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Predictors of Smoking Cessation Counseling Adherence in a Socioeconomically Disadvantaged Sample of Pregnant Women

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Abstract

Implementing and evaluating smoking cessation interventions in underserved populations has been found difficult due to high rates of non-adherence to the prescribed protocol. To understand better the barriers to cessation participation, we studied low-income inner-city pregnant women who were enrolled in either a standard or highly intensive quit smoking counseling program. The results showed that 1) in the prenatal phase, non-attendance was predicted by a greater number of cigarettes smoked per day; 2) in the postpartum follow-up phase, non-attendance was predicted by lower educational level and higher self-efficacy for quitting smoking; and 3) participants with more children living at home were at increased risk of rescheduling the postpartum follow-up session. These findings suggest that innovative delivery strategies are needed more effectively to assess and address risk factors for non-adherence to smoking cessation trials among underserved minority pregnant/postpartum smokers.

Keywords

Smoking cessation; pregnancy; postpartum; counseling adherence; counseling retention; intervention delivery

Tobacco use is the leading cause of preventable death in the U.S., contributing to over 440,000 fatalities each year.^{1,2} Smoking during pregnancy is a well-established risk factor for negative maternal and fetal outcomes including intrauterine growth retardation, low birth weight, placenta previa, abruptio placentae, congenital malformations, and an increased risk for spontaneous abortion, pre-mature births, and neo-natal and fetal mortality.^{3,4} Less well-known, smoking in the postpartum phase can also result in health problems for the child, including acute lower and upper respiratory illnesses, asthma, middle ear disease, reduced lung function, and neurobehavioral impairment.⁵⁻¹¹ Despite these health risks, about 22% of women in the U.S. who become pregnant are smokers in 2005,¹² with 16% of these women quitting upon learning of their pregnancy.¹²⁻¹⁴ Among those who do successfully quit smoking, postpartum relapse is prevalent and rapid, with 75% of women relapsing within six months.¹⁵⁻¹⁷ Although smoking rates during pregnancy have decreased among women of

high socioeconomic status, rates among pregnant women from low socioeconomic groups remain high, often exceeding 40%.^{18,19}

A number of potentially effective smoking cessation interventions have been developed for pregnant smokers, yet quit rates rarely exceed 20%.^{19–25} Smoking cessation programs usually entail professional counseling, ongoing support, and the use of nicotine replacement products.²⁶ Research shows that the most successful interventions involve multiple sessions (e.g., two to six) with continuity of support to help participants master techniques for behavior modification, stress reduction, relapse prevention, and other strategies for initial quitting as well as for long-term abstinence from cigarettes.²⁷ However, smoking cessation sessions are frequently rescheduled or missed altogether. Hence, the intervention cannot be delivered at the appropriate intervals or with the prescribed potency, making it difficult to interpret the validity of study findings.

High drop-out rates, treatment non-attendance, and rescheduling of treatment sessions plague intervention delivery and cause interventions to be more costly and less effective among members of underserved groups. Members of these populations are therefore less likely to participate successfully in smoking cessation programs and groups and also are less likely to receive cessation advice from health care providers. While some attention has been paid to smoking cessation treatment drop-out and predictors of drop-out in these populations,^{28,29} non-attendance or rescheduled sessions are often treated as missing data, without factoring in the nature of their impact on study outcomes. Thus, to design study interventions better and thereby to maximize the efficacy and cost of smoking cessation treatment delivery, it is important to delineate more comprehensively the predictors of non-adherence among pregnant women who are at risk for postponing or outright not attending scheduled counseling sessions.

To help fill this gap, further data are needed to more systematically understand and ultimately improve adherence to quit smoking sessions.³⁰ Since non adherence causes variability in the frequency and timing of intervention delivery potentially impacting cessation success,³¹ the goal of the present study was to examine the barriers associated with non-adherence to smoking cessation counseling and assessment sessions. Toward this end, we examined the predictors (demographic, nicotine level, and psychosocial) of non-adherence, specifically non-attendance and rescheduled sessions, at prenatal and postpartum counseling sessions among underserved low-income pregnant women.

Methods

Target population

Primarily, participants were low-income, minority, inner-city women who smoked, were pregnant at the time of enrollment, and were aged 18 years or older. This population was selected on the basis of their relatively high smoking rates and disproportionate rates of high-risk pregnancies and adverse birth outcomes compared with their higher socioeconomic status, more advantaged counterparts.

Inclusion criteria

Women were eligible for study participation if they: 1) were pregnant (between 1–25 weeks post-gestation); 2) had smoked at least one puff of a cigarette in the 30 days prior to recruitment; 3) were 18 years or older; and 4) were reachable by a telephone at the point of initial contact.

Exclusion criteria

Participants who had miscarriages, stillbirth, and neonatal death during the study period were dropped from the study.

Study setting

Participants were recruited at the Women, Infants and Children Clinics (WIC) in Center Philadelphia, Northeast Philadelphia, and North Philadelphia, as well as at the Prenatal Care Clinic at Temple University hospital.

Procedures and interventions

Women who were in the first 25 weeks of their pregnancy were asked to participate in a study aimed at learning about smoking effects on pregnancy and newborns, and about smoking cessation techniques for quitting and relapse prevention. Recruitment procedures involved providing initial recruitment forms to each clinic to be placed with the medical forms that each participant filled out during their initial WIC prenatal visit. Eligible women were then approached *via* phone by our study staff. Eligible, consenting participants were randomized to either: 1) the standard care group, which provided standard but brief counseling and educational advice and assistance for quitting during each session; or 2) a more intensive theoretically-guided smoking cessation intervention group (C-SHIP^{32,33}), which assessed and addressed the participant's pattern of risk perceptions, expectancies and beliefs, and affective reactions.^{34,35} Both groups received two prenatal sessions (session 1: at baseline 1–25 weeks gestation; session 2: at 26–38 gestation); and one postpartum session (session 3: at 2–6 weeks postpartum). All on-site sessions took place in a private room designated by the clinic.

For the standard care group, session 1 (10–15 minutes) included brief cessation counseling following the format of Ask, Advise, Assess, Assist, and Arrange. Session 2 included a smoking cessation guide, *Fresh Start Families*, pick-up by the participants without additional counseling. During the postpartum visit (session 3: 10–15 minutes), participants were provided with counseling advice to quit smoking, along with educational messages about the impact of smoking on the health of the infant and the participant. For the intervention group, participants were educated about the effects of smoking on their personal health and their pregnancy during session 1 (45 minutes counseling), and were encouraged to explore their risk perceptions and emotions, for themselves and their unborn child. During session 2, the 15-minute counseling segment highlighted the cognitive and emotion barriers undermining the participant's motivation to quit and the self-regulatory techniques for resisting personal smoking triggers. Session 3 (45 minutes counseling) involved reviewing smoking status and smoking history over the course of the pregnancy, as well as the effects of smoking on both their health and the health of their infant. All eligible participants were tracked for future appointment contacts regardless of their adherence status of the previous appointment.

Measures

Demographic variables included age, race, marital status, educational level, income level, and number of children living in the household.

Nicotine addiction level variables included standard assessments, specifically number of cigarettes smoked per day at baseline, and number of quitting attempts for at least 24 hours in the past year, in order to assess addiction level.³⁶

Quitting self-efficacy (an individual's confidence in her own ability to quit smoking³⁷) was assessed by adapting the well-validated Multidimensional Health-Related Control and Self-Efficacy Scale (MHCES³⁸), found to be relevant to quitting smoking in our past research.³⁹

The scale contains 10 Likert-type items (e.g., I have confidence in my abilities to quit smoking for good), ranging from 1 (strongly disagree) to 4 (strongly agree), and possesses high internal reliability (Cronbach's $\alpha = 0.8$).⁴⁰ The items were summed and the mean was calculated to indicate level of quitting self-efficacy. Higher scores on this scale indicate greater quitting self-efficacy. Participants with mean scale scores of less than 3.0 on the self-efficacy scale (i.e., below the scale point that denotes agree) were considered to be low in quitting self-efficacy.^{39,40}

Affective distress about quitting was measured by the 30-item Profile of Moods States (POMS⁴¹) short form, since the POMS provides separate factor indices for anxiety, depression, anger, vigor, fatigue, and confusion, and each individual factor score (sum score) has been successfully used to assess affect in the context of smoking cessation interventions. Each item is scored using a Likert-type scale, with values ranging from 0 = not at all to 4 extremely. A Total Mood Disturbance (TMD) score is obtained by summing the five negative subscales (anger, confusion, depression, fatigue and tension) and subtracting the only positive affect subscale (vigor). The score ranges from -20 to 100; higher scores indicate the presence of negative mood and are associated with psychological distress. The psychometric properties of the POMS short form have been demonstrated to have high content and construct validity, as well as high test-retest reliability, with a Cronbach of 0.89 for the total score.⁴² Please see appendix for survey items.

Data analysis

Statistical analyses were conducted using SAS, version 9.2 (SAS Institute, Cary, NC). Chi-squared analysis for categorical variables and t-tests for continuous variables were employed to conduct comparisons to determine whether there were significant differences among variables predicting adherence as well as no significant differences among adherence outcome variables between two intervention groups. Demographic, psychosocial, and nicotine addiction level variables were used as predictors of counseling session adherence patterns. Adherence was categorized based on the numbers of contacts required to secure adherence to the in-person counseling appointments. A maximum of six attempts were made to each person to reschedule an appointment. Participants were designated as adherent attendee (attended appointed counseling session without rescheduling effort), rescheduled attendee (requiring up to six rescheduling attempts in order to attend the session), or non-attendee (those who did not attend the scheduled session), for each of the prenatal and postpartum follow-up sessions.

Predictors of adherent attendees vs. rescheduled attendees vs. non-attendees were explored by logistic regression analysis using the backward likelihood method^{43,44} for each prenatal and postpartum session separately. To choose the best model, the backward stepwise likelihood method was used.⁴⁵⁻⁴⁶ Starting from the full model, variables were eliminated from the model in an iterative fashion. Removal testing was based on the probability of the likelihood-ratio statistic and based on the maximum partial likelihood estimates. After each removal, all removed variables were tested again to check if the addition of the variable back to the model would improve the model fit using likelihood ratio statistics. This process was repeated until none of the variables in the model could be eliminated. To avoid multicollinearity among the explanatory variables, collinearity diagnostic analysis was conducted to select variables with the following criteria: tolerance less than 0.4 or variance inflation greater than 2.5, condition index less than 10, and variance proportions of two or more variables no greater than 0.5.

Results

Baseline recruitment and retention results

Of the 1121 patients initially assessed for study eligibility by phone, 513 (46%) were eligible. Among those eligible, 448 (87%) patients expressed interest in the study by scheduling a baseline study appointment. The primary reasons reported for those who were eligible but who declined study participation were a lack of interest and time (13%).

Of the 448 patients who were scheduled, 277 (62%) patients attended the baseline appointment, including signing the consent form, completing the baseline assessment, and receiving the first smoking cessation counseling session. Among the 277 enrolled participants, 31% required rescheduling appointment efforts in order to complete the baseline appointment.

Attendance at the two follow-up counseling sessions

Of the 277 participants who completed the baseline session, 187 (68%) participants completed the prenatal follow-up session, compared with 69 (25%) who did not complete it. Another 18 participants (6%) did not complete the prenatal session primarily due to preterm labor, but were still included for the postpartum follow-up session. Three participants (1%) had miscarried after baseline session excluding from participation in the rest of the study. Of 187 participants who completed the prenatal follow-up session, 30 (16%) did not attend the prenatal follow-up session on the initial scheduled timeline, and required a rescheduling appointment in order to complete the second prenatal session.

For the postpartum follow-up session, 137 participants (80%) completed the initial scheduled session while 33 participants (20%) required rescheduling to complete the session. 104 participants (32%) did not attend the postpartum session. Figure 1 illustrates the flow of study participant recruitment and retention.

Baseline characteristics and intervention group comparison

Enrolled participants (n=277) were predominantly non-White (African American = 56% and Hispanic = 12%; non-Hispanic White = 33.83%), single (89%), low-income (50% < \$15,000), with a mean age of 27 years, education level of high school or less (>50%), and with an average of two children in the household. Women reported smoking an average of 9.2 cigarettes per day (30-day point prevalence; SD=7.9) and on average they had quit 6.6 times for at least 24 hours in the past year (M=6.3, SD=17.8). Descriptive analyses on the psychosocial measures showed the following: Self efficacy (M=2.82, SD=0.45), which indicates somewhat low levels of quitting self-efficacy based on published norms (compared with the cutoff of 3)^{39,40} and POMS Total Mood Disturbance score (M=17.1, SD=19.1), which indicates low levels of mood disturbance among study participants (see Table 1).

T-test and chi-squared comparisons showed that there were no statistically significant differences between the two groups on any of the baseline characteristics or adherence outcome variables (Table 1). Therefore, for the predictor analyses, the adherence analyses were approached as representing a cohort study, with the standard care and intervention groups being combined.

Predictors of prenatal second session adherence

Predictors of rescheduled attendees—Using the logistic regression model described above, the final model for predicting prenatal follow-up rescheduled attendees was not significant and no influential predictor was detected.

Predictors of non-attendees—Using a logistic regression analysis with the backward likelihood method, predictors of adherence to the prenatal second session included demographic, smoking addiction levels, and psychosocial variables. The final model was $\chi^2=4.05$ ($p=0.04$) (see Table 2). Cigarette consumption was the only significant predictor, with higher consumption predicting non-attendance to the prenatal follow-up session.

Predictors of postpartum adherence

Predictors of rescheduled attendees—The final model was $\chi^2=7.9$ ($p=.00$), with number of children as the only significant predictor. The logistic regression found that participants with more children were more likely to reschedule their appointment up to three times in order to complete the postpartum follow-up session (see Table 3).

Predictors of non-attendees—The final logistic regression model was $\chi^2=12.49$ ($p=.01$) for predicting non-attendance at the first postpartum session (see Table 4). Participants were more likely not to attend the first postpartum follow-up session if they were characterized by: (1) lower education level; (2) higher levels of self-efficacy with regard to quitting at baseline assessment.

Discussion

Low adherence rates have been described as one of the “skeletons in the closet of psychotherapy and behavior change interventions.”⁴⁷ The focus of this study was on women who delayed or did not attend their scheduled prenatal and/or postpartum smoking cessation counseling follow-up appointments. Although previous studies have examined predictors of recruitment success (e.g., higher income level),^{48–50} few studies have looked more discriminately at predictors of smoking cessation counseling attendance and rescheduling among underserved pregnant women. Recruiting pregnant women into smoking cessation trials is both resource intensive and time-consuming.⁵¹ Therefore, retaining participants and maximizing adherence to scheduled sessions becomes paramount.

The findings show that a significant number of participants did not attend scheduled follow-up sessions at both the prenatal (16% rescheduled attendees; 25% non- attendees) and postpartum (20% rescheduled attendees; 38% non- attendees) sessions. Intervention assignment was not a significant predictor of adherence to follow-up sessions, suggesting that a more intensive intervention does not promote greater uptake, even of programs that go beyond the standard of care. In part, this result is likely due to the fact that the standard of care group received a fairly high dose intervention, containing all of the components of active quit smoking programs, just with shorter sessions and less personalized content. Further, although the high-intensity intervention was conceptually-based, the number of sessions was at the low end of recommended frequency, and the theoretically-guided messages were not integrated into the recruitment contact scripts. Hence, although the higher-intensity intervention was designed to more explicitly address personal barriers to quitting smoking, its impact may have been diluted. Future studies should explore whether interventions that are designed to address adherence barriers more effectively from the outset result in higher motivation, greater perceived self-relevance of the program, and differential attendance and cessation outcomes.

Those who had higher cigarette consumption at baseline were more likely not to attend the follow-up counseling session during pregnancy. Our results thus extend findings with other populations showing that heavier smokers are more likely to miss study sessions^{52,53} and are less likely to abstain.⁵⁴ It is possible that participants who attempted to quit smoking may have lapsed or relapsed, which may have engendered feelings of guilt and avoidance, leading to more missed sessions.⁵⁵ The irony is that women who are the most heavily

addicted, and thus most in need of assistance in quitting, are also those who tend not to adhere to their clinic-based cessation counseling interventions.

During the postpartum period, having more children in the household predicted the need to reschedule in order to complete the postpartum intervention session, suggesting that there are additional barriers faced by women who have multiple children. This highlights one of the most central practical barriers for new mothers: lack of child-care. Other research has shown that female smokers with at least one child living at home are at increased risk of treatment attrition.⁵⁵ Further, family obligation has been identified as a contributing factor to non-attendance at smoking cessation interventions.⁵⁶ Therefore, childcare and related family concerns must be taken into account in intervention development, either through help with the provision of childcare or through the development of interventions which overcome childcare challenges, such as the use of mobile phone technology for intervention delivery.

The present study also found that lower educational levels predicted non-attendance during the postpartum period, which is supported by previous studies with similar underserved or pregnant populations that show that lower educational attainment compounds the risk of smoking cessation counseling attrition.^{29,54,55,57} One explanation of these findings is that widespread public health campaigns have been successful at educating women about the hazards of smoking during pregnancy, and therefore the need to adhere to appointments is more salient. Unfortunately, given that there has been less media coverage of the health risks of continued smoking during the postpartum period, less educated women may be unaware of these risks and so less motivated to attend smoking cessation intervention sessions.

Finally, we found that non-adherence to the postpartum session was predicted by higher levels of quitting self-efficacy. Although a higher level of quitting self-efficacy has sometimes been shown to predict greater interest and enrollment in smoking cessation treatments,⁵⁸ as well as a lower likelihood of dropping out of cessation programs,^{29,58} among non-pregnant populations, higher confidence in quitting has been found to increase dropout rates among Hispanic smokers enrolled in a smoking cessation program.⁵⁹ The higher level of baseline self-efficacy for quitting smoking among postpartum non-attendees suggests that they may have perceived that they no longer needed assistance to achieve their quitting goals. Another possibility is that they had started the program with unrealistically high expectations of the ease of success. Hence, they may have encountered more frustration with the everyday challenges of remaining smoke free. These alternative accounts require further follow-up investigation.

When interventions are not delivered as intended, the intervention may falsely be classified as ineffective. For example, Rigotti and colleagues⁶⁰ compared an intensive telephone quit-smoking counseling intervention (multiple calls) with a best practice control (one brief call) and found no difference in cessation rates. However, within the intervention group, women who received more calls had higher cessation rates than women who received fewer calls. Missed or rescheduled sessions decrease the cost-effectiveness of research because limited staff time and financial resources become invested in participants who might yield little to no usable data.²⁵ Thus, improving adherence rates by identifying subgroups of study participants who are at risk for missing or rescheduling sessions, and developing targeted retention strategies in efforts to sustain their involvement, may minimize unnecessary resource expenditure and improve study evaluation data.

There are limitations to the present study. First, although studies show that the prevalence of maternal smoking impacts on birth outcomes,⁶¹ obstetric and birth outcome data were not assessed and included in this study. Second, there are a relatively large number of participants who have missing covariates in our dataset, necessitating the use of the

backward stepwise likelihood model selection method in order to increase the number of participants included in the final analysis. Finally, the standard of care and intervention groups were not sufficiently distinct.

Conclusion

This study focused on identifying underserved pregnant woman who are at risk for not completing smoking cessation counseling or who requiring extra scheduling and staff efforts in order to complete counseling sessions, even less intensive counseling sessions. Understanding the complex pattern of factors that cause non-attendance at, and rescheduling of, counseling sessions will allow us to delineate more systematically women most at risk for non-adherence, and thereby intervene before program delivery becomes an issue. In this time of limited resources, efforts need to be optimized to ensure that interventions are delivered as parsimoniously as possible, following a strict protocol. By delineating the patient factors that are modifiable, interventions can be developed that improve the efficacy of existing programs. In this regard, the results indicate that childcare needs serve as a barrier to adherence to in-person counseling sessions among postpartum women. To counter these effects, it might be beneficial to take advantage of the growing advances in new technologies, in that more and more people have access to devices such as mobile phones, even those with few economic resources.⁶² Therefore, we are currently evaluating a comprehensive smoking cessation program for postpartum women, using a mobile phone text messaging intervention designed to specifically circumvent the childcare and transportation barriers faced by postpartum women, as well as related psychosocial barriers. Our findings fill a void in our understanding of the factors that influence non-adherence among pregnant and postpartum low income women. The insights gleaned have the potential to enhance the integrity of intervention delivery, which will have direct dissemination implications for women and their families, research findings, and public health efforts and policy.

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Notes

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Appendix—Major Survey Items

Nicotine Addiction Level

In the past 30 days, what was the average number of cigarettes you smoked per day? _____
of cigarettes per day

In the past twelve months, how many times have you quit smoking for at least 24 hours?
_____ Times

Quitting Self-Efficacy

Directions: Listed below are beliefs about your ability to either quit smoking or stay quit.
Using the scale provided indicate the degree to which you agree or disagree with each item.

	Strongly Disagree	Disagree	Agree	Strongly Agree
1. I believe that I have the ability to quit smoking for good	1	2	3	4
2. I have confidence in myself that I can give up smoking for good	1	2	3	4
3. In challenging situations like at a bar, I feel capable of not smoking	1	2	3	4
4. Even when I "get stressed out," I feel like I can avoid smoking	1	2	3	4
5. I generally feel capable of quitting smoking for good	1	2	3	4
6. I am confident about my ability to do what I need to keep from smoking	1	2	3	4
7. I have confidence in my ability to stop smoking	1	2	3	4
8. I have the power to stop smoking	1	2	3	4
9. Even around other smokers, I feel confident in my ability to not smoke	1	2	3	4
10. I feel confident that I can not smoke after a meal or while having coffee and relaxing with friends and family	1	2	3	4

Affective Distress about Quitting

Directions: Below is a list of words that describe feelings people have. Please read each one carefully, and then circle ONE answer to the right, which best describes how you have been feeling in the past week with regard to your efforts to quit smoking.

	Not at all	A little	Moderately	Quite a bit	Extremely
1. Tense	0	1	2	3	4
2. Angry	0	1	2	3	4
3. Worn out	0	1	2	3	4
4. Lively	0	1	2	3	4
5. Confused	0	1	2	3	4
6. Shaky	0	1	2	3	4
7. Sad	0	1	2	3	4
8. Active	0	1	2	3	4
9. Grouchy	0	1	2	3	4
10. Energetic	0	1	2	3	4
11. Unworthy	0	1	2	3	4
12. Uneasy	0	1	2	3	4
13. Fatigued	0	1	2	3	4
14. Annoyed	0	1	2	3	4
15. Discouraged	0	1	2	3	4
16. Nervous	0	1	2	3	4
17. Lonely	0	1	2	3	4
18. Muddled	0	1	2	3	4

	Not at all	A little	Moderately	Quite a bit	Extremely
19. Exhausted	0	1	2	3	4
20. Anxious	0	1	2	3	4
21. Gloomy	0	1	2	3	4
22. Sluggish	0	1	2	3	4
23. Weary	0	1	2	3	4
24. Bewildered	0	1	2	3	4
25. Furious	0	1	2	3	4
26. Efficient	0	1	2	3	4
27. Full of pep	0	1	2	3	4
28. Bad-tempered	0	1	2	3	4
29. Forgetful	0	1	2	3	4
30. Vigorous	0	1	2	3	4

Figure 1.
Flow of study participant recruitment and retention.

Table 1

PARTICIPANT CHARACTERISTICS BY GROUPS^a

Predictor Variables	Standard group (n=137)			Intervention group (n=140)			Overall (n=277)		
	Mean	SD		Mean	SD		Mean	SD	
Age	26.62	6.57	p=0.86	26.76	5.95		26.69	6.26	
Numbers of children in the household	1.57	1.50	p=0.94	1.59	1.65		1.58	1.57	
Numbers of cigarettes per day	9.18	7.33	p=0.99	9.16	8.40		9.17	7.88	
# of quitting attempts for at least 24 hours in the past	7.56	23.06	p=0.23	5.00	10.46		6.26	17.83	
Self Efficacy score	2.81	0.43	p=0.80	2.82	0.47		2.82	0.45	
Total Mood Disturbance score	17.80	19.76	p=0.57	16.46	18.62		17.11	19.16	
Race/ethnicity			p=0.65						
Non-Hispanic White	45	33.83		38	28.57		83	31.20	
Hispanic	16	12.03		17	12.78		33	12.41	
Black/African American	72	54.14		78	58.65		150	56.39	
Marital status			p=0.65						
Married or living with a partner	9	7.83		16	13.79		25	10.82	
Single	106	92.17		100	86.21		206	89.18	
Education level			p=0.40						
High school or less	88	66.17		97	69.79		185	67.97	
Some colleague	44	31.58		40	28.77		84	30.15	
Colleague graduate	3	2.26		2	1.44		5	1.84	
Income level			p=0.77						
\$0-15,000	54	54.55		45	45.92		99	50.25	
\$15,001-30,000	28	28.28		34	34.69		62	31.47	
\$30,001-45,000	12	12.12		12	12.24		24	12.18	
\$45,001-60,000	4	4.04		6	6.12		10	5.08	
\$60,001-75,000	1	1.01		1	1.02		2	1.02	
Dependent Variables	No.	Percent		No.	Percent		No.	Percent	
Adherence status at the prenatal follow-up			p=0.04 ^b						

Predictor Variables	Standard group (n=137)		Intervention group (n=140)		Overall (n=277)	
	Mean	SD	Mean	SD	Mean	SD
Non-attendees	27	21.26	42	32.56	69	26.95
Adherent attendees	100	78.74	87	67.44	187	73.05
Rescheduling status at the prenatal follow-up	p=0.24 ^b					
Rescheduled attendees	19	19	11	12.64	30	16.04
Adherent attendees	81	81	76	87.36	157	83.96
Adherence status at the postpartum follow-up	p=0.24 ^b					
Non-attendees	47	34.56	57	41.30	104	37.96
Adherent attendees	89	65.44	81	58.70	170	62.04
Rescheduling status at the postpartum follow-up	p=0.20 ^b					
Rescheduled attendees	14	15.73	19	23.46	33	19.41
Adherent attendees	75	84.27	62	76.54	137	80.59

^a p-values associated with t test for continuous variables and with chi-square test for categorical variables.

^b There are 4 adherence outcomes for this study. After adjustment for multiple comparisons, only p-values less than 0.0125 are considered statistically significant.

Table 2**PREDICTOR OF NON-ATTENDANCE AT PRENATAL FOLLOW-UP SESSION**

Variable remained in the model	Odds Ratio (95% CI)	p-value
Numbers of cigarettes per day	1.04 (1.00–1.08)	0.04

N=256 (69 non-attendees, 187 adherent attendees)

CI = Confidence Interval

Table 3**PREDICTORS OF NON-ATTENDANCE AT POSTPARTUM FOLLOW-UP SESSION**

Variables remained in the model	Odds Ratio (95% CI)	p-value
Education level	0.73 (0.56–0.96)	0.02
Self-efficacy	2.14 (1.09–4.19)	0.03

N=274 (104 non-attende, 170 adherent attendees)

Table 4**PREDICTOR OF RESCHEDULED ATTENDEES AT POSTPARTUM FOLLOW-UP SESSION**

Variables remained in the model	Odds Ratio (95% CI)	p-value
Numbers of children	1.43 (1.10–1.86)	0.01

N=170 (33 rescheduled attendees, 137 adherent attendees)