SHSe protective practices. Creative ways in which to affect change at the individual and household level are needed in order to fully address the complexity of child SHSe.

1. Introduction

Secondhand smoke exposure (SHSe) is a significant public health problem. Recent survey data suggest the significant downward trend in secondhand smoke exposure seen between 1988 and 2002 has leveled off and that significant disparities persist (Chen, Burton, et al., 2010). Infants and young children are commonly exposed to secondhand smoke in their homes, increasing risk for sudden infant death syndrome, acute respiratory infections, ear problems, and asthma (USDHHS, 2007).

Acute illness or hospitalization of a child provides an ideal opportunity to intervene with parents on eliminating SHSe in their homes and cars, particularly for children suffering from respiratory-related conditions (Winickoff, Hibberd, et al., 2001). Infants hospitalized after birth in a neonatal intensive care unit (NICU) are often born premature, at low birthweight, and typically have diminished respiratory function; and the smoking rate is high in this low-income, minority population

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(Stotts, Evans, et al., 2011, Stotts, Green et al. 2013a,b). Families with a medically at-risk child would benefit from a home smoking ban (Wakefield, Banham, et al., 2000, Gehrman & Hovell, 2003, Pizacani, Martin, et al., 2003), yet implementation is often a challenge. Interventions targeting households with smokers from NICU and similar populations have been tested with varying levels of success (Stotts, Green et al. 2013a,b; Rosen, Myers, et al., 2014, Blaakman, Borrelli, et al., 2015, Chi, Wu, et al., 2015, Northrup, Matt, et al., 2015), and, to the best of our knowledge, no SHSe intervention has been designated as evidence-based (Priest, Roseby, et al., 2008). Little is known about the process of change for reducing SHSe in general or about individual- OR social-contextual factors that may help or hinder new mothers in the adoption of home and car smoking bans.

Understanding and examining the process of change for smoking cessation has been a central focus of the Transtheoretical Model (Prochaska & DiClemente, 1983, Prochaska, Velicer, et al., 1991), and more recently the model has been used as a framework for SHSe interventions (Kegler, Escoffery, et al., 2012, Huang, Wu, et al., 2013). The stages and process of change are two interrelated dimensions used to understand intentional behavior change. The stages of change (precontemplation, contemplation, preparation, action, maintenance) represent the temporal, motivational aspects of change and the processes of change are overt and covert activities individuals engage in when they attempt to modify problem behaviors (Norcross, Krebs, et al., 2011). The processes of change were identified as common across over 400+ psychotherapies (Prochaska & DiClemente, 1983, Prochaska & DiClemente, 1985). Experiential processes (i.e., cognitive and affective experiences/activities) help increase awareness of the advantages of changing and/or the negative consequences and regret/guilt associated with not changing, which tend to increase motivation for change. Behavioral processes (i.e., action-oriented, behavioral activities) involve strategies like counterconditioning or response substitution, identifying helping relationships, and reinforcement management to support and sustain active change.

Processes of change have been found to be differentially effective in certain stages of change. Experiential processes tend to peak in the contemplation or preparation stages while behavioral processes are used most in the action and maintenance stages, and this interaction has been related to outcome (Rosen, 2000). Engaging in more experiential than behavioral processes during the contemplation and preparation stages and relatively more behavioral than experiential processes during the action stage was predictive of more successful behavior change (Perz, DiClemente, et al., 1996).

Motivation for change does not exist in a vacuum, of course, and is undoubtedly influenced by other individual and social-contextual factors (Hovell & Hughes, 2009). For example, we found that women who quit smoking *during pregnancy* used fewer experiential and behavioral processes of change compared to women who quit outside of pregnancy (Stotts, DiClemente, et al., 1996). Pregnant quitters essentially failed to engage in the decision-making and other experiential processes, and yet were able to suspend their smoking during pregnancy. This may, in part, explain the typically poor long-term outcomes for pregnant quitters after giving birth (i.e., postpartum relapse; (Colman & Joyce, 2003, Fang, Goldstein, et al., 2004)). Decision-making and other processes used in changing smoking ban policies may be similarly altered by having a hospitalized infant, underscoring the importance of context in the change process.

Additional contextual factors potentially important for new mothers include mental health and social contingencies, which may affect motivation to implement a home or car smoking ban or other protective practices. Postpartum depressive symptoms are not uncommon among new mothers and may be even more pronounced among mothers with a high-risk infant (Northrup, Evans, et al., 2013). Depressive symptoms are associated with poor outcomes for smoking cessation and other behavioral changes (MacPherson, Tull, et al., 2010). Social contingencies (e.g., praise from a friend) are reflected in the Transtheoretical Model's behavioral processes of change (e.g., reinforcement management, helping relationships) and have received increased attention in recent years (Hovell & Hughes, 2009, Zhang, Cowling, et al., 2010). Social reinforcement or punishment for indoor smoking may especially influence motivation to change home and car smoking policies in new mothers, particularly mothers of low SES who tend to reside in households with multiple family members or friends. Families have been found to be influential in normalizing smoking behaviors and practices (Weden & Miles, 2012, Vuolo & Staff, 2013). Smoking encouragement and discouragement by family members has also been identified as an important contributor to smoking status (Hofstetter, Hovell, et al., 2010). Despite bringing home from the hospital an infant at high respiratory risk, NICU mothers may be unduly influenced by other household members when considering a home and car smoking ban.

This secondary data analysis was the first study to examine the use of the processes of change across the stages of change for implementing home and car smoking bans among mothers with a hospitalized infant. Relations between stage of change and postpartum depression symptoms and social encouragement/discouragement for smoking in the home were also explored. The overarching goal was to better understand and characterize the process of change involved in establishing a smoke-free home for new mothers with physically vulnerable infants to identify new and/or more precise intervention targets. It was hypothesized that NICU mothers may be engaging in lower levels of experiential relative to behavioral processes of change for establishing home and car smoking bans, which has been indicative of less success in making or sustaining behavior change (Perz et al., 1996). It was also expected that NICU mothers who smoked themselves, lived with more than one smoker, were encouraged by others to smoke indoors, or did not have a residence of her own would be less likely to have a home smoking ban in place compared to women who did not smoke or who lived with only one smoker.

2. Methods

2.1. Participants

Participants (N = 205) were recruited as part of an ongoing, NICU-based, SHSe intervention study (*Baby's Breath II*; (Stotts, Northrup, et al., 2013a)), registered on clinicaltrials.gov (NCT01726062). Between September 2012, and April, 2015, mothers of infants admitted to the NICU of a large children's hospital in Houston, TX, were recruited. Eligible participants: (1) had an infant in the NICU; (2) reported ≥1 smoker living in the household; and (3) lived within a 50-mile radius of the hospital (follow-up assessments were conducted in the home).

2.2. Study design and procedures

The parent study employs a randomized-controlled, parallel-group design; only baseline data were used in this study. Research assistants (RAs) approached caregivers in the NICU to screen for eligibility. All participants provided written informed consent in compliance with our institutional IRB. At the baseline visit, while the infant was hospitalized in the NICU, RAs administered a structured interview and participants completed a self-paced computerized questionnaire. Following baseline, participants were randomized to conventional NICU care or a Motivational Interviewing intervention targeting the prevention of infant SHSe after discharge.

2.3. Measures

The baseline interview included demographic, smoking-related, and psychosocial measures. In-home and in-car smoking ban statuses were assessed separately with a multiple-choice question and two confirmation questions (Mullen, Carbonari, et al., 1991, Stotts, Green et al. 2013a,