

POSTPARTUM RELAPSE TO CIGARETTE SMOKING IN INNER CITY WOMEN

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Past studies suggest that African American women who quit smoking during pregnancy are more likely to relapse during the postpartum period than white women, although it is not intuitively clear why this should be the case. To shed further light on this issue, two studies were carried out to determine factors that influence smoking cessation during pregnancy and postpartum relapse to smoking in a predominantly low-income African American population. In Study 1, the women were asked to fill out a written survey, and in Study 2, women participated in a structured interview.

The same variables that influence smoking cessation and postpartum relapse in the general population, such as nicotine addiction levels, smoking by other members of the household, lack of social support, stress, weight gain, behavioral intentions to quit *temporarily*, and quitting for others, as opposed to one's self, influenced the behavior of low-income inner city residents. These findings suggest that the difference in rates of postpartum relapse to smoking in African American women and the general population is a matter of degree, rather than kind. The implications of these findings for understanding postpartum relapse in general and assisting low-income women in particular were discussed. (J Natl Med Assoc. 2003;95:461-474.)

Key words: cigarette smoking ♦ smoking cessation ♦ smoking relapse ♦ pregnancy ♦ postpartum period ♦ low-income women

The proportion of women of childbearing age in the United States who smoke is about 23%,¹ and 35% to 45% of them quit smoking during pregnancy, with the majority doing so on their own early in the course of pregnancy.² Unfortunately, up to 70% of women return to smoking within a year after delivery, with more

than half relapsing by six months postpartum.² The return to smoking places the mother at risk of tobacco-related disease and exposes the newborn to the adverse health effects of environmental tobacco smoke (ETS).³

Recent studies show that support from spouse and family, self-efficacy, and quitting smoking for themselves, not for others, decrease the likelihood of relapse, while the presence of other smokers in the home, inability to cope with stress, and intentions to quit smoking temporarily (e.g., intend to quit only for the duration of the pregnancy) may increase the probability of relapse.⁴⁻⁷ Other correlates associated with increased risk of postpartum relapse include African American race, multiparity, high maternal weight gain, late or no prenatal care, and stressful life events.⁴

Past studies^{4,5} suggest that African American women are twice as likely as Caucasians to return to smoking after delivery. However, little insight

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into why this may be the case was provided. We address this issue by determining whether variables known to influence postpartum relapse to smoking in the general population are the same ones that influence relapse in inner city African American and Hispanic women. To the extent that they are, the data would suggest that the differences in postpartum relapse rates among women of different racial/ethnic groups is a matter of degree, not of kind.

METHOD

Study 1: Postpartum Smoking Survey

Study Population

All mothers with infants, ages one year or less, were approached in succession by a Research Assistant (RA) in the waiting area of the New Jersey Medical School (NJMS) Pediatric Continuity Clinic and asked to participate in a tobacco survey. Women who (1) either reported that they never smoked cigarettes or that they smoked at least until the time of their most recent pregnancy, (2) were willing to provide informed consent to participate in the study, and (3) were willing to complete the Postpartum Smoking Survey (available in English and Spanish) were enrolled in the study.

Our goal was to recruit a total of 150 postpartum women from three categories: (1) women who never smoked; (2) women who quit smoking when they learned they were pregnant and remained abstinent until the time they were interviewed, and (3) women who either smoked throughout their pregnancy or quit during pregnancy but relapsed to smoking by the time they were contacted in the waiting area. While the relatively small sample size placed limitations on power to detect differences among the three groups, the sample size was sufficient to detect more robust between-group differences and to reveal trends in the data that could be followed-up by structured interviews in Study 2. To the extent that the different methodologies used in Studies 1 and 2 point to the influence of the same set of variables, the confidence one may place in the findings, despite the small sample sizes, may be enhanced many fold.

The Postpartum Smoking Survey

To inform survey development, brief interviews were carried out in the Continuity Clinic waiting area with African American women who gave birth within the past two years. The interviews included (1) women who smoked during pregnancy and afterwards; (2) women who quit smoking during pregnancy but relapsed during the postpartum period; and (3) women who quit smoking during pregnancy and remained abstinent after delivery, at least until the time of the interview. The women's responses, as well as an extensive review of the literature, informed the composition of the *Postpartum Smoking Survey*.

Mothers from each category were aware that smoking during pregnancy and afterwards may harm the developing fetus and the newborn baby, and they understood that they were putting their own health in jeopardy, as well. Key barriers to quitting smoking and remaining abstinent included craving for cigarettes, stress, weight gain, lack of support from family and friends, and other people smoking around them.

Topic areas covered by the *Postpartum Smoking Survey* included demographic characteristics, family tobacco use, past smoking behavior, past attempts to quit smoking, nicotine addiction, behavioral intentions, beliefs about the costs and benefits of smoking during and after pregnancy, and rules concerning ETS in the home and elsewhere. Pilot testing of the survey with women in the Continuity Clinic waiting area showed that the new mothers were able to understand the questions and answer them without difficulty.

Data Analysis

The study population was made up "never smokers," "ex-smokers" (those who quit smoking during pregnancy and did not relapse postpartum), and "current smokers" (those who smoked up to the time of their most recent pregnancy and either quit smoking during pregnancy and returned to smoking after birth of the baby or never quit smoking during pregnancy and continued to smoke during the postpartum period). The data for the two subgroups of current smokers were combined to increase the current smoker sample size for statistical purposes. In general, their responses to the survey were similar to one another. When differences were found, the data were analyzed and presented separately.

Table 1. DEMOGRAPHIC CHARACTERISTICS OF NEVER SMOKERS, EX-SMOKERS AND CURRENT SMOKERS

| FACTOR | NEVER SMOKERS (n = 89) | EX SMOKERS (n = 36) | CURRENT SMOKERS (n = 25) | ALL (n = 150) |
|--|-------------------------------------|----------------------------------|-------------------------------------|----------------------------|
| X Age (sd) | 24.1 (4.6) | 24.8 (6.4) | 23.2 (4.5) | 24.2 (5.1) |
| Ethnicity (percent) | | | | |
| White | 0 | 0 | 4.0 | 0.7 |
| African-American | 68.2 | 77.8 | 80.0 | 72.7 |
| Hispanic | 26.1 | 22.2 | 16.0 | 23.3 |
| Asian | 3.4 | 0 | 0 | 2.0 |
| Multiracial | 1.1 | 0 | 0 | 0.7 |
| Other | 1.2 | 0 | 0 | 0.6 |
| Education Level (percent) | | | | |
| Less than 12 Years | 23.3 | 25.7 | 54.2 | 28.8 |
| H. S. Diploma | 62.8 | 51.4 | 45.8 | 57.5 |
| Associates Degree | 3.5 | 11.4 | 0 | 4.8 |
| Bachelors Degree | 5.8 | 8.5 | 0 | 5.5 |
| Other | 4.6 | 2.0 | 0 | 3.4 |
| Marital Status (percent) | | | | |
| Never Married | 75.0 | 75.0 | 84.0 | 76.0 |
| Married | 25.0 | 19.4 | 8.0 | 21.4 |
| Divorced | 0 | 5.6 | 0 | 1.3 |
| Separated | 0 | 0 | 8.0 | 1.3 |
| Number of Children (sd) | 1.8 (1.2) | 1.9 (1.0) | 1.8 (1.1) | 1.8 (1.1) |
| Percent Who Drink Alcohol (percent) | 5.7 | 20 ¹ | 33.3 ² | 13.3 (60) ^{3,4,5} |

1. Odds Ratio = 4.2; 95% Confidence Interval = 1.2 – 14.1 (Referent is Never Smokers)

2. Odds Ratio = 8.3; 95% Confidence Interval = 2.4 – 28.6 (Referent is Never Smokers)

3. Percent of women (n= 10) who failed to stop smoking during pregnancy and postpartum who drink alcohol

4. Odds Ratio = 10.68; 95% Confidence Interval = 2.9 – 39.6 (Referent is Never Smokers)

5. Percent for participants who never quit (6/10)

Subgroup analyses showed that the responses of African American and other women (mostly Hispanic) were very similar to one another. Hence, their data were combined to increase the sample size. Descriptive statistics provided an overview of the data, while univariate analyses (analysis of variance [ANOVA] and chi-square) and logistic regression models were used to compare smoking behavior, knowledge, and beliefs of never smokers, current smokers, and ex-smokers.

Study 2: Structured Interview

Study Population

Fifty-four mothers of infants equal to or less than one year of age comprised four categories of participants: (A) never smokers; (B) current smokers-B (smoked during pregnancy and postpartum); (C) current smokers-C (quit smoking during pregnancy, relapsed postpartum); and (D) ex-smokers (quit smoking during pregnancy, remained abstinent postpartum). All women with infants were approached in succession in the Pediatric

Continuity Clinic, and eligible women were asked to provide informed consent and to participate in the interview, which was held in a private room.

Structured Interview

The interview consisted of a series of open-ended questions aimed at providing insight into factors that influence smoking during and after pregnancy. The women were encouraged to elaborate on their responses and to provide as much detail and as many examples as they wished. The interviews were conducted in English, and women who participated entered a lottery in which they could win a \$100 gift certificate.

Data Analysis

Responses to the open-ended questions were recorded and systematically analyzed to reveal major themes and issues. Where appropriate, ANOVA and the chi-square test of proportions were used to compare the performance of women in each category.

Table 2. SMOKING BEHAVIOR OF CURRENT AND EX SMOKERS

| | EVER SMOKERS | | EX SMOKERS | | CURRENT SMOKERS | |
|--|--------------|------|------------|-------------|-----------------|------------------------|
| | n | % | n | % | n | % |
| X Age Began Smoking (s.d.) | 16.7 (3.53) | | 24 | 16.8 (2.61) | 33 | (16) ¹ |
| Number of Cigarettes Smoked per day | | | | | | |
| 1 - 10 Cigarettes | 28 | 84.9 | | | 22 | 91. (50%) ¹ |
| 11 - 20 Cigarettes | 4 | 12.1 | | | 2 | 8.3 (40%) ² |
| 21 - 40 Cigarettes | 1 | 3.0 | | | 0 | 0 (10%) |
| > 40 Cigarettes | 0 | 0 | | | 0 | 0 |
| Brand of Cigarettes Smoked | | | | | | |
| | n | % | 35 | | 22 | |
| Newport | 32 | 91.4 | | | 21 | 95.5 |
| Marlboro | 2 | | | | 5.7 | 0 0 |
| Multiple Brands | 1 | 2.9 | | | 1 | 4.5 |
| Time to First Cigarette in the Morning | n | | 24 | | n | |

Table 3. COMPARISON OF REASONS FOR QUITTING SMOKING

| | CURRENT SMOKERS (n = 25) | EX SMOKERS (n = 36) | CHI-SQUARE² P-VALUE |
|--|--|-----------------------------------|---|
| Advice from Physician | 20.0% (30%) ¹ | 0.0% | 7.84 / .005 |
| Pressure from Spouse | 8.0% (20%) | 8.3% | .002 / .963 |
| Pressure from Family | 4.0% (10%) | 5.6% | .076 / .782 |
| Planning on Becoming Pregnant | 16.0% (20%) | 5.6% | 1.82 / .178 |
| Became Pregnant | 64.0% (100%) | 47.2% | 1.67 / .196 |
| Nausea/Morning Sickness | 20.0% (30%) | 0.0% | 7.84 / .005 |
| Worried About the Health of Baby | 36.0% (60%) | 22.2% | 1.39 / .238 |
| Concerned About Own Health | 16.0% (20%) | 44.4% | 5.42 / .020 |
| Concerned about other Children's Health | 16.0% (30%) | 16.7% | .005 / .945 |
| Breastfeeding the Baby | 20.0% (30%) | 11.1% | .927 / .336 |
| Cigarettes did not Taste Good | 16.0% (20%) | 16.7% | .005 / .945 |
| To Save Money | 20.0% (30%) | 19.4% | .003 / .627 |
| Returned to Work and Smoking not Allowed at Work | 4.0% (10%) | 0.0% | 1.46 / .226 |

1. Percentages for women who did not quit smoking during pregnancy or postpartum (n=10)

2. Chi-square compares Current Smokers (n=25) to Ex Smokers (n=36)

RESULTS

Study 1: Postpartum Smoking Survey

Demographic Characteristics

Less than 5% of the eligible women refused to participate, mostly nonsmokers who did not want to participate in a tobacco survey. The average time interval between the birth of the baby and the survey was similar for women in each category (Table 1). The mothers also were similar in age, race/ethnicity, education, marital status, and number of children. Logistic regression analysis, with "never smokers" as the referent group, showed that "ex-smokers" and "current smokers" were significantly more likely to report that they drink alcohol, with the highest percentage of drinkers occurring among the subgroup of women who did not stop smoking during pregnancy (60%; Table 1).

Smoking Behavior

Women in each category also were similar with respect to the number of cigarettes smoked per

day, age began smoking, and brand of cigarettes (Table 2). The majority of women smoked 10 or fewer cigarettes per day prior to becoming pregnant. Current smokers who did not stop smoking during pregnancy were significantly more likely to smoke 11 or more cigarettes per day than ex-smokers (Table 2). Almost 60% of the current smokers (80% for the subgroup of current smokers who did not quit smoking during pregnancy) reported that they smoked their first cigarette of the day within one-half hour of waking, and they also were significantly more likely than women in the other categories to report that they have a spouse/mate who smokes. Current smokers also reported a greater number of other household members who smoke than did women in the other categories (Table 2).

Reasons for Trying to Quit Smoking During Pregnancy and Postpartum

Table 3 shows reasons for trying to quit smoking for current and ex-smokers during pregnancy and postpartum. Women were

Table 4. REASONS CURRENT SMOKERS RETURNED TO SMOKING

| REASONS FOR RELAPSE | CURRENT SMOKERS (n = 15) | |
|--|--------------------------|-------|
| | n | % |
| To Lose Weight Gained During Pregnancy | 1 | 6.6% |
| To Relieve Fatigue and Boredom | 3 | 20.0% |
| Others' Smoking | 2 | 1.3% |
| Cravings | 5 | 33.3% |
| No Longer Pregnant | 13 | 86.6% |
| Stopped Breastfeeding My Baby | 4 | 66.6% |
| Difficulty Sleeping | 1 | 7.0% |
| Depression | 3 | 20.0% |
| Stress | 9 | 60.0% |
| Lack of Willpower | 1 | 6.6% |

instructed to select as many reasons for quitting that applied to them. The most frequent reasons given by current smokers for trying to quit smoking were *became pregnant* and *worried about the health of the baby*. For ex smokers, the most frequently endorsed reasons were *became pregnant* and *concerned about my own health*. Significantly more current smokers than ex-smokers endorsed *advice from physician* and *nausea/morning sickness* as reasons for quitting, while significantly more ex-smokers than current smokers endorsed *concern about my health* (Table 3). All of the women tried to stop smoking on their own, and only one mother reported using nicotine replacement therapy (data not shown).

Reasons for Returning to Smoking

Table 4 shows reasons why current smokers who stopped smoking during pregnancy returned

to smoking. Women endorsed as many reasons as they desired. Eighty-seven percent of the current smokers reported that they returned to smoking because they were no longer pregnant (Table 4). Other frequently endorsed reasons for relapse included *stress* (60%), *cravings* (33%), and *stopped breast-feeding* (27%). All of the current smokers returned to smoking within three months of giving birth (data not shown).

Beliefs About Smoking and Health

Table 5 shows beliefs about smoking during pregnancy and beyond. The referent group for the regression analyses was "never smokers." None of the odds ratios were statistically significant, although the percentages were of interest in their own right. While the majority of mothers in each category were aware of the adverse health effects of smoking during pregnancy, a surprisingly high proportion of them believed

Table 5. BELIEFS ABOUT SMOKING DURING PREGNANCY AND POSTPARTUM

| BELIEFS | NEVER SMOKERS (n=89) | EX SMOKERS (n=36) | CURRENT SMOKERS (n=25) |
|---|----------------------------|--------------------------------|-------------------------------|
| | % | % / ODDS ¹ RATIO | %/ ODDS ¹ RATIO |
| 1. A pregnant mother influences her baby's health via her lifestyle. | 91.5 | 97.2/3.37 | 87.5/0.65 |
| 2. Smoking during pregnancy hurts an unborn baby. | 95.2 | 97.2/1.75 | 95.8/1.15 |
| 3. A mother's lungs filter and protect a fetus from smoking. | 43.4 | 38.2/0.81 | 40.9/0.90 |
| 4. Smoking during pregnancy increases a baby's lung development. | 65.1 | 62.9/0.91 | 60.9/0.84 |
| 5. Mothers who smoke have larger babies. | 7.7 | 10.0/1.33 | 19.0/2.82 |
| 6. Children born to mothers who smoke are more prone to infection. | 68.8 | 54.8/0.55 | 57.1/0.60 |
| 7. Children born to mothers who smoke are more prone to sudden infant death syndrome. | 77.8 | 75.0/0.86 | 73.9/0.81 |
| 8. Children of mothers who smoke are more prone to respiratory distress. | 94.0 | 97.0/2.05 | 90.9/0.64 |
| 9. Children of mothers who smoke are more prone to behavioral disorders. | 39.7 | 33.3/0.76 | 23.8/0.47 |
| 10. Smoking after pregnancy is not harmful to infants and children. | 57.8 | 54.3/0.87 | 40.9/0.51 |
| 11. Breastfeeding can expose a baby to substances in cigarettes. | 95.2 | 91.2/0.52 | 81.8/0.23 |
| 12. Inhalation of secondhand smoke contributes to heart disease. | 90.1 | 84.8/0.61 | 72.7/0.29 |
| 13. Inhalation of secondhand smoke increases the risk of lung cancer. | 90.2 | 94.3/1.78 | 87.0/0.72 |
| 14. Inhalation of secondhand smoke protects children from asthma. | 15.0 | 5.9/0.35 | 21.7/1.57 |
| 15. Inhalation of secondhand smoke does not contribute to lung infections. | 46.3 | 34.5/0.61 | 56.5/1.51 |
| 16. Smoking after the baby is born no longer affects the baby's health. | 44.6 | 27.3/0.47 | 39.1/0.80 |

1. Referent is Never Smokers

Table 6. RULES ON ENVIRONMENTAL TOBACCO SMOKE (ETS)

| RULES | NEVER SMOKERS | EX SMOKERS | CURRENT ¹ SMOKERS |
|---|---------------|-----------------------------|------------------------------|
| | (n = 89) | (n = 36) | (n = 25) |
| | % | % / ODDS ¹ RATIO | % / ODDS ¹ RATIO |
| 1. Home rule: Only adults can smoke unrestricted | 17.0 | 13.9/0.79 | 36.0/2.74 |
| 2. Home rule: Adults can smoke in certain areas/times | 19.3 | 16.7/0.84 | 36.0/2.35 |
| 3. Home rule: Adults can smoke away from children | 38.6 | 33.3/0.79 | 56.0/2.02 |
| 4. Home rule: Children can smoke unrestricted | 1.1 | 0 | 8.0/7.57 |
| 5. Home rule: Children can smoke in certain areas/times | 0 | 0 | 4.0/3.63 |
| 6. Home rule: Children can smoke but not around guests | 1.1 | 0 | 4.0/3.63 |
| 7. Home rule: Children can smoke but not around young children | 1.1 | 0 | 4.0/3.63 |
| 8. Home rule: No smoking | 61.4 | 77.8/2.20 | 40.0/0.42 |
| 9. Rule: No smoking in the car | 43.2 | 63.9/2.33 | 52.0/1.43 |
| 10. Rule: No smoking in children's room | 56.8 | 69.4/1.72 | 80.0/3.04 |
| 11. Rule: Ask people not to smoke in presence | 53.4 | 63.9/1.54 | 52.0/0.95 |
| 12. Rule: Ask to sit in no smoking section in restaurant | 51.1 | 55.6/1.19 | 40.0/0.64 |
| 13. Rule: Ask people to smoke outside, not in home | 67.0 | 77.8/1.72 | 72.0/1.26 |
| 14. Rule: Ask people not to smoke around small children and infants | 71.6 | 75.0/1.19 | 72.0/1.02 |

1. Referent is Never Smokers

that smoking after pregnancy is not harmful to infants and children, that inhalation of second-hand smoke does not contribute to lung infections in newborns and children, and a *mother's lungs filter and protect a fetus from smoking*. About 60% of the mothers in each category agreed that *smoking during pregnancy increases a baby's lung development*.

Environmental Tobacco Smoke (ETS)

Table 6 shows rules about smoking in the home

and elsewhere. The referent group for the regression analyses was "never smokers." While none of the odds ratios reached statistical significance, the comparisons are in the expected directions, with current smokers being most likely to permit smoking in the home and never smokers and ex-smokers being least likely. However, current smokers and ex-smokers were as likely as never smokers to ask people not to smoke around small children and infants (Table 6).

Study 2: Structured Interview

Demographic Characteristics

Fewer than 5% of the new mothers approached in the waiting area did not agree to take part in the structured interview. Table 7 shows that the average interval of time between the birth of the baby and the structured interview was similar for mothers in each of the four categories. The women in each group also were of similar age, race, and educational level. Most were African American or Hispanic, between 23 and 25 years of age, and high school graduates (Table 7). Data for women in each racial/ethnic group were combined to increase the sample size and because their responses were similar to one another.

Smoking History

Twenty seven per cent of the never smokers reported that they lived with a smoker, compared to 50%, 67%, and 50% of participants in the other categories (Table 7). The differences between groups failed to achieve statistical significance, although the direction of the data is consistent with the survey data presented in Study 1. Typically, the other smoker in the home was a spouse/mate or another relative (teenager, parent, grandparent, aunt, etc.). Several women reported that they lived in someone else's home, with that person often being a smoker.

Analysis of variance showed that women who smoked during pregnancy and postpartum smoked significantly more cigarettes per day before and after the baby was born than women in the other categories (Table 7). They also began smoking earlier in life and were more likely to smoke their first cigarette of the day within a half an hour of waking, although differences between groups did not quite achieve statistical significance ($F=2.92$, $df = 2$, $p = .0670$ for the former comparison; $\chi^2 = 5.4616$, $p = .065$ for the latter comparison). Women who reported stopping smoking during pregnancy did so as soon as they learned they were pregnant (data not shown), and the average time to relapse during the postpartum period for women who returned to smoking after the baby

was born was five weeks, with one mother reporting that she returned to smoking the very first day she left the hospital.

Thoughts About Smoking During Pregnancy and Postpartum

Responses to questions 1, 5, and 6 of Table 8 suggest that most women in each category were aware that their smoking, as well as other's smoking, may adversely affect the health and vitality of the fetus, the health of the newborn and other children, and their own health. Many of the women stated that cigarette smoking during pregnancy and afterwards may lead to respiratory problems and asthma, with several mothers actually stating that the child may *catch* asthma because of their smoking. Fewer mothers seemed to know that cigarette smoking during pregnancy may increase the risk of low birth weight, birth defects, pre-term delivery, and abortion (see question 1) and that postpartum smoking may increase the risk of sudden infant death and ear infections (question 5). Mothers who quit smoking during pregnancy and remained abstinent were most likely to report that stopping smoking may lead to better health (90%) and to lowered risk of cancer (70%) (Table 8).

Women who smoked during pregnancy were most likely to report that they were not able to quit smoking because of cravings and nicotine withdrawal (Table 8). However, the chi-square test of proportions failed to achieve statistically significant levels, probably due to the small sample size. The actual responses of woman who were not able to quit during pregnancy and afterwards were quite telling: "*It is a crazy habit. I just can't do it. I crave it all of the time, and I just can't do without them*"; "*My mom smokes, and I crave cigarettes whenever I cut down*"; "*Cravings and gaining weight are my two biggest obstacles*"; "*I am addicted*"; "*I wake up during the night and smoke because I crave it.*"

The majority of the women who quit smoking during pregnancy reported that they did not

Table. 7 CHARACTERISTICS OF WOMEN WHO (A) NEVER SMOKED, (B) SMOKED DURING PREGNANCY AND POSTPARTUM, (C) QUIT SMOKING DURING PREGNANCY, RELAPSED POSTPARTUM, AND (D) QUIT SMOKING DURING PREGNANCY, REMAINED ABSTINENT POSTPARTUM

| | A | B | C | D |
|--------------------------------------|---------------------|---|---|---|
| | NEVER SMOKED | SMOKED DURING PREGNANCY AND POSTPARTUM | QUIT SMOKING DURING PREGNANCY, RELAPSED POSTPARTUM | QUIT SMOKING DURING PREGNANCY, REMAINED ABSTINENT POSTPARTUM |
| n | 15 | 13 | 16 | 10 |
| X TIME SINCE BIRTH (MONTHS) | 3.87 (1.77) | 4.25 (5.22) 1 | 5.44 (4.44) | 2.90 (2.69) |
| X AGE (YEARS) | 22.87 (2.53) | 24.33 (7.63) | 25.06 (6.74) | 23.60 (5.56) |
| RACE | | | | |
| AFRICAN-AMERICAN | 11 (73%) | 12 (92%) | 13 (81%) | 8 (80%) |
| HISPANIC | 3 (20%) | 1 (8%) | 3 (20%) | 2 (20%) |
| OTHER | 1 (7%) | -- | -- | -- |
| EDUCATION | | | | |
| 1-8 GRADE | 1 (7%) | 3 (23%) | 1 (7%) | 4 (40%) |
| 9-12 GRADE | 9 (60%) | 9 (69%) | 11 (69%) | 6 (60%) |
| > 12 GRADE | 5 (33%) | 1 (8%) | 4 (27%) | -- |
| OTHER SMOKERS IN THE HOME | | | | |
| YES | 4 (27%) | 7 (54%) | 11 (69%) | 5 (50%) |
| NO | 11 (73%) | 6 (46%) | 5 (33%) | 5 (50%) |
| X CIG/DAY (BEFORE PREGNANCY)2 | -- | 12.5 (5.74) | 6.75 (4.68) | 6.10 (2.96) |

encounter any obstacles to stopping smoking (Table 8). As in Study 1, women in each category were aware of the adverse health effects of ETS and the benefits of creating a smoke-free household (Table 8, question 10). They were aware that a smoke-free household would be good for the health of the occupants, and many of the mothers volunteered that the house and its contents would smell better. Ninety-one percent of the women who smoked throughout pregnancy and postpartum indicated that creating a smoke-free household was a good idea, *but* they had a variety of reasons for not creating one: *"My aunt would not go along with it"; "I could not put someone out in the cold"; "It is not my house."* Never smokers and ex-smokers were significantly more likely than current smokers to report that their home already was smoke-free (Table 8). Several stated that they *felt passionate* about maintaining a smoke-free home for their baby.

Among women who stopped smoking during pregnancy and relapsed, the most common reasons given for returning to smoking were stress, other people's smoking, and other (e.g., *"the smell of cigarettes no longer bothered me"; "I only gave it up for my baby"; "I missed it. I like to smoke"*). Two of the women stated that they intended to stop smoking only during pregnancy in the first place (Table 8).

Few of the current smokers were ready to try to stop smoking again (Table 8). In contrast, the majority of ex-smokers reported that nothing would cause them to return to smoking. Most current smokers believed that a doctor could assist them by providing counseling, advice, and nicotine replacement therapy, while 78% of ex-smokers believed that in order to succeed, they must do it on their own (*"My doctor can't help. He could tell me that I shouldn't smoke, but I must tell myself that"; "I don't know. I need to want it for myself. I'm doing it for myself"; "The doctor can't help. It's my choice"; I don't know. If I didn't want to quit, the doctor could not help"*) (Table 8).

DISCUSSION

The population of patients served by the NJMS Pediatric Continuity Clinic is made up largely of low income African Americans and Hispanics. Prior and more extensive surveys of the clinic population⁸ showed that only 28% of the parents had a high school education, only 23% were married, and 80% had an income of \$20,000 per year or less. Forty eight percent had an annual income equal to or less than \$10,000. Thirty six percent of the parents smoked cigarettes, and 55% of the households had at least one smoker.⁸ The demographic characteristics of the women in studies 1 and 2 are consistent with this clinic profile, providing an important perspective for understanding their health behavior.

The impetus for studying factors that influence smoking cessation and relapse during pregnancy and postpartum in our population was the report of the PRAMS Working Group that African American women were almost twice as likely as Caucasian women to return to smoking after they gave birth, despite the fact that African American women smoked fewer cigarettes per day than Caucasians.⁴ While our sample will not permit direct comparisons between African Americans and Caucasians, it is possible to determine if the kinds of variables which control smoking cessation and relapse during pregnancy and postpartum in the NJMS Pediatric Continuity Clinic sample are similar to the factors that influence the general population. Our findings suggest that the similarities far outweigh the differences.

Current smokers in studies 1 and 2 were more likely than ex-smokers to be addicted smokers. They smoked more cigarettes per day and smoked their first cigarette earlier in the day than ex-smokers. Their responses to questions about obstacles to smoking cessation were replete with references to being addicted to nicotine.

That addicted smokers have a more difficult time stopping smoking than other smokers is not new to the literature on smoking cessation during pregnancy⁹ or otherwise.¹⁰ While African

American women tend to smoke fewer cigarettes per day than Caucasians, their lower rate of smoking does not necessarily mean that they are less addicted or will have an easier time stopping smoking. African Americans may begin smoking earlier in the day, are more likely to increase their smoking on weekends, are more likely to smoke high tar and nicotine brands, and are more likely to smoke menthol cigarettes than Caucasian women.¹⁰ The latter may enable African American women to inhale cigarettes more easily and deeply than their Caucasian counterparts, enabling them to extract more nicotine from cigarettes.¹¹ African American smokers also may metabolize nicotine differently than Caucasians, a factor which may make African Americans more susceptible to nicotine addiction.¹²

Stress, alcohol intake, and other smokers in the home also play an important role in adversely influencing smoking cessation during pregnancy and increasing the risk of postpartum relapse. These factors may be particularly potent in the inner city. Referral for group or individual counseling may be indicated. However, such help most often is unavailable in inner city settings. Indeed, none of the women evaluated in studies 1 or 2 received formal assistance in stopping smoking or remaining cigarette-free.

Many women who returned to smoking after giving birth never intended to quit smoking for good. The theme, *never having quit*, has been described previously for smokers from all walks of life.¹³ In Study 2, several women stated that they never intended to remain abstinent after their baby was born, while others indicated that they quit smoking for other's sake, not their own. When asked to identify reasons why they returned to smoking after delivery, 87% and 67% of current smokers in Study 1 endorsed *because no longer pregnant* and *stopped breastfeeding my baby*, respectively.

In Study 1, current smokers were significantly more likely than ex-smokers to endorse *advice from physician* as a reason for quitting, and in

Study 2, those who failed to quit during pregnancy or relapsed to smoking afterwards were more likely than women who quit and remained abstinent to look to others, such as their physician, for support and assistance. Ex-smokers were more likely than current smokers to believe that the key to success must come from within. They endorsed concern about their own health as a key reason for stopping smoking and they placed the responsibility for stopping smoking squarely on their own shoulders.

These findings should not be misconstrued as suggesting that physicians do not have a significant and important role to play in helping women, pregnant or otherwise, stop smoking. Rather, health care providers should strive to foster a sense of self-efficacy, encourage smokers to draw upon inner strength and values, and explore benefits that women, as well as their babies, may gain when they stop smoking and remain abstinent.

The idea of stopping smoking temporarily for nine months or more may sound counter intuitive, if not impossible. Yet, experience shows that smokers are able to stop smoking for an extended period of time on a temporary basis. Teachers often do not smoke during the school day, while others may stop for the Sabbath or Lent. Tolerance to nicotine may be re-established very quickly after a prolonged period of abstinence,¹⁴ and it is not unusual for former smokers to quickly resume smoking at high rates after long periods of abstinence.

The issue of who stops smoking and remains abstinent and who does not is not solely one of knowledge or beliefs about the harmful effects of smoking during pregnancy and afterwards. While women in each of the categories in studies 1 and 2 were aware that smoking may harm their baby, they also harbored unrealistic and false beliefs, such as "*A mother's lungs filter and protect a fetus from smoking*" and "*Smoking during pregnancy increases a baby's lung development.*" Since women in each smoking category endorsed similar beliefs, one could hardly

Table 8. RESPONSES TO OPEN ENDED QUESTIONS ABOUT SMOKING DURING PREGNANCY AND POSTPARTUM FOR WOMEN IN CATEGORIES A, B, C, AND D

| | A | | B | | C | | D | |
|---|--------------|----|--|----|--|----|--|-----|
| | NEVER SMOKED | | SMOKED DURING PREGNANCY AND POSTPARTUM | | QUIT SMOKING DURING PREGNANCY, RELAPSED POSTPARTUM | | QUIT SMOKING DURING PREGNANCY, REMAINED ABSTINENT POSTPARTUM | |
| | (n=15) | % | (n=13) | % | (n=16) | % | (n=10) | % |
| | n | | n | | n | | n | |
| 1. IN WHAT WAY MAY A MOTHER'S SMOKING AFFECT THE HEALTH AND VITALITY OF THE FETUS? | | | | | | | | |
| 1. Respiratory Problems/Asthma | 8 | 53 | 11 | 85 | 13 | 81 | 8 | 80 |
| 2. Birth Defect | 8 | 53 | 3 | 23 | 6 | 38 | 4 | 40 |
| 3. Premature Birth, Abortion, Still Birth | 4 | 27 | 2 | 15 | 2 | 13 | 2 | 20 |
| 4. Low Birth Weight | 1 | 7 | 4 | 31 | 5 | 31 | 5 | 50 |
| 5. Baby Born Addicted | 1 | 7 | 3 | 23 | -- | -- | 1 | 10 |
| 6. Other Health Problems | 2 | 14 | 3 | 23 | 5 | 31 | 1 | 10 |
| 2. WHAT OBSTACLES WOULD YOU FACE IF YOU WANTED TO STOP SMOKING DURING MOST RECENT PREGNANCY? | | | | | | | | |
| 1. Addiction | -- | -- | 7 | 54 | 2 | 13 | 1 | 10 |
| 2. Other's Smoking | -- | -- | 3 | 23 | -- | -- | -- | -- |
| 3. Stress | -- | -- | 1 | 8 | 1 | 6 | 1 | 10 |
| 4. Weight Gain | -- | -- | 2 | 15 | 1 | 6 | -- | -- |
| 5. Other | -- | -- | 1 | 8 | -- | -- | -- | -- |
| 6. None | -- | -- | -- | -- | 12 | 75 | 8 | 80 |
| 3. WHAT ARE YOUR THOUGHTS ABOUT STOPPING SMOKING NOW? | | | | | | | | |
| 1. Would Like to Quit--But | -- | -- | 7 | 54 | 7 | 44 | -- | -- |
| 2. Not Now | -- | -- | 6 | 46 | 4 | 25 | -- | -- |
| 3. Do Not Think About it | -- | -- | -- | -- | 3 | 19 | -- | -- |
| 4. Would be Good for the Baby | -- | -- | -- | -- | 3 | 19 | -- | -- |
| 4. WHY DID YOU RETURN TO SMOKING FOLLOWING MOST RECENT PREGNANCY? | | | | | | | | |
| 1. Stopped for Pregnancy | -- | -- | -- | -- | 2 | 13 | -- | -- |
| 2. Stress | -- | -- | -- | -- | 5 | 31 | -- | -- |
| 3. Other's Smoking | -- | -- | -- | -- | 5 | 31 | -- | -- |
| 4. Other | -- | -- | -- | -- | 5 | 31 | -- | -- |
| 5. WHY MIGHT STOPPING SMOKING NOW BE IMPORTANT FOR YOUR BABY'S HEALTH? | | | | | | | | |
| 1. Fewer Respiratory/Asthma Problems | 12 | 80 | 6 | 46 | 6 | 38 | 10 | 100 |
| 2. Fewer Ear Infections | 1 | 7 | 1 | 8 | -- | -- | -- | -- |
| 3. Fewer Health Problems (General) | 6 | 40 | 5 | 38 | 3 | 19 | 3 | 30 |
| 4. Decreased Cancer Risk | 3 | 20 | 1 | 8 | 1 | 6 | 2 | 20 |
| 5. Would Not Set a Bad Example | 1 | 7 | 2 | 15 | 2 | 13 | -- | -- |
| 6. Cleaner Air | -- | -- | 3 | 23 | 2 | 13 | -- | -- |
| 7. I Would Be There for Them | 1 | 7 | -- | -- | 3 | 19 | -- | -- |
| 8. Do Not Know | -- | -- | 1 | 8 | 2 | 13 | -- | -- |
| 6. WHAT MIGHT YOU GAIN BY STOPPING SMOKING? | | | | | | | | |
| 1. Better Health | -- | -- | 8 | 62 | 9 | 56 | 9 | 90 |
| 2. Lower Risk of Cancer | -- | -- | 4 | 31 | -- | -- | 7 | 70 |
| 3. Smell Better (Breath, Clothes, House) | -- | -- | 2 | 15 | 2 | 13 | 10 | 100 |
| 4. Save Money | -- | -- | 4 | 31 | 3 | 19 | 1 | 10 |
| 5. Nothing | -- | -- | 1 | 8 | 3 | 19 | -- | -- |
| 7. WHAT WOULD YOU LOSE BY STOPPING SMOKING NOW? | | | | | | | | |
| 1. Nothing | -- | -- | 12 | 92 | 14 | 88 | 10 | 100 |
| 2. Inability to Cope with Stress | -- | -- | 1 | 8 | 2 | 13 | -- | -- |
| 3. Pleasure | -- | -- | -- | -- | 1 | 6 | -- | -- |
| 4. My "Shape" | -- | -- | 1 | 8 | -- | -- | -- | -- |
| 8. HOW CAN THE DOCTOR BE OF ASSISTANCE? | | | | | | | | |
| 1. Advice/Counseling | -- | -- | 4 | 31 | 2 | 13 | 2 | 20 |
| 2. Pharmacologic Aids | -- | -- | 9 | 69 | 6 | 46 | -- | -- |
| 3. Referral | -- | -- | -- | -- | 1 | 13 | -- | -- |
| 4. Must Stop on My Own | -- | -- | -- | -- | 6 | 46 | 8 | 80 |
| 5. Do Not Know | -- | -- | 2 | 15 | 3 | 19 | -- | -- |
| 9. WHAT MIGHT CAUSE YOU TO RETURN TO SMOKING? | | | | | | | | |
| 1. Nothing | -- | -- | -- | -- | -- | -- | 7 | 70 |
| 2. Stress | -- | -- | -- | -- | -- | -- | 1 | 10 |
| 3. Drinking | -- | -- | -- | -- | -- | -- | 1 | 10 |
| 4. Peer Pressure | -- | -- | -- | -- | -- | -- | 1 | 10 |
| 10. HOW DO YOU FEEL ABOUT CREATING A SMOKE-FREE HOUSEHOLD? | | | | | | | | |
| 1. Home Already Smoke-Free | 13 | 87 | 2 | 15 | -- | -- | 8 | 80 |
| 2. Good--But | 2 | 17 | 10 | 77 | 2 | 18 | -- | -- |
| 3. Better Health | 13 | 87 | 8 | 62 | 12 | 75 | 7 | 70 |
| 4. House Will Smell Better | 12 | 80 | 6 | 46 | 5 | 31 | 6 | 60 |

account for differences in ability to quit smoking and remain abstinent on the basis of knowledge and beliefs alone.

Despite limited knowledge and faulty beliefs, a fairly large proportion of never smokers and ex-smokers indicated that their homes were smoke-free, and they take special measures to protect their children from ETS outside of the home. Many current smokers also indicated that they attempt to protect their children from ETS, and many of those who do not, indicated that they would if they could. Unfortunately, in addition to their own smoking behavior, many of the subjects face obstacles caused by other people's smoking.

In summary, the variables that influence smoking cessation and abstinence in low-income African American and Hispanic women appear to be the same as those that influence smoking and smoking cessation in the population as a whole. It is possible, that life in the inner city places additional burdens on low-income African American and Hispanic women. The stresses and strains of everyday life, key obstacles to cessation and abstinence, may be experienced more intensely among urban poor than among higher income groups. While future studies may yet reveal other reasons why African American women are more likely than Caucasian women to relapse during the postpartum period, by addressing the factors described in studies 1 and 2, health care providers, public health advocates, and community leaders may narrow the putative disparity between African American and Caucasian women and increase the likelihood that all women can achieve a smoke-free lifestyle for themselves as well as their families.

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