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Cigarette smoking in pregnant substance users: Association with substance use and desire to quit

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Abstract

Cigarette smoking is prevalent in pregnant substance users but receives low priority in substance use disorder treatment. This paper reports the results of a secondary analysis of a randomized, multi-site trial with 200 pregnant substance users, 145 (72.5%) of whom smoked at baseline. As predicted: 1) smokers had significantly greater substance use; 2) approximately half of smokers wanted to quit; and 3) smokers with a quit goal had significantly greater self-efficacy and lower perceived difficulty of quitting. Smoking may be associated with more severe substance use in pregnant substance-using patients, half of whom may be interested in smoking-cessation interventions.

Keywords

pregnant; substance use; smoking

INTRODUCTION

Decreasing smoking during pregnancy is a priority in both research and clinical practice. In contrast, despite the high prevalence of smoking in pregnant substance users (upwards of 90%),¹ smoking-cessation treatment has received relatively little attention in substance use disorder (SUD) treatment.² Several barriers to integrating smoking-cessation interventions into SUD treatment have been delineated,³ one of which is the belief that cigarette smoking is unrelated to substance use. However, pre-clinical research has found that nicotine increases the use of alcohol and illicit substances⁴ and an association between cigarette smoking and greater substance use has been found clinically.⁵ Whether there is a similar association in pregnant substance users is unknown. Another barrier is the belief that substance-using smokers do not want to quit smoking.² A recent study revealed that treatment staff underestimated patients' desire to stop smoking and that 50% of pregnant patients wanted to quit smoking.² A study replicating this level of interest would provide

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Declaration of Interests

The authors report no conflicts of interest.

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additional support for providing smoking-cessation treatment to this population. Successfully promoting smoking abstinence requires an understanding of modifiable factors related to smoking-cessation attempts and outcomes. Research has found that self-efficacy and perceived difficulty of quitting smoking predict smoking-cessation attempts and outcomes in non-pregnant smokers.⁶ In pregnant smokers, self-efficacy has been found to be a significant predictor of smoking-cessation attempts and outcomes.⁷

The goal of this secondary analysis was to test our hypotheses that in pregnant substance users: 1) cigarette smoking would be associated with greater alcohol and drug use; 2) approximately 50% of smokers would be interested in quitting smoking; and 3) greater self-efficacy and lower perceived difficulty of smoking would be associated with interest in quitting smoking.

METHODS

Study Design

The parent trial⁸ was a 16-week, intent-to-treat, 2-group randomized controlled trial. Eligible participants were randomized to 3 sessions of motivational enhancement therapy for pregnant substance users (MET-PS) or treatment as usual (TAU); the three MET-PS sessions replaced the intake session and the first two individual treatment sessions provided by clinical treatment staff. Participants were scheduled to attend 5 research visits: 4 weekly visits during the first month post-randomization and visits at 1 and 3-months post-randomization. The study was approved by the IRBs of the participating sites.

Participants

Participants were recruited from intakes to four outpatient pregnant women SUD treatment programs (in North Carolina, New Mexico, Indiana, and Kentucky). Eligible participants were at least 18 years old, pregnant, and not planning to terminate the pregnancy. Participants were excluded from the study if they required residential or inpatient treatment (other than detoxification), were more than 32 weeks pregnant, planned to relocate from the area within 4 months, had pending legal charges that might lead to incarceration, or were a significant suicidal/homicidal risk. The present study focused on participants who did (n=145) and did not report (n=55) cigarette smoking at baseline.

Measures

At each research visit, participant's substance use was assessed with the Timeline Follow-Back procedure (TLFB⁹), which captured substance use for each day since the prior visit, and urine drug screens (UDSs) testing for opiates, cocaine, methamphetamines, benzodiazepines, and marijuana. The number of days assessed with the TLFB ranged from 7 for the weekly visits to 56 at the 3-month follow-up; the TLFB can validly assess past use for up to 90 days. In smokers, the Thoughts About Abstinence assessment¹⁰ was administered at baseline to assess desire to quit, expected success in quitting (i.e., self-efficacy), and perceived difficulty of quitting.

Data analysis

All analyses were completed using SAS, Version 9.3 (SAS Institute, 2010). The weekly fraction of drug/alcohol use days and weekly UDS results (positive or negative) outcomes were analyzed using a logistic generalized mixed model regression testing for a baseline smoking (e.g., smoking vs. non-smoking) effect. The dependent variables of expected success in quitting and perceived difficulty of quitting were analyzed using an proportional odds logistic regression testing for a quit goal effect (e.g., goal of quitting vs. no goal of quitting). Corrected Akaike Information Criteria (AICC) was used to evaluate group baseline differences, study week, treatment arm (MET-PS or TAU), and related interaction effects for inclusion in the regressions.

RESULTS

Participant characteristics are provided in Table 1. Smokers had a greater percentage of drug/alcohol-use-days ($X^2=5.30$, $p<0.05$) and positive UDSs ($X^2=7.64$, $p<0.01$) compared to non-smokers (see Figure 1). Forty-eight percent of smokers reported a goal of quitting smoking. Smokers with a quit goal had greater quitting self-efficacy compared to those without a quit goal ($X^2=40.28$, $p<0.0001$, Cohen's $d=1.58$). Finally, smokers without a quit goal perceived quitting to be more difficult relative to smokers with a quit goal ($X^2=15.19$, $p<0.0001$, Cohen's $d=0.59$).

DISCUSSION

Consistent with findings in non-pregnant substance users,⁵ this secondary analysis revealed a significant relationship between cigarette smoking and substance use. This suggests that smoking and substance use are interrelated although cause and effect determinations cannot be made due to the correlational nature of the data. Our finding that 48% of participants wanted to quit smoking is consistent with the 50% reported in a recent study of pregnant substance users.² Also consistent with prior research, desire to quit was associated with greater self-efficacy and lower perceived difficulty in quitting. These findings suggest that smoking may be associated with more severe substance use in pregnant substance users, half of whom may be interested in smoking-cessation treatment. Increasing interest in quitting in the other half may require interventions to increase self-efficacy.

This study has several limitations. First, the designation of smoking status was based on self-report, with no biochemical verification; this may have resulted in women who were smokers being designated as non-smokers, due to the social desirability of not smoking. Second, the trial did not include a measure of cigarettes-per-day but, rather, assessed whether the participant smoked (yes/no) for each day of the trial. As a result, analyses could not take into account the relative level of nicotine dependence in the smokers.

In conclusion, these findings highlight the importance of addressing smoking in pregnant substance users. While some work is being done to identify effective smoking-cessation interventions for this population, this remains a significant clinical and research need.¹

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Figure 1.

Proportion of drug/alcohol-use days (A) and percent of positive urine drug screens (B) as a function of baseline cigarette smoking status and trial week. In A, time “0” is the fraction of alcohol/drug use days during the 28 days prior to study screening.

Table 1

Participant demographic and baseline characteristics as a function of baseline smoking status and desire to quit smoking

	Smoker n = 145	Non-Smoker n = 55	Smokers with Quit Goal n = 69	Smokers with No Quit Goal n = 75
Age	26.4 (5.5)	25.9 (5.2)	26.4 (5.8)	26.4 (5.3)
Race/ethnicity:				
African American	33.6%	37.7%	45.2%	22.5%
Caucasian	44.0%	28.3%	27.4%	59.2%
Hispanic	20.1%	18.9%	24.2%	16.9%
Other	2.2%	15.1%	3.2%	1.4%
Marital Status:				
Divorced or Separated	16.6%	12.7%	13.0%	20.0%
Married	13.1%	18.2%	10.1%	16.0%
Not Married	70.3%	69.1%	76.8%	64.0%
Employed (past 28 days)	22.1%	30.9%	26.1%	17.3%
Weeks Pregnant	20.1 (8.0)	20.8 (7.4)	18.3 (7.6)	21.8 (8.1)
Primary Drug Used:				
Alcohol	9.0%	14.5%	13.0%	5.3%
Benzodiazepines	0.7%	1.8%	0.0%	1.3%
Cocaine	26.2%	16.4%	23.2%	29.3%
Marijuana	28.3%	38.2%	26.1%	29.3%
Methamphetamine	9.7%	1.8%	7.2%	12.0%
Opiates	13.1%	12.7%	14.5%	12.0%
Other*	13.1%	14.5%	15.9%	10.7%
Days of Drug/Alcohol Use (past 28 days)	10.1 (11.3)	8.3 (11.0)	10.8 (11.5)	9.7 (11.2)

Note. The demographics/baseline characteristics of: 1) smokers vs. non-smokers and 2) smokers with a quit goal vs. smokers without a quit goal were compared using between group comparisons consisting of either a Pearson Chi Square or Fisher's exact test for each categorical variable, and either a Wilcoxon Rank Sum or a Student's t test for each numeric variable, depending on the test assumptions met by the data. Significant differences between smokers and non-smokers were found for race/ethnicity and primary drug used. Significant differences between smokers with and without a quit goal were found for race/ethnicity, weeks pregnant, and primary drug used. Where not specifically indicated, numbers represent means (standard deviations).

* Methadone and poly-substance