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Tailoring a NICU-Based Tobacco Treatment Program for Mothers Who Are Dependent on Opioids

Amanda Fallin-Bennett and **Kristin Ashford**

Abstract

Objective—To collect formative information to design a tailored tobacco treatment intervention for women with newborns treated or evaluated for neonatal abstinence syndrome and to explore current tobacco use behaviors and facilitators and barriers to smoking cessation.

Design—Qualitative descriptive study.

Setting—An academic medical center in the southern United States.

Participants—Mothers of newborns who were treated or evaluated for neonatal abstinence syndrome at birth within the preceding three months. Women were recruited who were older than 18 and reported opioid dependence and smoking during pregnancy.

Methods—Participants took part in semi-structured individual interviews that lasted approximately one hour. Interviews were professionally transcribed and analyzed in MAXQDA using content analysis.

Results—Five themes emerged from the data: *Strategizing to Reduce Risk, Desire to Quit Smoking in the Future; Holding on to Smoking While Working Through Recovery, Feeling Judged by Nurses*, and *Feeling Supported And Empowered By Nurses*. Participants reported planning to reduce risk to their newborns by avoiding secondhand and thirdhand smoke exposure. Participants wanted to stop smoking but reported many barriers, including multiple life stressors compounded by their newborns' extended stays in the hospital. However, most participants described overall positive experiences and the support of health care providers.

Conclusions—Holistic tobacco treatment programs that incorporate stress relief and social support and are led by trusted health care providers have the potential to be effective to reduce smoking in new mothers with histories of opioid dependence disorders and smoking and whose newborns are in the NICU.

Smoking during pregnancy is a leading cause of preventable adverse birth outcomes (U.S. Department of Health and Human Services, 2014), including preterm birth (Ion & Bernal,

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2015), low birth weight, and sudden infant death syndrome (Zhang & Wang, 2013). In addition, smoking during the first trimester was associated with a 19% increase in NICU admission (Räisänen et al., 2013). Further, the risks of smoking continue beyond the perinatal period. Women who smoke were less likely to breastfeed (Weiser et al., 2009), and children exposed to secondhand smoke were more likely to have ear and respiratory infections and asthma attacks (U.S. Department of Health and Human Services, 2006). Exposure to secondhand smoke in the first six months of life was associated with an increased risk of hospitalization for serious infection until children are eight years old (Kwok et al., 2008).

Smoking cessation during pregnancy is ideal but difficult and not always achieved. In the United States, 10.7% of women reported smoking in the third trimester of pregnancy (Tong et al., 2013). In addition, 42% of women who successfully stop smoking during pregnancy ultimately relapse, and this rate of relapse remained constant over a 10-year period (Rockhill et al., 2016). The rates of smoking during pregnancy are even higher in vulnerable groups of women, including women with other addictions. Nearly all (approximately 95%) women dependent on opioids reported smoking during pregnancy (Chisolm et al., 2013). According to the National Survey on Drug Use and Health (2005–2014), 5% of pregnant women in the United States reported non-medical prescription opioid use (Kozhimannil, Graves, Levy, & Patrick, 2017).

In order to promote long-term cessation for mothers, tobacco treatment and relapse prevention interventions are needed in the early postpartum period, particularly for women with opioid dependence. The American College of Obstetricians and Gynecologists (2011) recommended the 5 A’s approach for smoking cessation in the perinatal period. Holbrook & Kaltenbach (2011) found that integrating a six-week 5A’s based tobacco treatment intervention into substance use disorder treatment leads to a substantial reduction in cigarettes consumed per day among pregnant and parenting opioid dependent women However, the small percentage of women who successfully stopped smoking in this program indicates the need for a longer, more intensive intervention.

The NICU is a logical place for tailored tobacco treatment support in the postpartum period. Newborns exposed to smoke in-utero tend to have longer stays in the NICU. This is particularly true for newborns of women with opioid dependency who smoke during pregnancy. Smoking during pregnancy increases the risk of neonatal abstinence syndrome (NAS; Choo, Huestis, Schroeder, Shin, & Jones, 2004). Neonatal abstinence syndrome is a constellation of symptoms experienced by neonates exposed to opioids prenatally; it can lead to prolonged hospital stays and pharmacologic treatment with morphine (Kocherlakota, 2014). Smoking during pregnancy was associated with higher necessary doses of morphine and longer hospital stays among infants who were opioid exposed in utero (Jones et al., 2013). Mothers with infants in the NICU reported an interest in receiving health services in this setting, including tobacco cessation treatment (Verbiest, McClain, Stuebe, & Menard, 2016). Finally, having an infant with a high risk health condition also could serve as a teachable moment (Pollak et al., 2010) in which the mother has a high level of interest in health behavior change to promote the health of her infant.

Evidence supports the efficacy of tobacco related interventions delivered in the NICU (King, Wooderson, Rees, Neild, & Wright, 2008; Phillips et al., 2012; Stotts et al., 2013). King et al. (2008) tested the John Hunter NICU smoking cessation program, which included motivational counseling delivered by a clinical nurse consultant; a two-week supply of nicotine replacement therapy; educational materials on smoking cessation; enrollment into QUIT, a telephone cessation support program; and follow-up services in outpatient care or by phone. According to self-report smoking status, 33% of participants successfully stopped smoking (King et al., 2008). Further, interventions to promote smoke-free homes among mothers of infants in the NICU have demonstrated effectiveness. Stotts et al. (2013) tested Baby's Breath II, an intervention in the NICU to promote smoke-free home policies for caregivers that included motivational interviewing sessions (two in the hospital and two in the home) paired with the potential for incentives (e.g, prize drawings). Significantly more caregivers who participated in the intervention adopted smoke-free homes than those who received usual care (64% vs. 20%). Phillips et al. (2012) also tested an innovative intervention designed to prevent relapse to smoking and promote breastfeeding among mothers of infants in the NICU that was tailored to participants' life circumstances. They designed this dual intervention in part because breastfeeding enhances maternal-infant bonding and reduces stress, which reduces risk of relapse to smoking. Results of this randomized controlled trial indicated that more women who received the intervention remained smoke-free than women in the control group (81% to 46%) at 8 weeks (Phillips et al., 2012).

In addition, tobacco treatment interventions tailored for disadvantaged women show promise. Stewart et al. (2010) tested a tobacco treatment intervention targeted to women living in poverty; they found a decrease in participants' desire to smoke and number of cigarettes smoked per day. The intervention targeted tobacco use but holistically addressed barriers to tobacco cessation in the women's lives by promoting self-efficacy, positive health behaviors, support seeking, and building social networks. Although these results are promising, no other studies were identified in which researchers examined the effects of tobacco intervention delivered in the NICU specifically for women with opioid dependence.

Therefore, the purpose of this study was to collect formative information to design a NICU-based, tailored, tobacco treatment intervention for women with newborns who were treated or evaluated for NAS and to explore current tobacco use behaviors and facilitators and barriers to smoking cessation.

Methods

Design and Setting

The University of Kentucky Institutional Review Board approved our study, which was based on qualitative description, a methodology used to describe phenomena while staying close to the data and using the everyday language of the participants (Sandelowski, 2000). Participants were recruited from an academic medical center in the south, from within the hospital (e.g, flyers in the NICU waiting room), and from an affiliated medication assisted treatment (MAT) clinic for pregnant and newly postpartum women dependent on opioids.

Sample

Participants were mothers of newborns who were treated or evaluated for NAS at birth within the preceding three months. Women who were older than 18 and reported dependence on opioids and smoking during pregnancy were recruited from December 2015 through April 2016. Exclusion criteria included the inability to read and speak English, serious mental illness (e.g., schizophrenia, bipolar disorder with current mania, or suicidal ideation), or current incarcerated status.

Procedures

After participating in the informed consent process, participants took part in semi-structured individual interviews, typical of qualitative descriptive studies (Sandelowski, 2000). Interviews took place in a quiet, private location within the hospital or clinic and lasted approximately one hour. To facilitate rapport and trust, the interviews were conducted by a certified peer support specialist who was a mother in long-term recovery with years of experience in working with women with substance use disorders. Interviews began with the specialist asking participants to describe their experiences in the hospital while their newborns were treated or evaluated for NAS; probes were used to explore positive and negative aspects. To transition into conversations about tobacco use, participants were asked, *Tell me about your experiences with smoking during pregnancy*. Follow-up questions were asked about quit attempts, barriers to quit attempts, advice from health care providers, and rules regarding smoking in the home. While the interviews were based on a guide, participants were also asked follow-up or clarifying questions about unexpected findings that arose during the interviews.

After the interview, participants took part in a brief survey to assess demographic (e.g, age, race/ethnicity) and tobacco use (e.g, cigarettes smoked per day) characteristics. Women who participated in our study received a $25 Walmart gift card. We conducted interviews until saturation was reached or no new information emerged. The interviews were voice recorded and professionally transcribed. To ensure accuracy, the transcripts were then checked against the voice recordings.

Analysis

Each transcript was carefully reviewed several times by multiple team members. Next, we developed a codebook based on the transcripts. Codes were selected to capture the major concepts, topics, processes, and beliefs represented within the data (Jacoby & Siminoff, 2008). Consistent with qualitative description (Sandelowski, 2000), transcripts were coded using content analysis, were applied to the data using a line by line coding approach, and then to facilitate interpretation, data were re-organized into a code report (i.e, all the data associated with a particular code were reviewed). Next, the data contained within each case report were examined and representative quotations were selected (Jacoby & Siminoff, 2008). Finally, the data were organized into categories and themes, and an example of this process is presented in Table 1. Qualitative coding and data management was conducted using MAXQDA. To enhance verification, the first two interviews were coded separately by the principal investigator (AFB) and a trained research assistant until we reached 90% intercoder agreement. The initial two interviews were then coded to consensus. The trained

research assistant coded the remainder of the transcripts. Next, we organized the coded data into five overarching themes. To further enhance validity, we provided a thick, rich description of the participants' stories by reporting many detailed direct quotes (Creswell & Miller, 2000).

Results

Sample Characteristics

The final sample included 11 women in the postpartum period who were opioid dependent and used tobacco use during pregnancy and whose newborns were treated or evaluated for NAS in a large academic medical center in the southern United States. Participants identified as white, non-Hispanic, and were between the ages of 22 and 36. Four participants were married, three were living with partners, one was in a relationship but not living with her partner, and four were not currently in relationships. The age of first cigarette for the participants ranged from nine to 17 years of age. The participants ranked the importance of stopping smoking to them as an average of 8 on a scale of 0–10 and the scores ranged from 4–10 (with 0 indicating not important at all and 10 indicating the most important goal of their life), but they ranked their confidence in quitting within the next month at an average of 5.5 on a scale of 0–10 with a range of 0–10 (with 0 indicating not confident at all and 10 indicating 100% confident).

Themes

Five themes emerged from the qualitative data: *Strategizing to Reduce Risk, Desire to Quit Smoking in the Future, Holding on to Smoking While Working through Recovery, Feeling Judged by Nurses*, and *Feeling Supported and Empowered by Nurses*.

Strategizing to Reduce Risk—The majority of participants emphasized planning to reduce their child's risk of harm by avoiding secondhand and thirdhand smoke exposure to their newborns, rather than quitting. Participants consistently reported the plan to avoid thirdhand smoke exposure. According to one participant, her health care provider advised her to "keep like a towel outside to wrap around you…and you can just leave it outside but you wrap it…around you when you smoke and then before you come in, just take it off and leave it outside." Participants reported learning about the dangers of thirdhand smoke in their prenatal care:

> You basically have to take an entire shower [after smoking]…change your clothes. And you're still not going to get it off of you…I'm paranoid. I strip down, wash, when I go smoke, I cover up completely as much as I can.

Another explained, "Any time I smoke, I come in, I wash my hands, put hand sanitizer on and change my shirt." On the other hand, another participant described struggling to implement a smoke-free home policy:

> When we moved into this new place, I said, "I'm going to go outside and I'm going to stay in this room, like the living room towards the front door, to smoke." It didn't last a day. I'm there watching TV; I lit up a cigarette and after that it was like, pfft.

Other participants restricted smoking to certain areas in the home:

> So all of my babies… when they go home, we do not smoke in the house. And then whenever they're like 9 months to a year, we start in the bedroom. And that's where we stay. We don't smoke throughout the house like that.

Lack of full control over their living situation was one barrier to establishing a smoke-free home. One participant stated, "It sucks because I have been; there's 15 people smoking and I can't keep every one of them from smoking in the house; it's not my house."

Desire to Quit Smoking in the Future—Participants reported wanting to stop smoking. One participant explained "Smoking is something I really would like to quit doing." Another stated, "It's not good for me and I need to quit." Participants were motivated to quit smoking by the health of their children and a desire to be around to care for their children. According to a participant, "If you're going to be around for them, you've gotta quit smoking and take care of yourself…I don't want to leave her [daughter] anytime soon." A participant also acknowledged that stopping smoking was the only way to fully protect her child, "That's really why I want to quit….Even though I'm not smoking in the house, it's still on me." One participant reported the desire to stop role modeling smoking for other children in her family:

> My niece the other day, I'll never forget it, broke my heart. I was sitting at my grandparents' and she was acting like she was smoking and she's only 3…she's always like, "Are you going to smoke?" And that's awful to hear a 3-year-old say that. I mean, it kills me.

Holding On To Smoking While Working Through Recovery—Participants reported many barriers to smoking cessation, and the primary barrier was stress: "I really want to [quit smoking]. Right now [the barrier] is mainly the stress." Another participant explained, "After the baby [was born], I knew I wasn't going to hurt her with it so I just smoked more and it kind of calms me down." Similarly, another reported:

> It kind of calms me down. I don't think I'm addicted to it. I'm not. But when I get stressed out, I like to have a cigarette, you know. Just to sit there and think and just have something to do.

Participants reported feeling overwhelmed at the idea of smoking cessation in early stages of recovery from opioid dependence. One participant explained that smoking was a low priority issue for her, giving her current life circumstance, "I think with quitting everything else, it's like the cigarette, it's the least thing." Another stated, "I'll give up everything else; just leave my smoking alone. I'll give it all up; let me smoke a cigarette." Another participant reported that she was unable to quit smoking during pregnancy while dealing with her opioid dependence, but that she was currently ready to stop, "I can't quit everything like that…not all at once. But I'm working on it now, to quit smoking."

Given the stress of their lives and tackling dual addictions, participants described a desire to quit in the future. One participant was waiting, "Until I can get myself lined out, because that helps my nerves so much." Another explained,

> I don't think I'm addicted to it. I think once I get on my feet, I get us a nice house and I get my babies back. And I get a job and a GED…stay on my medication… everything's just going to be into place and I won't even probably care about it. Because I don't really care about it.

In the hospital environment, participants reported dealing with guilt, unexpected events, and logistical barriers which prevented them from staying with or visiting their newborns. Guilt emerged as a theme throughout the transcripts. The participants described feelings of guilt related to their newborns' withdrawal symptoms, the NAS scoring process, and NAS. One explained,

> Just watching her jerk like that…she didn't ask for none of this. She's innocent in all of it. And it just broke my heart to know that that's something that's affecting her; it's hurting her…I know what withdrawals are like. God help her if she feels like that.

Another explained, "It's just an instant guilt trip on you and what you did, and why you did it, and like, my whole drug use history kind of just flashed before me, like 'What have I done?'"

Other participants also reported major unexpected events. One participant described learning her son would be placed with a foster family:

> The day before I thought him and I were getting discharged. They didn't say a word the whole time, just let me believe that we were leaving on Thursday and the night before told me I had to leave my visitation with my son because a foster family was going to come and do bedside teachings.

Some participants reported logistical barriers to visiting their newborns in the hospital, including finding transportation to and from the hospital, places to stay and even food: "My car blew up and it's been hard for me to get back and forth to the clinic." Another explained, "I don't have transportation. I don't have friends. I don't have family." According to one participant, "We just homeless, just staying at the hospital and just my baby going through hell and that made me go through hell….trying to take care of my baby and not getting no sleep and no food."

Feeling Judged By Nurses—A few participants reported negative interactions with health care providers. A participant reported,

> One of them [a nurse] acted like I didn't deserve to have an IV because I had ruined my own veins. That I had ruined my veins and it was awful that they had to struggle so hard to find one to get my IV.

Another reported,

> She [a nurse] came around the corner and she was like, "Ma'am, you gotta put a robe on. You cannot hold that baby, you've got an open wound…the doctor said you had an open wound like you got shot, and you got a bullet hole through you." And I was sitting there thinking, "You should've called me over to the side and

asked me these things. Because you really just made me feel like I had a bad disease."

Feeling Supported and Empowered by Nurses—Most participants reported feeling supported by the health care team; one felt surprised that "they didn't treat me any differently than anyone else." Another reported, "I was shocked…I expected, honestly, a shitty attitude…but there was no one. There's never been anyone that's been nasty about anything, never. And that's mind boggling to me because I've never had that experience at a hospital." One explained that the health care providers "make you feel like you are doing the right thing…that you've done the right thing. That it's ok to ask for help." Participants reported that the support they received from health care providers made a positive difference:

> I had a meltdown over [on the] mother/baby [unit] over the tremors…that second day, they were really noticeable, you know. And I broke down, I melted. Because you know, I've done this to this baby, it's my fault…And the nurse was like, "Don't look at it like that." And she sit with me for an hour and a half and I cried the entire time and she sit with me the entire time, and she cried the whole time.

Another reported, "She [the nurse] was the reason I got through having the baby without medicine."

Discussion

Participants reported a variety of efforts to protect their newborns from secondhand and thirdhand smoke; however, some discussed barriers to maintaining smoke-free homes. Smoke-free homes have the immediate positive effect for the mother and newborn of reduction in secondhand smoke exposure. Smokers living in smoke-free homes have more tobacco quit attempts and successfully stop smoking (Mills, Messer, Gilpin, & Pierce, 2009) or smoke fewer cigarettes per day (Kegler et al., 2012) than smokers living in homes with indoor cigarette smoke. Promoting smoke-free homes as a step toward future cessation is a recommended approach to for tailored tobacco treatment for vulnerable groups of women (Stewart et al., 2010). A harm reduction approach, such as working toward a smoke-free home policy, can be a method to enhance confidence and increase readiness for smoking cessation.

However, evidence-based, smoke-free home interventions delivered in the NICU should be tailored for women with opioid dependence, a particularly vulnerable group. Several participants reported living in housing situations in which they lacked control over the smoking policy, which supports previous study findings that disadvantaged women (e.g., women living below the federal poverty level) can face many complex obstacles to creating smoke-free home environments (Amos, Greaves, Nichter, & Bloch, 2012). Therefore, smoke-free home interventions and access to needed social services should be paired with tailored treatment support for mothers and their partners (Stewart et al., 2010).

Results of our study suggested that women of low socioeconomic status with substance use disorders smoke in part to relieve stress. This is supported by a body of research indicating

that disadvantaged women (Flemming, Graham, Heirs, Fox, & Sowden, 2013; Flemming, McCaughan, Angus, & Graham, 2015; Howard et al., 2013; Stewart et al., 2011), including women dependent on opioids (Fallin, Miller, & Ashford, 2016) report smoking to relieve stress. In addition, results of our study complemented previous research findings that some women dependent on opioids feel overwhelmed at quitting smoking while receiving treatment for their substance use disorder (Fallin et al., 2016). To appropriately tailor a tobacco treatment intervention for vulnerable women, it is necessary to first understand the link between smoking and stress in their lives and then integrate stress reduction and tobacco treatment interventions into prenatal and postpartum care. This supports the results of previous studies that indicated that vulnerable women were interested in smoking cessation but recognized a need for intense support (e.g., a buddy; Fallin et al., 2016; Stewart et al., 2011) and assistance to navigate the many barriers to cessation services (e.g., child care; Stewart et al., 2011).

In addition to the high levels of stress in their everyday lives, having newborns in the NICU was an additional stressor. Other parents of infants in the NICU reported feeling overwhelmed and uncertain and described the environment as chaotic (Wraight, McCoy, & Meadow, 2015). Results of our study supported a larger body of research that indicates individuals with substance use disorders face particular stress in the hospital environment from real or perceived stigma and discrimination from health care professionals (Chang, Dubbin, & Shim, 2016; Cleveland & Gill, 2013) that could lead to less engagement in their care (van Boekel, Brouwers, van Weeghel, & Garretsen, 2013). However, most participants in our study reported supportive interactions with health care providers. These positive relationships can lay the groundwork for health promotion interventions and future health care engagement.

Findings of our study have implications for the development of a NICU-based tobacco treatment program for opioid dependent women. Health care providers in the NICU setting have a responsibility to the maternal-newborn dyad. Nurses who have developed rapport and trusted relationships with mothers with opioid dependence are in a prime position to lead tobacco treatment groups in the NICU with a holistic approach that encompasses stress reduction, support, and self-efficacy for smoking cessation. Group tobacco treatment sessions, held during times when the mothers would be away from the newborns' bedsides (e.g, immediately before or after visiting hours) could serve a dual purpose of also creating a peer social support network.

Limitations

There are several limitations of our study. As with all qualitative research, these findings are based on self-report, and social desirability bias may have hindered participants from openly discussing their tobacco use and/or opioid dependence during their pregnancy and early postpartum period. We attempted to mitigate this bias as much as possible by having the interviews conducted by a certified peer support specialist with many years of experience working with women with substance use disorders. We did not collect specific data on infant health outcomes (e.g., NAS severity or gestational age at birth), and it is possible that these factors may affect the participants' motivation to quit smoking. Further, all the participants

in our study were recruited from one academic medical center (the NICU waiting area and affiliated MAT program for pregnant and postpartum women). The results are from a relatively homogenous sample of white women of low socioeconomic status. However, this does reflect demographics of the region, as pregnant women dependent on opioids in the southern region are less likely than those in other regions to have a high school education or health insurance (Verbiest et al., 2016). Finally, our study was conducted in a tobacco growing state with high rates of smoking during pregnancy.

Conclusion

Nearly all women who are dependent on opioids smoke during pregnancy (Chisolm et al., 2013). Smoking adversely affects maternal and child health, and interventions are needed to promote smoking cessation in the postpartum period. The goal of our study was to collect formative data for a tobacco treatment program in the NICU for mothers who are dependent on opioids and who smoke. The participants in our study reported planning to reduce their child's risk by avoiding secondhand and thirdhand smoke exposure. Participants wanted to stop smoking, but reported many barriers including multiple life stressors compounded by their newborns' extended stay in the hospital. However, most participants described an overall positive experience with the healthcare system, with the support of health care providers. Holistic tobacco treatment programs incorporating stress relief and social support that are led by trusted healthcare providers have the potential to be effective to reduce smoking among new mothers with a history of opioid dependence.

Acknowledgments

NA

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Three call-outs

1. Tobacco treatment interventions in a NICU setting are promising but have not been tested for mothers who are dependent on opioids. (after introduction)
2. Participants wanted to stop smoking but reported many barriers, including multiple life stressors compounded by their newborns' extended stays in the hospital.
3. Tobacco treatment programs that incorporate stress relief and social support and are led by trusted health care providers could reduce smoking in this high risk population.

Table 1

Example of Data Analysis Process

Raw Data	Code	Category	Theme
"So all of my babies… when they go home, we do not smoke in the house. And then whenever they're like 9 months to a year, we start in the bedroom. And that's where we stay. We don't smoke throughout the house like that."	Indoor Smoking (Practices)	Plan to protect child from secondhand smoke	*Strategizing to Reduce Risk*
"Secondhand smoke, like with her [referring to her daughter], smoking around her and stuff like that, it can cause SIDS."	Indoor Smoking (Advice from Health Care Provider)		
"It sucks because I have been, there's 15 people smoking and I can't keep every one of them from smoking in the house; it's not my house."	Inability to Enact Smoke-free Home Policy	Barriers to enacting a smoke-free home policy	
When we moved into this new place, I said, 'I'm going to go outside and I'm going to stay in this room, like the living room towards the front door, to smoke. It didn't last a day. I'm there watching TV; I lit up a cigarette and after that it was like, pfft."	Failed Attempt at Smoke-free Policy		
"Any time I smoke, I come in, I wash my hands, put hand sanitizer on and change my shirt."	Thirdhand Smoke (Practices)	Plan to protect child from thirdhand smoke	
"Keep like a towel outside to wrap around you…and you can just leave it outside but you wrap it…around you when you smoke and then before you come in, just take it off and leave it outside.	Thirdhand Smoke (Advice from Health Care Provider)		