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Breastfeeding and Smoking among Low-Income Women: Results of a Longitudinal Qualitative Study

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Abstract

Background—The benefits of breastfeeding for infants and mothers have been well established, yet rates of breastfeeding remain well below national recommendations in the United States and even lower for women who smoke during pregnancy. Primary goals of this study were to explore contextual factors that contribute to breastfeeding intentions and behavior and to examine how smoking status affected women's decision making about breastfeeding.

Methods—This paper is based on a longitudinal qualitative study of smoking, pregnancy, and breastfeeding among 44 low-income women in the southwest U.S. who smoked during pregnancy. Each woman was interviewed 9 times; 6 times during pregnancy and 3 times postpartum using semistructured questionnaires. Interviews lasted 1 to 3 hours and were tape-recorded, transcribed, and analyzed.

Results—Despite 36 (82%) respondents stating that they intended to breastfeed for an average duration of 8 months, rates of breastfeeding initiation and duration were much lower than intentions. By 6 months postpartum, only two women were breastfeeding exclusively.

Conclusions—Women perceived that a strong risk of harming the baby was posed by smoking while breastfeeding and received little encouragement to continue breastfeeding despite an inability to stop smoking. The perceptions of the toxic, addictive, and harmful effects of smoking on breastmilk constitution and quantity factored into reasons why women weaned their infants from breastfeeding much earlier than the recommended 6 months. The results indicate a need for more consistency and routine in educating women on the relationship between smoking and breastfeeding and in promoting breastfeeding in spite of smoking postpartum. (BIRTH 35:3 September 2008)

Keywords

smoking; breastfeeding; weaning; qualitative data; harm perceptions

Three decades of scientific research has documented the numerous benefits of breastfeeding for infants and mothers (1). Aside from promoting healthy infant growth and development, it decreases the incidence or severity of many infectious diseases (1–3) and for mothers, decreases postpartum bleeding, facilitates uterine involution, and has been associated with an earlier return to prepregnancy weight (4).

Despite these well-documented benefits, recent United States data show that by 6 months postpartum, 39 percent of babies are breastfed, only 14 percent exclusively (5). According to recent national data collected among women participating in the Women, Infants, and Children (WIC) supplemental nutrition program, by month 3 postpartum, only 32 percent of infants are exclusively breastfeeding and by month 6, this rate has decreased to 11 percent (6).

Smoking and Breastfeeding

Strong evidence has shown that nicotine is passed from the mother to a breastfeeding infant by way of breastmilk, although effects of the transmission remain unclear (7). Scientists have found concentrations of nicotine or one of its metabolites, cotinine, in breastmilk and in blood lipids and urine of breastfed infants of women who smoke (8,9). The amount of cotinine detected in breastmilk directly reflects the number of cigarettes smoked (10). Evidence shows that shorter times between smoking a cigarette and breastfeeding leads to higher concentrations of nicotine in breastmilk. Furthermore, tests have shown that cotinine levels measure tenfold over levels in bottle-fed babies of smoking mothers, indicating that nicotine is carried through the breastmilk rather than through environmental smoke (11). In spite of the measurable transmission of nicotine through the breastmilk, the American Academy of Pediatrics has recommended that advice to mothers should reflect the assumption that the protective factors associated with breastmilk supersede the harm associated with continuing to smoke (1,7).

Research has shown a direct negative effect of maternal smoking on breastfeeding initiation and duration; specifically, smoking has been linked to early weaning (3,6,12–17). A dose-effect relationship between smoking and breastfeeding duration has been found; that is, the higher the number of cigarettes a woman smokes, the shorter is her duration of breastfeeding (18). Not only do smoking mothers exhibit a shorter duration of *exclusive* breastfeeding but also more likely not to initiate breastfeeding at all (17,19). A recent population-based cohort study showed that women who smoked throughout their pregnancies and postpartum were more than twice as likely than nonsmokers to wean their infants by 10 weeks after delivery (16).

Researchers are still in the process of investigating physiological mechanisms that might lead to early weaning among smokers. It has been hypothesized that smoking interferes with two hormones closely connected to milk ejection, prolactin, and oxytocin, although some contradictory research refutes these findings (18,20). For example, some researchers conclude that too little research has been conducted to confirm interference with oxytocin (12,21). Although lower levels of prolactin have been measured in smokers relative to nonsmokers (22), several recent studies have established that no physiological connection exists between prolactin levels and milk production (17,23,24). Research has shown, however, that the milk of smokers has a lower fat content (25). Since the physiological

mechanisms are not clearly understood, it seems important to consider in greater depth the range of social factors that may result in early weaning.

To date, social and behavioral factors contributing to diminished breastfeeding among mothers have not been adequately studied. The risks perceived by mothers who smoke and breastfeed merit further consideration. Insufficient milk has been one reason for early weaning reported by smokers (14). Other researchers suggest that babies may refuse to feed once the mother returns to smoking and the breastmilk composition is altered (26) or that the nicotine transfer causes restlessness in babies that may be interpreted as a sign of insufficient milk by mothers, leading them to supplement with artificial feeding (27). Previous research has shown that some mothers who smoke believe that their milk has been negatively altered by their smoking and choose formula feeding to lessen the perceived harm to their babies (13,26).

To date, few qualitative studies have focused on the topic of breastfeeding among mothers who smoke (13,27,28). Much of what is known about early weaning among smokers is based on surveys conducted at one point in time, which, although providing valuable information on breastfeeding intentions, fail to capture women's subjective experiences of smoking and breastfeeding. Our study presents data from a longitudinal ethnographic study of 44 women who were smokers at the onset of their pregnancy. One of the main goals was to explore contextual factors contributing to smoking cessation, relapse, and harm reduction efforts during pregnancy and up to 6 months postpartum (29,30). During pregnancy and postpartum, we also collected data on breastfeeding intentions and behavior to examine how smoking status affected women's decision making about breastfeeding.

Women in the study were interviewed about their intentions to breastfeed during pregnancy and reinterviewed about their breastfeeding practices at 1, 3, and 6 months postpartum. We examined the extent to which women who were smokers at the onset of pregnancy intended to breastfeed their babies when asked during pregnancy whether they initiated breastfeeding postpartum, and if so, for how long. Despite findings in the literature that typically suggest that breastfeeding practices are a direct outcome of intentions, we sought in this study to qualitatively explore key social variables associated with various degrees of concordance between intentions and our sample's actual behavior postpartum.

Methods

The study was conducted over an 18-month period (2000–2002) in a large city in the southwestern U.S. An earlier paper reported on women's smoking during pregnancy from the same cohort (29). Eligibility criteria specified that a woman be no more than 28 weeks pregnant at entry into the study, had been smoking at the time she learned of her pregnancy, and was low income. At the time of enrollment, women were asked about their present smoking status but were not recruited on the basis of their desire or intention to stop. Low income was defined as eligible for WIC; that is, they had an income of less than \$30,000 for a family of four or were eligible for Medicaid. Medicaid is a government-subsidized mode of health care delivery available to low-income U.S. citizens. Participants were aged 18 years or older and fluent in English or Spanish.

Women were recruited for the study using multiple recruitment strategies. Flyers were posted in locations frequented by low-income pregnant women, such as obstetrician offices, children's resale stores, WIC clinics, and immunization clinics. The flyer showed a drawing of a pregnant woman and asked "Are you pregnant?" Additional questions included "Are you less than 28 weeks pregnant?" "Are you at least 18 years of age?" and "Are you currently smoking or have you tried to quit or cut down since becoming pregnant?" The

flyer stated that the woman would be compensated for her time and tear-off phone number strips were provided. We also collaborated with the local tobacco control project to conduct active recruitment at local baby fairs. To a lesser extent, we used mass media including local newspapers, television, and radio spots to assist in recruitment. All women who were interested in participating were invited to telephone the project office and the project manager administered a screening questionnaire to all women who called. In total, 104 women were screened for the study; 15 women were not interested in participating but were eligible, and 36 were not eligible. The most common reasons for ineligibility were that the family income was too high or that the woman was pregnant but not a smoker. Of the 53 pregnant women recruited into the study, 44 were included, gave their informed consent, and remained in the study at 6 months postpartum. The major reason for dropout after delivery was that the woman could no longer be reached. Approval for the study was obtained from the institutional review board at the University of Arizona.

Each informant was interviewed three times postpartum (during months 1, 3, and 6) by the same interviewer who had met with her during pregnancy. Based on formative research with pregnant women who smoked, we developed and pretested a questionnaire. In-person interviews were semistructured and conducted at the woman's home, typically lasting 1.5 to 2 hours. The interview protocol contained a set of core questions that were repeated at each interview and questions introduced during specific interviews to minimize informant fatigue and vary interview content. A saliva sample was collected at each in-person interview and sent for laboratory analysis as a validation of reported smoking abstinence.

Data Analysis

All interviews were tape-recorded and later transcribed verbatim and coded using ATLAS.ti 5.0 (31). This software program permits classification and retrieval of data on the basis of codes, facilitating a comparison of discourse across participants. The research team developed a coding scheme based on interview questions and important themes that emerged from the data. Coders were given extensive training in using the coding scheme. After each coder had independently completed three interviews, they were cross-checked for accuracy and interrater reliability was established. Regular meetings were held to discuss emergent themes and problems with codes and to consider the creation of new codes that more adequately reflected women's narratives.

Results

Women were recruited into the sample in their fourth or fifth month of pregnancy (mean gestational age = 19.3 wk). In terms of ethnicity, 27 (62%) were Anglo American, 11 (25%) were Mexican American, 1 (2%) was African American, and 5 (11%) were multiethnic. The mean age of participants was 24 years, with a range between 18 and 43 years; one half of the women were married; 16 (36%) were primiparas and 28 (64%) multiparas. In terms of educational status, 15 (34%) had not graduated from high school, 17 (39%) had a high school diploma, and 12 (27%) had some posthigh school education. Characteristics of participants are shown in Table 1.

To analyze the sample further in terms of breast-feeding status, smokers were categorized as "quitters," "harm reducers," and "shifters," as developed previously (29,31). Quitters had successfully stopped smoking during pregnancy and stopped for 6 months postpartum. Harm reducers had successfully reduced their smoking by 50 percent over the course of their pregnancies and stayed reduced for 6 months postpartum. Shifters altered their smoking levels over the course of the pregnancies and postpartum but did not sustain reduced levels; they were unable to reduce their smoking by at least 50 percent of their prepregnancy levels

throughout pregnancy. Saliva samples analyzed for cotinine content served as a validation of reported smoking abstinence (31).

Intentions to Breastfeed

During the third trimester of pregnancy, we asked women whether they intended to breastfeed; of the 44 participants, 36 (82%) reported that they intended to do so. When asked about the duration of their intended breastfeeding, responses were varied with some women noting anticipated length in months, whereas others provided qualitative explanations, such as “until the baby develops teeth” or “for as long as the baby wants.” Ten women did not know how long they would breastfeed. Among the 18 women who provided an anticipated length of time, the average intended duration for breastfeeding was 8 months. No variation in breastfeeding intentions were found across women’s smoking levels. Fourteen women who had stopped smoking during pregnancy reported that they intended to breastfeed compared with 30 women who continued to smoke. Surprisingly, women who had successfully stopped during pregnancy reported that they intended to breastfeed for an average duration of 7 months, whereas women who were still smoking reported that they intended to breastfeed for 9 months.

When asked about the perceived benefits of breastfeeding, study women provided a range of responses, most often citing the health benefits of breastmilk for babies (Table 2). In response to the question “what are the advantages and disadvantages of breastfeeding?” A first-time pregnant woman responded:

What I’ve heard is the first few days are the most critical, I guess because of the antibodies and all that. You don’t have to spend \$13 a can on Enfamil It seems like it’d be easier when they wake up at night, just to breastfeed than have to go make a bottle and all that other stuff. I don’t see any disadvantages. (C1)

In another pregnancy interview, a 23-year-old woman indicated that her first child had been so healthy due to breastfeeding that she planned to breastfeed her second child. She said:

I think she’s a lot healthier (*reference to first child*) ...she just takes to things better. She seems to be smarter ...she’s never had an ear infection ...she’s had one major cold last April where she was sick for about 4 or 5 days, and other than that she hasn’t had anything besides a runny nose. She has been an *extremely* healthy kid. I have two friends that had babies 2 weeks before her and my other friend had one a month after her. And both of those kids have had ear infections all the time and they’ve had tons of colds. And they only breastfed for 2 weeks to a month. And I did with her for about 6 to 7 months. I haven’t had any problems with her, luckily. So I’m very thankful. (D1)

This mother’s intention to breastfeed her second child reflects several of the multiple positive reasons for breastfeeding mentioned by other women in the study. Women perceived breastfeeding as a way to ensure the baby’s physical health, including a steady weight gain and less colic. Others mentioned mental health benefits of breastfeeding, such as increased intelligence and good behavior.

Breastfeeding Practices after Delivery

After delivery, participants were asked about their breastfeeding practices at three time points: 1, 3, and 6 months postpartum. After childbirth, 38 women initiated breastfeeding, with only 6 women not attempting to breastfeed at all. By 1 month postpartum, only 10 women were still breastfeeding exclusively, whereas another 24 were breastfeeding but also had introduced the bottle or other solid foods. The remaining 4 women were not breastfeeding at all. At month 3, just 6 women were still breastfeeding exclusively. At 6

months, this number dropped to 2 participants (5%). Although mindful of sample size limitations, this percentage appears to be substantially lower than the national average for the WIC-eligible population who, at 6 months postpartum, breastfeed their infants at a rate of 11 percent (5).

Rates of exclusive breastfeeding were low in the sample. Exclusive breastfeeding was defined as feeding the baby solely on breastmilk. Seventeen women exclusively breastfed for an average of 2.4 months (range 2 wk to 6 mo). Nine women “tried” breastfeeding while still in the hospital but only continued for 1 or 2 days. The main reason that these women reported stopping was that they thought that the baby was still hungry after nursing and would need formula even after breastfeeding, as qualitative data reveal below.

The duration of any or exclusive breastfeeding by smoking category (i.e., quitters, harm reducers, and shifters) is shown in Table 3. Of the 14 quitters, 4 were breastfeeding exclusively at 1 month, 1 was breastfeeding at 3 months, and none at 6 months postpartum. Of the 11 shifters, 4 were breastfeeding their infants exclusively at 1 month, 2 at 3 months, and none at 6 months postpartum. Of the 19 harm reducers, the largest category, 5 were breastfeeding exclusively at 1 month postpartum, 4 at 3 months, and by 6 months postpartum, 2 harm reducers—the only exclusive breastfeeders among the entire study population at this point—were exclusively breastfeeding their infants. Among the participants exclusively breastfeeding their infants at 1 and 3 months postpartum, the harm reducers composed the greatest proportion at 37 percent (5/14) and 57 percent (4/7). Breastfeeding practices coincided with smoker reduction efforts, which indicate that women perceived the harm smoking posed to their breastfeeding infants, as illustrated by qualitative data findings below.

The two women who continued to breastfeed exclusively until the recommended duration of 6 months did so because their babies gained weight quickly and were sick less often. Notably, neither mother perceived a risk between smoking and breastfeeding and both continued to smoke at prepregnancy levels. Both women mentioned receiving encouragement to breastfeed and that health care practitioners had told them that it was okay to breastfeed and smoke. These women thought that the health benefits of breastfeeding outweighed the risks associated with smoking.

I just notice that he's a lot healthier. There was a 2-month-old over here, ...and I felt so sorry for the mom because she couldn't breastfeed, and ...her kid was probably 9 pounds at 2 1/2 months, and mine's 17 pounds and 10 ounces and he's 3 1/2 months. And it was just so much of a difference, and the baby had colic ...he was crying all the time. [My son] is just always happy, except for when he's hungry ...I think it makes a BIG difference I see a lot of 1-year-olds that weren't breastfed that only weigh twenty pounds. I don't know if it has to do with the breastfeeding thing, but I know it makes them a lot healthier. (M1)

This description echoes the reasons cited widely by women in the sample in response to questions asked during pregnancy about their intentions to breastfeed. Nonetheless, a large disjuncture was observed between intentions and practices. Breastfeeding practices were highly contingent on women's experiences, not just intentions, and reflected a complex mix of experiences revealed through in-depth postpartum interviews.

Reasons for Weaning

Through an analysis of women's interview data to shed light on the low rates of exclusive breastfeeding among women in our sample, we identified five main reasons: 1) women's perceptions of the toxic and addictive qualities of nicotine passed through their breastmilk; 2) mixed messages from women's health care and social service practitioners about

breastfeeding, particularly when the woman had resumed smoking; 3) women's beliefs that they had an insufficient milk supply; 4) the shame of breastfeeding in front of others; and 5) the limits that breastfeeding placed on women's flexibility and autonomy. The perceived disadvantages of breastfeeding are listed in Table 4.

Issues of Taste, Toxicity, and Addiction to Nicotine

Regardless of their smoking levels, many respondents believed that smoking affected both the quality and the quantity of breastmilk. Most mothers in our study—95 percent (42/44)—believed that smoking had at least some kind of negative effect. Mothers described the toxic properties of a smoker's breast-milk in their narratives. Other mothers expressed the belief that breastmilk constitution was altered, rendering the milk unpalatable for the baby. Four women directly stated that nicotine in breastmilk fostered addiction in the baby.

For several women who had successfully stopped smoking during pregnancy, beliefs about the potential harm of smoking on their breastmilk provided the prime motivation to continue not smoking. One mother who had stopped during pregnancy was clear that having already stopped for 5 months she was not about to start again, particularly since “the smoke could be carried in breastmilk.” Similarly, a 30-year-old mother of three discussed her breastfeeding as a reason to remain stopped at 2 months postpartum. She commented “Only after I stop breastfeeding will it cross my mind to smoke again.”

Another participant who successfully stopped smoking during her pregnancy and breastfed her son exclusively for 3 months noted:

I think it (smoking) can affect your breastmilk. I mean, look what it does to you, and it's going to get, it gets not only into your lungs, but it gets into your bloodstream and everything, so why wouldn't it get into your milk and go to the baby? I don't know what it would do to the baby, but I'm sure it would (affect your breastmilk). (Y1)

She went on to comment on *how* smoking might affect the breastmilk:

It might slow down, you know? And it might kill any nutrients or anything that's in it or vitamins, or ...it might kill some of it, or make it to where it's not as high as, not as potent ... (Y1)

Several mothers spoke of smoking affecting the taste of breastmilk (“it would taste gross”) and consistency (“I don't want my daughter drinking tobacco”). Other women noted that poisons from the cigarette transfer to the baby not just through breastmilk, but that the lingering smell of smoke on one's clothes was inhaled by the infant.

Among those women who smoked after delivery, some reduced the number of cigarettes smoked so as to reduce the harm that they believed smoking posed to their breastfeeding infants. Others believed that although harmful for the baby, it was safer than smoking during pregnancy.

As one 23-year-old, first-time mother noted:

I think that most women think it's a lot safer after they've had the baby because they're not getting anything ...like when they were in your stomach ...But I think regardless, whether you're breastfeeding or they're in there, then they're definitely getting something from it. Anything you take into your body has got to come out somehow. (E1)

The strong perception of a negative relationship between smoking and breastfeeding led some women to wean early. Just before giving birth, when asked if she saw her smoking

changing in the next few months and why, one respondent who had cut down her smoking significantly during pregnancy but had not stopped, noted, “Oh God, I was thinking about not smoking at all. It’s different when you don’t see the child, I think.” She anticipated that the visual experience of motherhood would cause her more guilt while smoking and that this increased guilt would facilitate her stopping smoking. Although women believed that having a baby would serve as an impetus to stop, many found that it did not, so breastfeeding, even if initiated, was terminated quickly.

Some mothers suspected that nicotine in breastmilk fostered the same physical addiction as that experienced by the mother. One first-time mother worried that her baby was addicted to nicotine because she had smoked during pregnancy and was still smoking postpartum. In an interview shortly before she gave birth, a 20-year-old mother lamented that just as her mother had made her addicted to nicotine, she was now doing the same to her child. She explained:

I was talking to my mom and I feel really bad ...it’s horrible ...he’s inside of me and if it’s so hard for me to quit smoking and he’s going to be out in the world and he’s just *going to have* to quit irregardless of the nicotine or whatever I’m addicted to. Poor thing, he’s *going to have* (to quit), and that makes me feel bad ... (M1)

This feeling carried through in interviews after the birth where she expressed continuous worry:

He might be addicted to the nicotine ...I think he could be. Sometimes I’ll give him a bottle and he will just not stop crying. As soon as I give him the breastmilk it’s over. I don’t know, and that might not be, he just might be used to the breastmilk too, but I honestly don’t know. (M1)

At 3 months postpartum, this mother was so sure that her son was addicted to nicotine that she was committed to cutting back her smoking gradually so as not to provoke any withdrawal symptoms in him.

I want to quit smoking before I stop breastfeeding ...because he’s probably addicted to the nicotine as much as I am. If I cut down, if I stop smoking, then his withdrawals won’t be as hard either I was thinking about that; it makes me feel bad. (M1)

Like this mother, other informants feared the toxic and addictive aspects of their breastmilk and worried that their smoking posed great harm to their breast-feeding infants. In addition, they articulated the way that smoking might diminish their milk supply.

Mixed Messages on Breastfeeding and Smoking

In response to the direct question “Have you received encouragement to breastfeed?” More than two-thirds of the women expressed receiving encouragement to breastfeed both during pregnancy and 6 months postpartum from a significant other. Multiple responses were allowed. Fifteen women received encouragement from their mothers, 11 from their doctors, 9 from their boyfriends or husbands, 4 from friends, 4 from WIC officers, and 4 from “everybody.” Some women reported receiving the suggestion to breastfeed, but that they did not know for how long they should continue whether they should do it exclusively, or if not, when they should introduce infant formula. In general, women seemed to understand little about the biological mechanism of breastfeeding, specifically that introducing formula would lead to a diminished milk supply. Furthermore, study participants did not understand that the benefits of breastfeeding superseded the harm posed by their smoking to their breastfeeding infants. Importantly, no participant reported that their health practitioners had specifically discussed this issue with them.

In some cases, practitioners directly told women that smoking would cause a depletion of breastmilk. For example, a WIC worker told a mother that her baby's poor weight gain could be due to a low milk supply caused by her smoking. However, in other cases, women said that no health care practitioner had ever told them that their smoking would have an impact on their breastmilk or had they felt comfortable asking. One woman reported being told that continuing to smoke while breastfeeding was not as bad as smoking during pregnancy. Another was told by her social worker that it was okay to smoke while breastfeeding because she had done it with her children "and they turned out just fine."

Insufficient Milk

Insufficient milk was another concern expressed by respondents who continued to smoke postpartum. Whereas most did not understand the mechanism by which smoking reduced breastmilk, 1 mother of 5 children shared her experience of the effect of smoking.

When you smoke, it dries up your milk ...So, after I had my other kids, as soon as I had them, I was, like, 'I have a cigarette.' As soon as I was able to be wheeled down to the front of the hospital, I had one. But it dries up your milk. (E1)

From previous experience, she remembered the overpowering desire to smoke after delivery, a desire that in effect would prevent her from being able to breastfeed her infant.

Seven study women reported that insufficient milk was the reason for introducing formula. This group included both quitters and women who continued to smoke postpartum; in fact, 5 of the 7 women had already stopped smoking during pregnancy and had not relapsed postpartum. All these women mentioned feeling frustrated that they could not satisfy their baby's hunger. When asked if anyone was encouraging them to continue breastfeeding despite their concerns, one woman noted:

My doctor did, the pediatrician. He said it's the best, but I was, like, 'my baby's so hungry. I need to give him something else.' He wouldn't take a bottle if I was breastfeeding. He wouldn't even take breastmilk in a bottle, so I had to either breastfeed him and he'd still be hungry, or just bottle-feed him. Or put baby cereal in his bottle. That's what I started doing. That's the only person that really encouraged me to do it. (K1)

Shame and Embarrassment to Breastfeed in Front of Others

An issue noted by more than three-fourths of the sample (35/44, 79%) was the stigma of breastfeeding in public. As low-income mothers, they spent a lot of time in public places such as health care offices (in an effort to obtain various social services), on public transportation, and in grocery stores that they frequented daily for small purchases they could carry home without a car. As one woman explained, "It's like when you're at home, it's more convenient, but when you're out, it's really not convenient at all. It's kind of embarrassing ... (breast exposure for feeding in public)." One woman related an experience she had while breastfeeding in public:

Those dirty old men that are just sitting there like waiting for your (breast) to pop out...they're waiting for something to happen, you know, just to get that extra little look or something ...So I just, in some places I just don't do it. (M1)

For these low-income women, breastfeeding in front of others was uncomfortable for them and prompted them to use bottle-feeding to avoid the embarrassment.

Ten women expressed disgust with the practice of breastfeeding, as the following quotation captures:

There's a lot of disadvantages to having a baby hanging off your breast. One, you look like a damn fool, two, you have to show your breast every time. It's just nasty ...Doctors ...don't care about ...your dignity." (J1)

Burdens of Exclusive Breastfeeding

In addition to embarrassment, breastfeeding limited women's flexibility to carry out other responsibilities, such as caring for other children, looking for jobs, working, or leaving the house to run errands. More than 40 percent of participants ($n = 18$) noted that exclusive breastfeeding placed a burden on the mother as the only one who could feed the baby. Due to the frequency of infants' eating schedules, mothers felt very constrained as the baby's sole feeder. They thought that they could not leave the house because they would not be able to breastfeed the baby in the car or in public, and they felt like they would never get a good night's sleep because they were the only ones who could feed the baby at night. This first-time mother described this concern:

I never really use infant formula, but I know if I did use it ...that it would be so much easier because I could go out and do things without the baby and have somebody watch him. I just know that when I'm breastfeeding, he has to go everywhere with me, and there is just no way he can't because he has to eat. But, ...I don't really even do that, I don't really leave him with anybody or anything, because there's been three times in a month, and I've only been gone for about an hour ...and he just was so hungry, he couldn't wait ...You still can't do anything; you have to be there the whole time when you breastfeed. (M1)

Another participant echoed this feeling of being tied down when exclusively breastfeeding:

Babies go through spurts where they just want to eat all the time; you get sore, and it wears you out ...you don't want to sit there an hour, four times a day, that's really crazy physical (J1)

The demands of breastfeeding on women's mobility were not only frustrating for personal reasons but also sometimes interfered with women's responsibilities to other family members. One mother, who had two other children, detailed how at 1 month postpartum, although her baby was eating well and breastfeeding regularly, it left her little time for the rest of the family. She explained:

She nurses ...too much I think ...she goes in spurts, she'll have days where she eats ...every couple hours, but then she'll have days where she'll nurse for an hour, sleep for 20 minutes, wake up and nurse for another hour! It's like, 'Okayyyy'. Instead I've given her formula a couple of times, but it's like ... 'Honey, I can't do this anymore' ... 'Mommy needs a shower' I have to feed the rest of the family. So two or three times now I've given her something besides, breastmilk—I've never had to do that with the other two kids. They were satisfied. (C2)

Other mothers wanted to enable husbands and other family members to feed the baby, thus facilitating their bond. In addition, because many of these women needed to return to outside work, introducing formula was an easier and more convenient choice, as this study participant describes:

Now I'm formula feeding too. I only breastfeed at night because I'm trying to so I could go get a job. He was getting very attached. He wouldn't go with my husband. He wouldn't go with nobody. He wanted just to stay with me. My husband said 'well, we need to get him on a bottle.' So, that's what we did. (S1)

The burden of exclusive breastfeeding was explained as a hindrance to women's efforts to complete other household responsibilities, look for jobs, and work outside the home.

Discussion

Intentions to breastfeed are lower among women who smoke than among nonsmokers, although why this is so has not been well understood (12). The lack of a clear physiological explanation for the low levels of breastfeeding and early weaning among smokers has led researchers to investigate social, cultural, and behavioral factors that may influence women's decision making. DiGirolamo et al concluded that initial experiences with breastfeeding must also be taken into account when predicting breastfeeding duration (32).

Among the 44 women in this sample, followed through pregnancy and 6 months postpartum, we found a sizable disjuncture between women's intentions to breastfeed noted during the last trimester of pregnancy and their low rates of actual breastfeeding. The study suggests that whereas intentions to breastfeed during pregnancy were high among these women who smoked, an intention to breastfeed was not a good predictor of a woman's actual behavior postpartum. Rather complex contingencies, including messages from practitioners, perceptions of harm, and feelings of shame of breastfeeding in public, must be taken into consideration to understand the breastfeeding behavior of women who smoked at the onset of pregnancy. Our study raises issues about intentions to breastfeed for low-income women who have limited resources and support to actualize their intentions.

Rates of any and exclusive breastfeeding were low in this study population when compared with national and state averages among WIC-eligible women (5), reflecting the low rates of breastfeeding among women who smoke. To the discussion of why women who smoke during pregnancy do not breastfeed much or for very long, our study adds important qualitative evidence about some women's perceptions of the risk their smoking poses to their breastfeeding infants. Women in the study described clear perceptions of the toxic, addictive, and harmful effects of smoking on breastmilk constitution and quantity, which were some of the most important reasons why women who smoked decided not to breastfeed or, for those who initiated breastfeeding, led to early weaning.

Due to their low-income status, the lives of these women were highly public. Regularly, they relied on public transportation or relatives with cars for getting around. Living in contexts of poverty, they received social services for which they often had to wait in public waiting rooms. Rather than experience the discomfort and embarrassment of breastfeeding in a context of public stigma, they chose to bottle-feed in these situations.

Many of the study women had multiple daily challenges. Life events, such as home eviction and changes in jobs and partners, caused them to move sporadically with little warning or time to prepare for drastic changes. Respondents were poor and managing the best they could with few economic and social resources during the pregnancy and postpartum periods. Family support was often unreliable and sometimes antagonistic to their efforts to stop smoking, improve their lives, or breastfeed their infants (29).

It is noteworthy that the study women reported receiving few messages from health care practitioners about the importance of breastfeeding, particularly if they were still smoking. Messages received were reported to be too general, and women were unclear about whether they should breastfeed if they still smoked. Unclear and mixed messages from practitioners did not help women continue breastfeeding but, rather, enabled them to legitimate early weaning. Furthermore, the burden on women's flexibility and on their ability to attend to other responsibilities was reported as a drawback to breastfeeding.

Some limitations of the present study should be noted. First, the sample size of this ethnographic study was limited to 53 women, and thus, we are unable to generalize to the larger population. Although we included women of different ethnicities in our sampling, the

small sample size makes it difficult to detect potentially important differences in smoking across pregnancy. Second, our intensive ethnographic methodology (three 1.5- to 2-hr interviews over the course of two trimesters of pregnancy) may have unintentionally biased the respondents by increasing their awareness of their smoking, by enhancing their feelings of guilt about their continued smoking, or both. With respect to interactions with health care practitioners, we collected only self-report data and were unable to observe what was actually said to these women about their smoking.

Clinical Implications

Beyond general information, health education efforts need to inform mothers specifically *how* tobacco causes harm to their babies and to address directly the relationship between smoking and breastfeeding. Women in this study thought that the little information they had received from practitioners was not helpful. They remained unaware that the benefits of breastfeeding outweighed the potential harm posed to their babies by nicotine in their breastmilk.

Importantly, study women reported that they did not receive a message from practitioners that the benefits of breastfeeding superseded the harm of smoking. In light of women's concerns over the harm posed by their smoking, they need to receive this message. Women reported that they had received encouragement to breastfeed; however, it is clear that this encouragement did not sustain their breastfeeding practices. Breastfeeding education and advocacy must make the supply-and-demand relationship between breastfeeding and bottle-feeding clear so women understand that introducing formula could diminish their supply. The dual messages that they need to stop smoking, but that they ought to breastfeed even if they cannot stop need to come across more clearly.

Health care practitioners and breastfeeding advocates need to recognize that many low-income women who continue to smoke confront a myriad of challenges due to their poor, unstable, and unpredictable lives. Rather than continuing to shame them for their inability to stop smoking, practitioners, health workers, and advocates need to actively develop cessation intervention programs that respect and address the concerns of this group of women.

Conclusions

Women perceived that a strong risk of harming the baby was posed by smoking while breastfeeding and received little encouragement to continue breastfeeding despite an inability to stop smoking. The perceptions of the toxic, addictive, and harmful effects of smoking on breastmilk constitution and quantity factored into reasons why women weaned their infants from breastfeeding much earlier than the recommended 6 months. The results indicate a need for more consistency and routine in educating women on the relationship between smoking and breastfeeding and in promoting breastfeeding in spite of smoking postpartum.

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References

1. American Academy of Pediatrics. Policy statement: Breastfeeding and the use of human milk. *Pediatrics*. 2005; 115(2):496–506.
2. Andraca, I.; Periano, P.; Uauy, R. Pan American Health Organization, The World Bank, and Tropical Metabolism Research Unit, University of the West Indies. *Nutrition, Health, and Child Development: Research Advances and Policy Recommendations*. Washington, DC: Pan American Health Organization; 1988. Nutrition and care in the pre-term and neonatal periods and later development: Human milk is best for optimal mental development; p. 43-68.
3. Duncan B, Ey J, Holberg CJ, et al. Exclusive breast-feeding for at least 4 months protects against otitis media. *Pediatrics*. 1997; 91:867–872. [PubMed: 8474804]
4. Dewey KG, Heinig MJ, Nommsen LA. Maternal weight-loss patterns during prolonged lactation. *Am J Clin Nutr*. 1993; 58:162–166. [PubMed: 8338042]
5. Centers for Disease Control. Breastfeeding National Immunization Data: States: 2005. [Accessed March 4, 2008]. Available at: http://www.cdc.gov/breastfeeding/data/NIS_data/2004/socio-demographic.htm
6. Ryan AS, Zhou W. Lower breastfeeding rates persist among the Special Supplemental Nutrition Program for Women, Infants, and Children participants, 1978–2003. *Pediatrics*. 2006; 117(4):1136–1146. [PubMed: 16585308]
7. American Academy of Pediatrics Committee on Drugs. The transfer of drugs and other chemicals into human milk. *Pediatrics*. 2001; 108:776–789. [PubMed: 11533352]
8. Luck W, Nau H. Nicotine and cotinine concentrations in serum and milk of nursing smokers. *Br J Clin Pharmacol*. 1984; 18:9–15. [PubMed: 6743492]
9. Schulte-Hobein B, Schwartz-Bickenbach D, Abt S, et al. Cigarette smoke exposure and development of infants throughout the first year of life: Influence of passive smoking and nursing on cotinine levels in breast milk and infant's urine. *Acta Paediatr*. 1992; 81:550–557. [PubMed: 1392372]
10. Woodward A, Grgurinovich N, Ryan P. Breast feeding and smoking hygiene: Major influences on cotinine in urine of smokers' infants. *J Epidemiol Community Health*. 1986; 40:309–315. [PubMed: 3655623]
11. Mascola MA, Van Vunakis H, Tager IB, et al. Exposure of young infants to environmental tobacco smoke: Breastfeeding among smoking mothers. *Am J Public Health*. 1998; 88(6):893–896. [PubMed: 9618615]
12. Donath SM, Amir LH, the ALSPAC Study Team. The relationship between maternal smoking and breastfeeding duration after adjustment for maternal infant feeding intention. *Acta Paediatr*. 2004; 93:1514–1518. [PubMed: 15513582]
13. Edwards N, Sims-Jones N, Breithaupt K. Smoking in pregnancy and postpartum: Relationship to mothers' choices concerning infant nutrition. *Can J Nurs Res*. 1998; 20:83–98. [PubMed: 10030187]
14. Hill PD, Aldag JC. Smoking and breastfeeding status. *Res Nurs Health*. 1996; 19(2):125–132. [PubMed: 8606982]
15. Horta BL, Kramer MS, Platt RW. Maternal smoking and the risk of early weaning: A meta-analysis. *Am J Public Health*. 2001; 91(2):304–307. [PubMed: 11211645]
16. Liu J, Rosenberg KD, Sandoval AP. Breastfeeding duration and perinatal cigarette smoking in a population-based cohort. *Am J Public Health*. 2006; 96(2):309–314. [PubMed: 16380564]
17. Ratner PA, Johnson JL, Bottorff JL. Smoking relapse and early weaning among postpartum women: Is there an association? *Birth*. 1999; 26(2):76–82. [PubMed: 10687570]
18. Horta BL, Victora CG, Menezes AM, Barros FC. Environmental tobacco smoke and breastfeeding duration. *Am J Epidemiol*. 1997; 146(2):128–133. [PubMed: 9230774]
19. Hakansson A, Carlsson B. Maternal cigarette smoking, breast-feeding and respiratory tract infections in infancy. *Scand J Prim Health Care*. 1992; 10:60–65. [PubMed: 1589666]
20. Lawrence, RA.; Lawrence, RM. *Breastfeeding: A Guide for the Medical Profession*. 5. St. Louis, Missouri: Mosby; 1999.

21. Amir LH. Maternal smoking and reduced duration of breastfeeding: A review of possible mechanisms. *Early Hum Dev.* 2001; 64(1):45–67. [PubMed: 11408108]
22. Anderson AN, Lund-Andersen C, Larsen JF, et al. Suppressed prolactin but normal neurophysin levels in cigarette smoking breast-feeding women. *Clin Endocrinol.* 1982; 17:363–368.
23. Cox DB, Owens RA, Hartmann PE. Blood and milk prolactin and the rate of milk synthesis in women. *Exp Physiol.* 1996; 81:1007–1020. [PubMed: 8960706]
24. Ingram JC, Woolridge MW, Greenwood RJ, McGrath L. Maternal predictors of early breast milk output. *Acta Paediatr.* 1999; 88:493–499. [PubMed: 10426170]
25. Powers N. Slow weight gain and low milk supply in the breastfed dyad. *Clin Perinatol.* 1999; 26:399–430. [PubMed: 10394494]
26. Minchkin MK. Smoking and breastfeeding: An overview. *J Hum Lact.* 1991; 7(4):183–188. [PubMed: 1818572]
27. Lyon AJ. Factors affecting breast feeding—A comparison of two British military hospitals. *J R Army Med Corps.* 1983; 129:135–139. [PubMed: 6663575]
28. Bottorff JL, Johnson JL, Irwin LG, Ratner PA. Narratives of smoking relapse: The stories of postpartum women. *Res Nurs Health.* 2000; 23:126–134. [PubMed: 10782871]
29. Nichter M, Nichter M, Adrian S, et al. Smoking and harm reduction efforts among postpartum women. *Qual Health Res.* In press.
30. Nichter M, Nichter M, Muramoto M, et al. Smoking among low-income pregnant women: An ethnographic analysis. *Health Educ Behav.* 2007; 34(5):748–764. [PubMed: 17200098]
31. Muhr, T. User's Manual for ATLAS.ti 5.0. Berlin, Germany: Atlas.ti, Scientific Software Development GmbH; 2004.
32. DiGirolamo A, Thompson N, Martorell R, et al. Intention or experience? Predictors of continued breastfeeding. *Health Educ Behav.* 2005; 32(2):208–226. [PubMed: 15749967]

Table 1Characteristics of Participants ($n = 44$)

Variable	Quitters ($n = 14$) No. (%)	Harm Reducers ($n = 19$) No. (%)	Shifters ($n = 11$) No. (%)
Mean age	23	25	25
Primigravida	5 (36)	7 (37)	4 (36)
Race/ethnicity			
Anglo American	5 (36)	13 (68)	9 (82)
Mexican American	6 (43)	5 (26)	0
Multicultural	3 (21)	0	2 (18)
African American	0	1 (5)	0
Mean number of cigs/day prepregnancy	18	20	23
Mean number of cigs/day at interview 3 (3rd trimester)	0	1	18
Mean number of cigs/day at interview 9 (6 mo postpartum)	3	12	13

Cigs = cigarettes.

Table 2

Advantages of Breastfeeding Reported in Third Trimester of Pregnancy*

Reported Advantages	Number of Respondents No. (%)
Healthier for the baby, less sickness, good for immune system	29 (65)
Convenience (no preparation required, easier delivery for night feedings)	16 (36)
Encourages bonding with baby	9 (20)
Cheaper than formula	8 (18)
Helps mother lose weight	7 (16)
Good for baby's behavior/less colic	5 (11)
Decreases mother's cancer risk	3 (7)

* Multiple responses allowed.

Table 3

Duration of Any and Exclusive Breastfeeding by Smoking Category

Smoking Category	Quitters (<i>n</i> = 14) No. (%)	Harm Reducers (<i>n</i> = 19) No. (%)	Shifters (<i>n</i> = 11) No. (%)
Any breastfeeding	11 (78)	17 (89)	10 (91)
Exclusive breastfeeding			
1 mo postpartum	4 (37)	5 (26)	0
3 mo postpartum	2 (19)	4 (21)	2 (11)
6 mo postpartum	0	2 (11)	0

Table 4

Disadvantages of Breastfeeding*

Reported Disadvantages	Number of Respondents No. (%)
Demanding on mother, no freedom, entrapment	18 (41)
Embarrassment/shame in front of others	18 (41)
Pain and soreness	11 (25)
Physical discomfort (engorgement, clothes do not fit right, leakiness)	13 (30)
Work constraints on breastfeeding	6 (14)
Concern about breastmilk contaminated by smoking	6 (14)
Harder to lose weight (because cannot diet while breastfeeding)	4 (9)

* Multiple responses allowed.