A Community Health Center Smoking-Cessation Intervention for Pregnant and Postpartum Women

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Objectives: To evaluate the effect of a provider counseling and office systems intervention in obstetric, pediatric, and Special Supplemental Nutrition Program for Women, Infants and Children (WIC) clinics on smoking and relapse rates in pregnant and postpartum women.

Methods: Five community health centers were randomized to special intervention (SI) or usual care (UC). Subjects (n =601) were current smokers or had quit with pregnancy. Prenatal and postpartum interviews assessed smoking status and related factors. Data were collected between May 1997 and November 2000.

Results: There was a statistically significant difference in 30-day abstinence rates between SI (26%) and UC (12%) conditions at the end of pregnancy among women who had not quit spontaneously with pregnancy (odds ratio [OR]=2.57, p =0.05). This effect remained at 1 month postpartum but was lost at 3- and 6-month postpartum follow-ups.

Conclusions: Brief interventions delivered by healthcare providers during routine prenatal care increased smoking abstinence during pregnancy among women who did not quit spontaneously. Interventions extended into postpartum care did not affect relapse and smoking rates postdelivery.

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Introduction

Cigarette smoking during pregnancy and the postpartum period is recognized as one of the most modifiable causes of fetal and infant morbidity and mortality in the United States.[1,2] Unfortunately, cigarette smoking during pregnancy continues to be a major public health concern. Although some women spontaneously quit smoking after learning of their pregnancy, the majority do not quit during pregnancy or postpartum. In a survey of 18- to 44-year-old women, 15% reported smoking during their most recent pregnancy.[3] In another national survey of 15- to 44-year-old women, 21% reported smoking during their last pregnancy.[4] In the current study, only 28% of women aged 14 to 45 reported quitting upon learning of their pregnancy.[5] White, unmarried, low-income women with less than a high school education have the highest rate of smoking during pregnancy,[3,4,6] resulting in especially high risk for tobacco-related harm.[7]

Although smoking rates during pregnancy have declined, postpartum relapse continues to be as high as 50% to 70%.[6,8] Addressing cessation and relapse prevention continues to be an important national health objective.[9] Behavioral interventions are efficacious in reducing smoking rates during pregnancy,[10–13] although absolute quit rates rarely exceed 20%.[14,15] Studies suggest that postpartum relapse may be delayed but not prevented, even in women who had spontaneously quit prior to any cessation treatment.[16–18] Interventions are needed that will both promote cessation during pregnancy and help spontaneous and intervention-assisted quitters remain abstinent postpartum.[19] Indeed, studies combining prenatal cessation and postpartum relapse intervention have shown promise.[20,21] Most studies, however, utilized trained research personnel to deliver treatment. This approach is not easily translated into the real world of busy prenatal and postpartum care settings with limited resources to support additional personnel.

An intervention in which existing healthcare providers deliver tobacco treatment may improve patient compliance with treatment, minimize costs compared to interventions using adjunct personnel, and endure after the research study has been completed. Therefore, an intervention was developed that trained health-

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care providers to deliver smoking treatment within the context of routine prenatal and postpartum care at community health centers (CHCs). CHCs provide comprehensive care to low-income pregnant and postpartum women that includes a number of supplemental services (i.e., social welfare, nutrition programs, transportation, outreach, and health education) in addition to medical care.[22]

This article reports the effectiveness of a health center–based intervention trial on smoking-cessation rates at delivery and postpartum among women who participate in the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) and receive their care in CHCs.

Setting, Intervention, and Training Program

Six CHCs in the greater Boston, Massachusetts, area with on-site WIC programs, prenatal and pediatric services, and patients of diverse race and ethnicity participated in the Quit Together (QT) study. Sites were randomized to either a special intervention (SI) or usual care (UC) condition, in which no training or intervention occurred. One control site was dropped due to low recruitment.

The intervention consisted of three components: (1) provider training to deliver a smoking intervention based on national clinical practice guidelines[23] tailored to the woman's stage of change and delivered through three channels (obstetric, pediatric, and WIC providers); (2) an office practice management system to routinely screen for smoking status, prompt/remind providers to intervene, document the encounter, distribute materials, and arrange follow-up; and (3) establishment of program boards to coordinate the transfer of documentation among clinics, including periodic meetings with representatives from all clinics.

Providers in all three channels were taught common intervention objectives: (1) deliver clear quit messages; (2) legitimize concern about smoking; (3) increase confidence/self-efficacy in ability to stop smoking by providing information, support, and assistance in developing skills to quit; (4) offer assistance, including supplementary materials; and (5) elicit a commitment to stop smoking or maintain abstinence. Providers were instructed to follow an algorithm based on the four A's (ask, advise, assist, and arrange) recommended by the Agency for Healthcare Policy and Research (now the Agency for Healthcare Quality and Research) in clinical practice guidelines, and to assess motivation to quit and to tailor assistance accordingly. This approach is consistent with the revised tobacco-dependence treatment guideline that recommends the assessment of motivation as a fifth element of the algorithm.[24]

An initial group training session consisting of didactic presentations and practice using the intervention algorithm was held separately for obstetric, pediatric, and WIC providers. The training for WIC providers also included information on the impact of smoking on nutrition and breast-feeding, and managing weight while quitting. Providers discussed their personal barriers to and potential strategies for implementing the intervention in their daily practices. They were given support materials including the practice guideline and patient materials in both English and Spanish. Providers unable to attend the initial training and all subsequent new hires received individual training. Approximately 2 months after initial training, each provider received individual coaching and feedback on the intervention protocol. The intervention coordinator attended clinic staff meetings to review and reinforce intervention delivery throughout the study and oversaw each program board.

Methods

Subjects and Data Collection

The Institutional Review Board of the University of Massachusetts Medical School approved all subject recruitment and data collection procedures. Women receiving prenatal care and WIC services and planning to receive pediatric care at one of the CHCs were eligible to participate. Research assistants screened women in the WIC offices for additional eligibility, which included speaking English or Spanish, having at least 2 months before their due date, being a current smoker or spontaneous quitter (quit smoking after learning of pregnancy), and planning to remain in the area for at least 6 months following delivery. The majority of participants were enrolled prior to their first prenatal WIC appointment, and all participants signed an informed consent.

Data were collected from participants at five time points: (1) baseline interview upon enrollment, (2) 9-month interview before delivery, (3) 1-month postpartum interview within 30 days after delivery, (4) 3-month postpartum interview, and (5) 6-month postpartum interview. Interviews after baseline were planned to be conducted at the WIC office in conjunction with regular appointments. Sixty-day interview windows allowed for variable scheduling of appointments.

Interviews were conducted or completed by telephone if a window would have ended prior to the next appointment or the participant could not complete the interview at the time of the appointment. Participants received a gift certificate to a local grocery store for each interview completed. Respondents reporting abstinence in the 7 days prior to the interview were asked to provide a saliva sample for biochemical validation via cotinine assay. For telephone interviews, participants were asked to come to the WIC office to provide the saliva sample. Data were collected from May 1997 to November 2000.

Measures

Selection of survey items was guided by empirical evidence, constructs in social cognitive theory,[25] items included in the Robert Wood Johnson Foundation (RWJF) Smoke-Free Families Initiative core survey,[26] and formative research. Variables hypothesized to affect smoking included individual factors (demographic/personal characteristics, attitudes and perceptions, and smoking variables) and environmental context

Table 1. Selected characteristics of SI and UC groups at baseline (N=550)

Characteristics	SI (*n*=272) *n*(%)		UC (*n*=278) *n*(%)		*p* value[a]
Personal characteristics					
Race/ethnicity					
White, non-Hispanic	62	(22.8)	228	(78.6)	0.15 (White vs others)
Black, non-Hispanic	106	(39.0)	5	(1.8)	
Hispanic, any race	75	(27.6)	30	(10.9)	0.68 (Hispanic vs black and others)
Others	29	(10.7)	13	(4.7)	
Marital status					0.51
Married/living with partner	85	(31.3)	109	(39.2)	
Not married	187	(68.8)	169	(60.8)	
Born in United States					0.47
No	40	(14.7)	31	(11.2)	
Yes	232	(85.3)	247	(88.9)	
Education					0.24
High school	145	(53.3)	105	(37.8)	
<High school	127	(46.7)	173	(62.2)	
Currently working for pay					0.27
No	198	(74.4)	185	(67.3)	
Yes	68	(25.6)	90	(32.7)	
Age, mean (SD)	25.65	(6.1)	25.80	(6.4)	0.81
Language spoken					0.62
English	234	(86.0)	265	(95.3)	
Other	38	(13.8)	13	(4.7)	
Insurance/entitlements					0.61
Medicaid	169	(65.5)	173	(63.1)	
Other	89	(34.5)	101	(36.9)	
Health center					
A	144	(100.0)	—		
B	82	(100.0)	—		
C	36	(100.0)	—		
D	—		112	(100.0)	
E	—		166	(100.0)	
Pregnancy history					
Week of pregnancy, mean (SD)	16.45	(7.8)	15.73	(7.5)	0.48
Number of previous births					0.26
0	116	(43.3)	138	(49.8)	(0 vs ≥1)
1	61	(22.8)	62	(22.4)	
≥2	91	(34.0)	77	(27.8)	
Smoking status					0.94
Smokers	191	(70.2)	201	(72.3)	
Spontaneous quitters	81	(29.8)	77	(27.7)	
Tobacco addiction					
Cigarettes/day prior to pregnancy	14.89	(11.50)	18.43	(11.63)	0.69
Time to first cigarette after waking, prior to pregnancy					
<5 minutes	101	(37.7)	94	(34.1)	
6–30 minutes	74	(27.6)	93	(33.7)	0.59
31–59 minutes	15	(5.60)	16	(5.8)	(≤30 mins vs >30 mins)
1–2 hours	47	(17.5)	34	(12.3)	
>2 hours	31	(11.6)	39	(14.1)	

[a]*p* values are from the proc mixed procedure, fitting patient's characteristics variables as dependent variables, intervention group as independent variable, and controlling for the health center nested within the intervention group.
SD, standard deviation; SI, special intervention; UC, usual care.

factors (smokers among friends and family and social support).[27] Priority was given to measures with the greatest potential for predictive power and specificity for use in planning and evaluating smoking interventions. Cognitive pretesting of the instrument was conducted in a WIC program not participating in the study, and items were refined.

A subset of these measures is reported in Table 1, and briefly summarized here.

- Personal characteristics included demographic measures, healthcare measures (insurance/entitlements and setting of care) and pregnancy history.
- Tobacco use variables included smoking status, number of cigarettes smoked, and time to smoking their first cigarette after waking, prior to pregnancy.
- Smoking outcome measures were smoking status at the end of pregnancy and 1, 3, and 6 months postpartum.

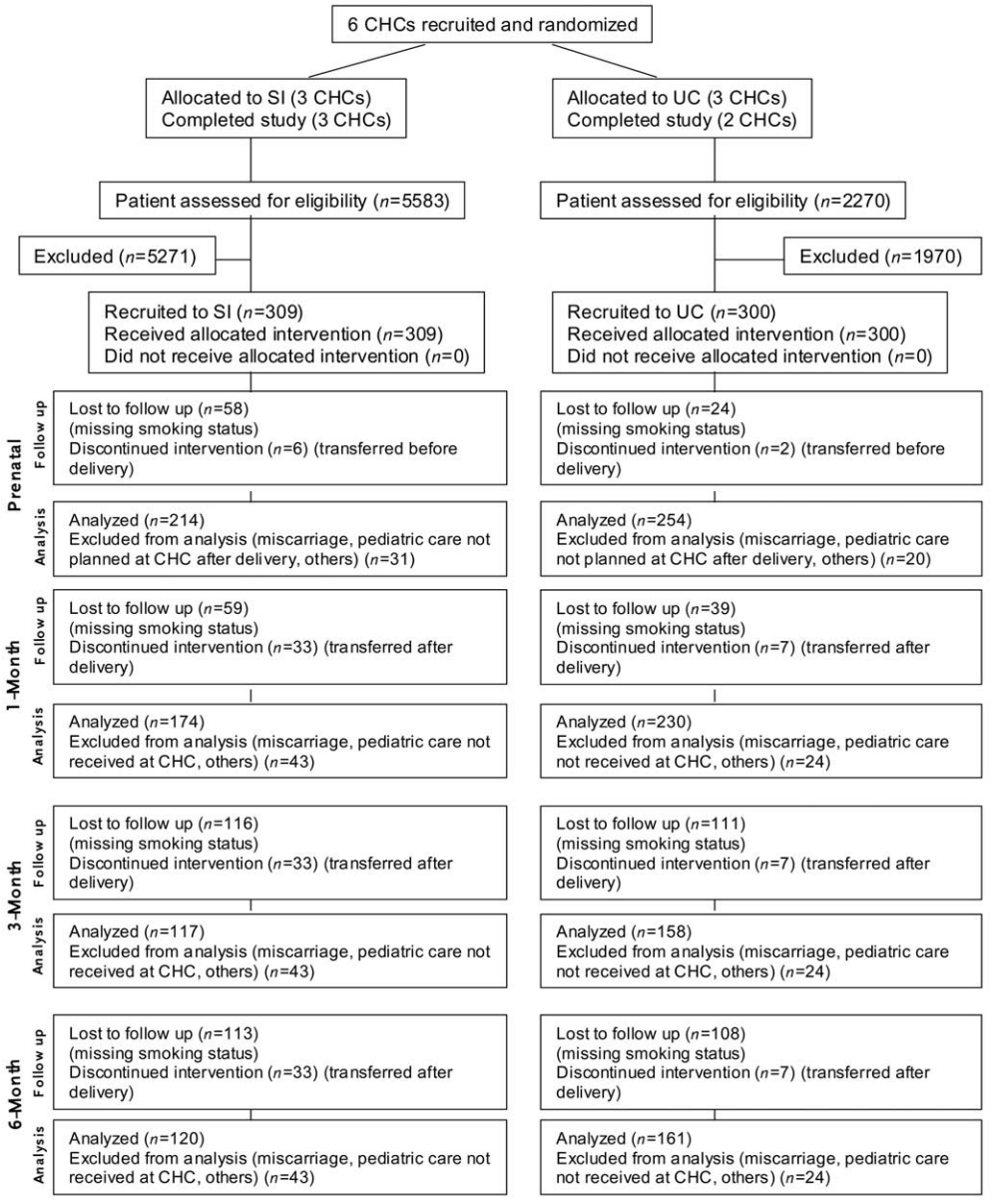
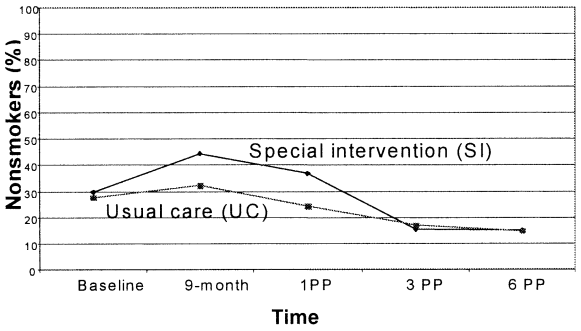


Figure 1. Quit Together diagram showing the flow of participants through each stage of a randomized trial for prenatal, 1-, 3-, and 6-month postpartum analyses.
CHC, community health center; SI, special intervention; UC, usual care.

At baseline, current smokers were defined as having had a cigarette in the previous 7 days, while spontaneous quitters were smokers who quit since learning they were pregnant and had not smoked for at least 7 days prior to baseline assessment. A woman was considered a smoker at the end of pregnancy if she reported smoking in the 30 days prior to delivery on the 1-month postpartum interview. This interview was used to assess end-of-pregnancy smoking status because there was a higher response rate for this interview (77%) than the 9-month prenatal interview (59%), patient recall of smoking status for the 30 days prior to delivery obtained at 1-month postpartum was more likely to reflect smoking status at the end of pregnancy than the 9-month prenatal interview that was conducted at varying times before delivery, and the two measures showed high consistency (93% agreement). If the 1-month postpartum interview was not completed, report of smoking within 7 days of the 9-month interview was used as a proxy. The 1-month postpartum interview also was used to determine postpartum smoking status since the baby was born. Smoking status was assessed at 3 and 6 months postpartum by asking about smoking since the last interview. Salivary cotinine was analyzed for women reporting abstinence for the 7 days prior to interview. A cotinine level of ≤20 ng/ml confirmed self-report of 7-day abstinence.[20]

Statistical Analyses

Since the unit of randomization and intervention was the CHC, a mixed-effects linear modeling was used to test hypotheses about treatment conditions controlling for the clustering



Sample size:					
SI	272	214	174	117	120
UC	278	254	230	158	161

Figure 2. Percentage of nonsmokers at each survey in intervention condition.
9-month, 9-month prenatal interview; 1PP, 1-month postpartum interview; 3PP, 3-month postpartum interview; 6PP, 6-month postpartum interview.

of respondents within each CHC.[28] The linear logistic regression analyses were computed using the GLIMMIX macro, which uses iteratively reweighted likelihoods to fit a logistic regression.[29] The PROC MIXED procedure in SAS was used for analysis of number of cigarettes per day over time (SAS Institute Inc., Cary NC, 1996). All analyses were conducted using the personal computer version of SAS statistical software (SAS Institute Inc., Cary NC, 2000). Reported p values are for two-sided alternative hypotheses. Data were initially analyzed between January and October 2001.

Results

Both eligibility and response rates decreased over time. Of the 7853 women screened, 5199 (66%) were pregnant. Of these, 77 (2%) were ineligible because they were less than 2 months before their due date, and 860 (17%) were ineligible because they did not speak English or Spanish. Of the 4562 (88%) women who were not currently smoking, 236 (5%) had quit with pregnancy and therefore were eligible to participate. These percentages were not exclusive; some women fell into two or more categories.

Of the 693 (9%) women who were eligible, 617 (89%) consented, and 609 (88%) completed baseline interviews and were considered to have formally entered the study. Figure 1 diagrams the eligibility and response rates of participants for the prenatal, 1-, 3-, and 6-month postpartum analyses. Most of the 59 subjects who became ineligible before delivery either miscarried (n =34; 58%) or transferred to another health center (n =12; 20%).

Baseline characteristics of the 550 participants who were eligible until delivery are presented in Table 1 by treatment condition. The sample was ethnically and racially diverse. Most women in the study were unmarried, possessed minimal education, had Medicaid coverage, and were experiencing their first pregnancy. While no differences between SI and UC were statistically significant, some were large (e.g., race/ethnicity, education). This reflects the variability in size and race/ethnicity distributions among CHCs, the unit of randomization.

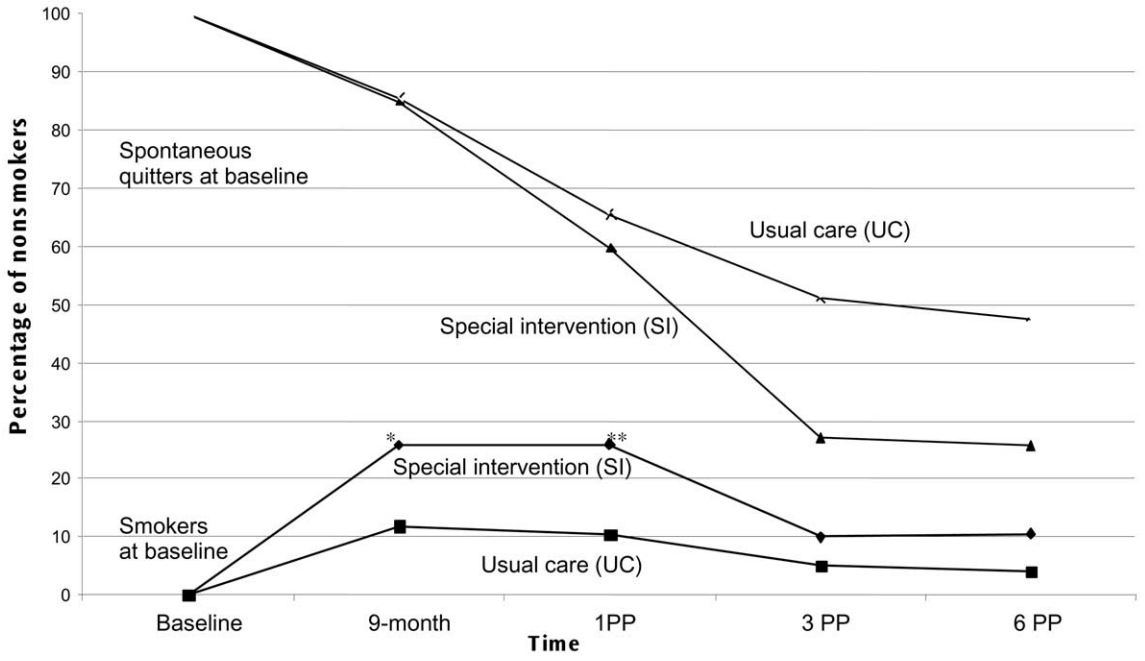
A total of 468 (85%) women completed a 9-month prenatal or 1-month postpartum interview, and 283 (51%) completed both. Among women who responded to both the 9-month and 1-month postpartum interviews, 93% gave the same response to questions regarding end-of-pregnancy smoking status. Considering the high consistency of these two measures, the 9-month response was used if the 1-month postpartum assessment was missing.

Of the 502 women eligible for follow-up after delivery, 404 subjects (80%) completed at least one postpartum interview. Baseline characteristics of women included versus those excluded from analysis were compared for the prenatal sample and postpartum sample. Results indicated that nonrespondents started smoking at a younger age than respondents (14.5 vs 15.1, p =0.04) for both the prenatal and postpartum samples. Women in the UC condition were more likely than women in the SI condition to have completed one of the prenatal interviews (91% for UC vs 79% for SI, p =0.04). A similar trend was observed for postpartum interviews (81% for UC vs 73% for SI, p =0.12), but the difference did not reach a statistically significant level. Overall, UC sites had higher response rates (82%, 80%) than SI sites (77%, 75%, 68%). No other characteristics of the women were associated with response status.

Most interviews were conducted in person (96% at baseline, 85% at 9-month prenatal assessment, 83% at 1-month postpartum, and 70% and 77% at 3 and 6 months postpartum, respectively). There were no differences in smoking status reported by women assessed in person versus telephone at baseline, 9-month prenatal, and 1-month postpartum interviews. At 3-month and 6-month postpartum interviews, a greater percentage of women reported smoking in the in-person versus telephone assessments (85% vs 71%, p <0.0008, and 85% vs 74%, p <0.05, respectively).

Figure 2 presents the nonsmoking rates of women who completed assessments by treatment condition throughout the study period. The percentage of women not smoking increased during pregnancy and decreased over time postpartum in both conditions. A greater percentage of women in the SI compared to the UC condition reported not smoking at the end of pregnancy, but the difference was not statistically significant. Nonsmoking rates for each condition at 3-month and 6-month postpartum interviews approached each other and remained steady at about 15%.

The data from women who completed follow-up assessments were stratified by smoking status at baseline (Figure 3). A high percentage of women who had quit smoking spontaneously after learning of their preg-



Sample size for each condition at different time points

Group	*Baseline*	*9-month*	*1PP*	*3PP*	*6PP*
SI					
Smokers at baseline	191	147	119	80	85
Spontaneous quitters at baseline	81	67	55	37	35
UC					
Smokers at baseline	201	184	172	117	121
Spontaneous quitters at baseline	77	70	58	41	40

* $p = 0.05$; ** $p = 0.04$

Figure 3. Percentage of nonsmokers at each survey by intervention condition and baseline smoking status.
9-month, 9-month prenatal interview; 1PP, 1-month postpartum interview; 3PP, 3-month postpartum interview; 6PP, 6-month postpartum interview.

nancy (prior to intervention) were not smoking at the end of pregnancy in both conditions (85% SI, 86% UC), and the difference was not statistically significant (odds ratio [OR]=1.34, $p = 0.75$). However, among those women who did not quit spontaneously and completed follow-up assessments, a significantly higher percentage of women in the SI condition was not smoking at the end of pregnancy (26%) compared to women in the UC condition (12%), (OR = 2.57, $p = 0.05$). At 1-month postpartum, the difference between SI and UC also was larger for those who were smoking at baseline (26% vs 11%) (OR = 3.01, $p = 0.04$). This effect was lost at 3-month postpartum follow-up (10% vs 5%) (OR = 1.91, $p = 0.65$). For women who quit spontaneously, the difference between the two conditions was small and not significant at 1-month postpartum (OR=0.86, $p = 0.73$).

As noted earlier, there was a lower follow-up rate in the SI than in the UC condition. To investigate the possible effect of confounding due to response bias, a sensitivity analysis was conducted. When all nonrespondents were assumed to be smokers—an intent-to-treat model—the ORs in both strata were somewhat closer to unity. The OR of not smoking for smokers at baseline decreased from 2.57 to 2.02 and was no longer statistically significant ($p = 0.09$). The OR among spontaneous quitters also decreased from 1.34 to 0.95 ($p = 0.95$). When nonrespondents were assumed to be nonsmokers for spontaneous quitters and smokers for women who smoked at baseline, the OR for smokers at baseline

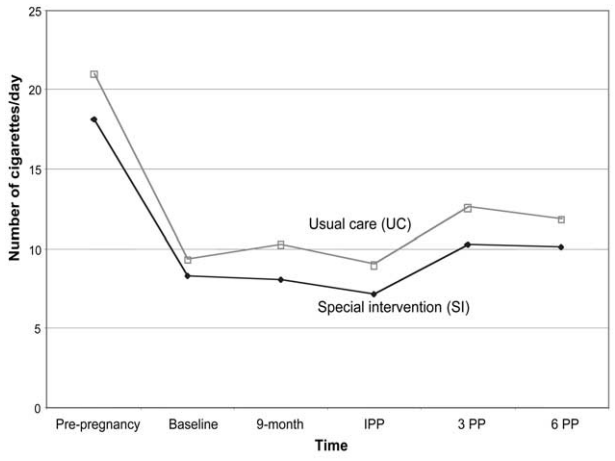


Figure 4. Number of cigarettes per day between special intervention and usual care over time.
9-month, 9-month prenatal interview; 1PP, 1-month postpartum interview; 3PP, 3-month postpartum interview; 6PP, 6-month postpartum interview.

remained identical to the intent-to-treat model, and the OR for spontaneous quitters was similar to that observed in women who completed follow-up assessments (OR=1.37, $p=0.69$).

Among those women who did not quit during the study, reduction in the number of cigarettes smoked per day was investigated. Figure 4 presents the number of cigarettes smoked per day measured at all six time points. For both the SI and UC conditions, the number of cigarettes was highest before women knew they were pregnant and significantly reduced at baseline ($p<0.001$). It remained low at delivery and 1-month postpartum, but increased significantly at 3-month and 6-month postpartum ($p<0.001$). Although there was no statistically significant difference between SI and UC in the number of cigarettes smoked per day, women in the UC condition reported smoking a higher number of cigarettes per day than women in SI prior to pregnancy and remained higher at follow-up.

Of the 158 women who reported quitting smoking spontaneously at baseline, 123 subjects provided cotinine samples. Problems with storage and transfer of samples resulted in only 105 usable samples (66%). At baseline, cotinine values and self-report of abstinence agreed 91% of the time. The percentage of subjects with cotinine values decreased at each follow-up assessment (58% at delivery, 49% at 1-month postpartum, 43% at 3-month postpartum, and 46% at 6-month postpartum). Agreement between cotinine values and self-report of smoking abstinence at each assessment point for women in the SI compared with the UC condition was 89% and 92%, respectively, at baseline ($p=0.74$); 84% versus 94% at delivery ($p=0.28$); 81% versus 88% at 1-month postpartum ($p=0.73$); 71% versus 90% at 3-month postpartum ($p=0.34$); and 40% versus 80% at 6-month postpartum ($p=0.09$).

Discussion

This trial is the first to rely exclusively on existing healthcare providers in CHC clinics to deliver smoking-cessation interventions to low-income pregnant and postpartum women. The findings indicate that brief interventions delivered by healthcare providers during the course of routine prenatal and postpartum care improve smoking abstinence rates during pregnancy for women who do not quit smoking spontaneously on learning they are pregnant. Unfortunately, the effects do not persist beyond the first month postpartum. This finding of an effect during pregnancy persisted in the intent-to-treat analysis where all nonrespondents were assumed to be smokers, although it was no longer statistically significant. The power of this study to detect important effects as statistically significant is reduced in comparison to an individually randomized study due to the analysis controlling for the clustering of women in health centers. Nevertheless, the effect sizes are larger than those found in other studies. For instance, a meta-analysis of 11 randomized prenatal clinical trials conducted in the early 1990s found an overall OR of 1.5 (95% CI, 1.22–1.86), and concluded that pregnancy-specific interventions with multiple contacts increased cessation rates by 50%.[14] The decision to base the conclusions of this study on data collected versus the intent-to-treat analysis was due to a recent consensus article from the Society for Nicotine and Tobacco Research, which concluded that intent-to-treat analyses work best "for a volunteer sample and a relatively short trial where attrition is likely to be minimal," and are not appropriate for effectiveness trials on smoking cessation,[30] as was the case in the present study. Consistent with their recommendation that in cases where differential attrition occurred and attrition was more than 20% of the sample, a pattern-mixture model and selection model for missing data are most appropriate; this is the method on which our conclusions were based.

Unlike other studies that included existing clinic staff in the delivery of the intervention[31,32] or mainly used trained interventionists and not existing healthcare providers to deliver the counseling,[14,33] this study relied exclusively on existing clinicians to deliver the intervention and did not include nonclinician intervention components such as motivational interviews conducted by research personnel, structured self-help manuals, and videotapes. The finding of an intervention effect during pregnancy for women who had not quit with pregnancy is therefore noteworthy. Indeed, recent research funded by the RWJF Smoke-Free Families Initiative evaluated smoking-cessation and relapse-prevention interventions for pregnant women delivered through a variety of venues and providers, and found that few demonstrated positive outcomes.[33] A number of potential reasons were cited, including that the interventions may not have been effective, were not

evaluated appropriately, or may not have been implemented as intended due to the stress and organizational challenges in the medical care systems in which they were being tested. Interestingly, RWJF-funded studies that had initially proposed using existing clinic staff to deliver intervention as was done in the present study found that they were unable to do so, due to workload and low priority for smoking cessation among the healthcare providers,[33] challenges noted in the current study.

While the brief provider-delivered smoking-cessation interventions in this study improved cessation rates during pregnancy for women who had not quit with pregnancy, they did not affect relapse and smoking rates postpartum beyond the first month of pregnancy, consistent with the finding of other studies suggesting that postpartum relapse may be delayed but not prevented.[20] There are several potential reasons for this outcome. Little to no intervention occurred beyond the usual care during the postpartum period in the SI condition, as revealed by an extensive process evaluation consisting of chart audits, contact logs, meeting notes, and patient reports of intervention received. Patient reports of dose of intervention received by WIC nutritionists in the SI condition as assessed by the psychometrically tested patient exit interview (PEI)[34] indicated that WIC nutritionists asked about smoking status at a high rate at the baseline prenatal visit (89%), but less so at the 9-month prenatal (63%) and 3- and 6-month postpartum visits (42%). Advice to quit, low at the baseline visit (53%), decreased in the 9-month prenatal visit (30%) and 3- (12%) and 6-month (13%) postpartum visits.

The "assist" components of the intended intervention (discussing reasons to quit, smoking triggers, quit strategies, and setting a quit date) were completed by WIC nutritionists in the SI condition at low rates at baseline and decreased over time, ranging from 35% to 40% at baseline, 8% to 18% at the 9-month prenatal visit, and 3% to 9% at 3- and 6-month postpartum visits. Patient retrospective reports indicated a similar decrement in intervention delivery over time by obstetric and pediatric clinicians in the SI condition. For example, 54% of patients reported that their obstetric clinician talked to them or gave them written materials about smoking at baseline, which decreased to 28% at the 9-month prenatal assessment. Only 26% reported that pediatric providers talked to them or gave them written materials at the 3- and 6-month postpartum assessment.

These findings were disappointingly similar to those of UC patient reports, with 52% of UC patients reporting that obstetric clinicians intervened at baseline and 19% at the 9-month prenatal assessments, and 13% and 15% reporting pediatric clinicians intervened at 3- and 6-month postpartum visits, respectively. Chart audit data from obstetrics and WIC charts (prenatal) and pediatric and WIC charts (postpartum) confirmed the low level of implementation and falling rates over time. For instance, asking about smoking dropped from 71% to 23%, and advising to quit/remain abstinent fell from 39% to 4%.[35] These findings of minimal intervention delivered during the postpartum period were consistent with an earlier survey conducted by this research team, which found that pediatric providers do not see it as their role to counsel parents who smoke, despite the health impact on their child.[36]

Another possible reason for the intervention's lack of effect on relapse and smoking rates postpartum is that this target group of women appears to be a highly addicted cohort. For example, the majority reported smoking a cigarette within 30 minutes of waking (67%) and smoking an average of 17 (standard deviation=11.69) cigarettes per day prior to pregnancy. The intervention may not have been intensive enough to assist these women in maintaining changes in their smoking behavior after the baby was born. In addition, a state-sponsored tobacco-control initiative[37] may have contributed to a secular trend that masked the impact in the SI group postpartum.

In conclusion, the brief interventions tested in the present study increased smoking abstinence rates during pregnancy among women who did not quit spontaneously with pregnancy, but did not affect relapse and smoking rates beyond the first month postpartum. Although the interventions were developed to be brief, they do not appear to have been delivered as intended beyond the initial dose, possibly due in part to the busy and often chaotic environment of the CHC. It appears that existing healthcare providers in these settings cannot be the sole source of intervention to help women remain abstinent postpartum. Other avenues for delivering high-quality efficacious interventions within the healthcare system need to be explored in order to capitalize on the window of opportunity afforded by the healthcare contacts that occur during pregnancy and postpartum.

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