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Perinatal smoking and depression in women with concurrent substance use

Ariadna Forray [a,*], Nathan Gotman [a], Trace Kershaw [b], Kimberly A. Yonkers [c]

[a] Department of Psychiatry, Yale School of Medicine, USA
[b] School of Public Health, Yale School of Medicine, USA
[c] Departments of Psychiatry and Obstetrics, Gynecology and Reproductive Sciences, Yale School of Medicine, USA

HIGHLIGHTS

- Smoking was common; 66% of women smoked at baseline and 60% smoked postpartum.
- 42% of pre-pregnancy smokers achieved abstinence before delivery.
- Smoking did not differ significantly between depressed and non-depressed groups.
- Women resumed/increased smoking postpartum independent of depression status.

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ABSTRACT

Objective: The purpose of this report was to examine the course of smoking among pregnant women with concurrent substance use, and to assess the impact of depression on smoking.
Methods: Data were gathered as part of a randomized controlled trial assessing the efficacy of substance abuse treatment in pregnant women. Women (n = 176) were recruited before 28 completed weeks of pregnancy, and followed until 3 months postpartum. Depression was assessed using the Inventory of Depressive Symptomatology and the MINI Neuropsychiatric Interview. Our outcome was the average number of cigarettes smoked per day. Linear mixed effects regression was used to measure differential changes in smoking.
Results: 66% of women smoked in the three months before pregnancy, 42% of pre-pregnancy smokers achieved abstinence before delivery and 60% of the baseline cohort smoked postpartum. Smoking did not differ significantly between depressed and non-depressed groups. After delivery both groups increased smoking at similar rates.
Conclusion: Smoking was common among our cohort of pregnant women with a history of substance use. Women were able to discontinue or decrease smoking during pregnancy, but were likely to resume or increase smoking postpartum. Having clinically significant depressive symptoms or a diagnosis of depression did not have an obvious effect on smoking behaviors.

1. Introduction

Pregnancy and the postpartum period present unique opportunities and challenges for the 17 million reproductive age female smokers in the US (Substance Abuse and Mental Health Services Administration, 2009). Close to half of women who were smokers prior to conception are able to quit smoking in pregnancy (Colman & Joyce, 2003), but nearly 80% of this group relapses within a year after delivery, designating pregnancy as a period of "suspended smoking" (DiClemente, Dolan-Mullen, & Windsor, 2000). Smoking in pregnancy is associated with poor pregnancy outcomes and increased infant morbidity and mortality (Centers for Disease Control and Prevention, 2000; Cnattingius, 2004). Understanding the factors that influence smoking in pregnancy and after delivery is important for the development of effective interventions. This is particularly important among substance-dependent women since rates of smoking in pregnancy are high in this population: 77% among women receiving substance abuse treatment (Haller, Knisely, Dawson, & Schnoll, 1993), and 88–99% among methadone-maintained women (Haller et al., 1993; Haug, Svikis, & Diclemente, 2004; Svikis et al., 1997). Moreover, evidence suggests that smoking may be more harmful to the developing fetus than the use of illicit drugs, and that the combination of both smoking and illicit drugs is associated with worse birth outcomes (Jacobson et al., 1994; Kennare, Heard, & Chan, 2005). Unfortunately, there is limited information on the course of smoking in pregnancy among substance abusing women and on the factors that influence smoking behavior in the perinatal period.

* Corresponding author at: 142 Temple Street, Suite 301, New Haven, Connecticut, 06510, USA. Tel.: +1 203 764 6621; fax: +1 203 764 6766.
E-mail address: ariadna.forray@yale.edu (A. Forray).

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Depression is highly prevalent in among substance-dependent individuals (Nunes & Rounsaville, 2006), and some evidence suggests that depressive symptoms moderate smoking outcomes in non-substance abusing perinatal women. Pregnant smokers who quit during pregnancy are more likely to have lower levels of depressive symptoms than those who continue to smoke (Munafo, Heron, & Araya, 2008), and those with depressive symptoms are at higher risk of postpartum relapse to smoking (Park et al., 2009). However, very little is known about the role of depression among substance abusing pregnant smokers. Only one study has evaluated this relationship, and it found that methadone-maintained pregnant women who smoke are significantly more likely to meet criteria for current mood and anxiety disorders than those who do not smoke (Chisolm, Tuten, Brigham, Strain, & Jones, 2009). The paucity of information regarding the role of depression among substance abusing pregnant smokers is regrettable considering up to 40% of pregnant methadone-maintained women report clinically significant depressive symptoms (Haug, Stitzer, & Svikis, 2001), and depression is associated with worse substance abuse treatment outcomes (Nunes & Levin, 2004). Addressing depression may be an opportunity to enhance treatment in this population at high risk for adverse smoking related outcomes affecting both mother and infant. Hence, the association between smoking and mood in pregnant women with a concurrent substance use disorder merits further investigation.

The purpose of this prospective study was to understand the normal course of smoking and smoking cessation behaviors during and after pregnancy among women with substance misuse, and to examine the effect of depressive symptoms on smoking. This investigation examined the association between depression and smoking throughout various time points in pregnancy, as well as how depression impacts changes in smoking during the postpartum time period. We hypothesized that in this group, as in non-substance using women, smoking would decrease in pregnancy and increase again postpartum. Also we predicted that women with clinically significant depressive symptoms would reduce smoking less during pregnancy and smoke more postpartum compared to those without depressive symptoms.

2. Methods

Between 2006 and 2009, pregnant women who presented for obstetrical care at two hospital-based reproductive health clinics were screened for misuse of substances of abuse. Data were gathered as part of a randomized controlled trial to assess the efficacy of motivational enhancement therapy (MET) coupled with cognitive behavioral therapy (CBT) administered by a nurse, compared to brief advice from an obstetrical provider, to reduce drug and alcohol use among pregnant substance users. Trained research assistants obtained verbal and written informed consent prior to screening. The Yale School of Medicine and Bridgeport Hospital Human Subjects Boards approved study procedures.

2.1. Subjects

Women were eligible to participate if they had not yet completed their 28th week of pregnancy, spoke English or Spanish and were at least 16 years of age. Potential subjects must have reported use of alcohol or an illicit drug, other than solo use of opiates, during 28 days prior to screening or scored at least 3 on the TWEAK (Chang, Wilkins-Haug, Berman, & Goetz, 1999; Russell et al., 1996) that was modified to query about alcohol and other drugs. Women were ineligible if they intended to terminate their pregnancy, were planning to move out of the area, were in imminent danger to themselves or their fetus, required emergent medical or psychiatric inpatient treatment or were engaged in outpatient substance abuse treatment. While smoking was not an eligibility criterion for the study, smoking status and amount was assessed at intake and all subsequent study visits (see below). This report focuses only on subjects that endorsed cigarette smoking in addition to their primary drug of abuse.

2.2. Screening

Women were screened at a usual obstetrical appointment at either of the two prenatal care centers. A research assistant or nurse approached pregnant women, obtained consent to screen and asked them to complete a health questionnaire that included demographic information, plans for prenatal care, the Patient Health Questionnaire-2 (PHQ-2) (Kroenke, Spitzer, & Williams, 2003), the 4 P's (Chasnoff, Wells, McGourty, & Bailey, 2007; Chasnoff et al., 2005), the modified TWEAK (Chang et al., 1999; Russell et al., 1996), and yes/no probes about individual substances of abuse (cigarettes, alcohol, marijuana, cocaine, opiates and "other") within the previous 28 days. After this initial assessment, research staff explained the study to respondents who were potentially eligible and obtained written, informed consent to enroll in the study. Respondents who were interested in participation either underwent an immediate intake interview or completed an intake visit at the next prenatal visit.

2.3. Study intake visit and recruitment

The intake assessment was completed largely via computer through the use of audio assisted software whereby questions were read to the respondent while they also appeared on screen. The assessment included interview questions about current and past pregnancy events and complications, the Addictions Severity Index-Lite (ASI) (McLellan, Luborsky, Woody, & O'Brien, 1980), the Inventory of Depressive Symptomatology (IDS-SR) (Rush, Gullion, Basco, Jarrett, & Trivedi, 1996) and questions from a diagnostic interview, the MINI Neuropsychiatric Interview (Sheehan et al., 1998). The Time Line Follow Back (TLFB) (Sobell, Brown, Leo, & Sobell, 1996), which collects daily information on substance use, was obtained by study personnel in a face-to-face manner.

Subjects were allocated to either: 1) behavioral therapy that combined MET and CBT for substance abuse or 2) brief advice. The MET-CBT was formatted into six sessions that could be delivered alongside prenatal and immediate postnatal care visits. Brief advice was a manualized version of standard interventions offered by obstetrical providers. An analysis of treatment efficacy showed very little difference between treatments at 3 months post the intervention trial (see Yonkers et al., 2012).

2.4. Data collection

Women were interviewed throughout pregnancy and postpartum at prenatal care visits. Study visits were of two types, treatment and assessment only. The number of treatment visits was unlimited in pregnancy and limited to 2 postpartum (3 and 6 weeks postpartum). Assessment only visits occurred at intake (T1), delivery (T2) and 3-months post-delivery (T3). On average women completed 8.57 visits. The following assessments were administered during all study visits: the TLFB, IDS-SR, and follow-up version of the ASI, which included information on psychosocial function and other significant events. The MINI Neuropsychiatric Interview was administered at T1, T2 and T3 only.

2.5. Statistical procedures

We used Fisher's exact test to estimate differences in demographics by smoking status in pregnancy, and by IDS score or diagnosis of depression at T1. Our main outcome was the mean number of daily cigarettes, which was combined from retrospective ASI data (for smoking prior to enrollment) and prospective TLFB data (for smoking subsequent to enrollment), to obtain a full spectrum of monthly data beginning 3 months before pregnancy to 3 months