Perinatal substance use: A prospective evaluation of abstinence and relapse

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ABSTRACT

Background: Substance use decreases in pregnancy but little prospective data are available on the rates of abstinence and relapse for specific substances. This study compared rates of abstinence in pregnancy and relapse postpartum for nicotine cigarettes, alcohol, marijuana, and cocaine.

Methods: Data from 152 women drawn from a randomized controlled trial comparing psychological treatments for substance use in pregnancy were analyzed. Self-reports of substance use and urine for toxicology testing throughout pregnancy and 3-months, 12-months and 24-months post-delivery were collected. Multivariate Cox models were used to compare rates of abstinence and relapse across substances.

Results: In pregnancy, 83% of all women achieved abstinence to at least one substance. The mean (SE) days to abstinence was 145.81 (9.17), 132.01 (6.17), 151.52 (6.24), and 148.91 (7.68) for cigarettes, alcohol, marijuana and cocaine, respectively. Participants were more likely to achieve abstinence from alcohol (HR 7.24; 95% CI 4.47–11.72), marijuana (HR 4.06; 95% CI 1.87–6.22), and cocaine (HR 3.41; 95% CI 2.53–6.51), than cigarettes. Postpartum, 80% of women abstinent in the last month of pregnancy relapsed to at least one substance. The mean days to relapse was 109.67 (26.34), 127.73 (21.29), 138.35 (25.46), and 287.55 (95.85) for cigarettes, alcohol, marijuana and cocaine, respectively. Relapse to cocaine was only 34% (HR 0.34; 95% CI 0.15–0.77) that of cigarettes.

Conclusions: Pregnancy-related abstinence rates were high for all substances except cigarettes. Postpartum relapse was common, with cocaine using women being less likely to relapse after attaining abstinence compared to women using cigarettes, alcohol or marijuana.

1. Introduction

Approximately 11% of reproductive age women use illicit substances, 25% use cigarettes, and 30% binge drink or use heavy amounts of alcohol (Substance Abuse and Mental Health Services Administration, 2013). Pregnancy interrupts the pattern of substance use in many women. Nearly 50% of pregnant women who smoke cigarettes (Tong et al., 2008) and 70–90% of women who use illicit substances (Ebrahim and Gfroerer, 2003; Massey et al., 2011) achieve abstinence in pregnancy. Similar abstinence rates are reported among pregnant women with heavy alcohol use (Massey et al., 2011; Substance Abuse and Mental Health Services Administration, 2013). Offsetting the pregnancy-related decrease in substance use is the precipitous increase that occurs during the 6 months to one year after delivery (Ebrahim and Gfroerer, 2003; Gilchrist et al., 1996; Howell et al., 1999). For example, close to half of women who attain abstinence to smoking in pregnancy relapse within two weeks of delivery (Colman and Joyce, 2003), and 80% relapse within six months (DiClemente et al., 2000).

While existing data consistently illustrate the moderating effect of pregnancy on the course of substance use, most information, with the exception of studies of smoking in pregnancy, is derived from cross-sectional surveys and retrospective reports.

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Methodologically, it is easiest to focus only on one substance, and thus few studies have compared abstinence across substances. However, it is possible that the addictive properties of various substances differ making it harder for pregnant women to cease the use of one substance compared to another. From a clinical perspective, it would be useful to determine whether the likelihood of abstinence in pregnancy from cigarettes, illicit substances or alcohol is uniformly similar because resources could be devoted to the substances that are more difficult to stop.

It is also unknown whether the risk of relapse after delivery is the same across substances. The majority of research has focused on smoking relapse postpartum (Colman and Joyce, 2003; Gyllstrom et al., 2012; Kaneko et al., 2008; Park et al., 2009; Ruger et al., 2008; Tong et al., 2008; Tran et al., 2013; Yasuda et al., 2013), with only a handful of studies looking at postpartum alcohol relapse (Ebrahim et al., 1998; Jagodzinski and Fleming, 2007a, 2007b; Nayak and Kaskutas, 2004). One of these studies found that at 6–12 weeks postpartum 37.8% of women who were frequent drinkers before pregnancy reported postpartum risky drinking, with 18% reporting heavy episodic drinking, 5% frequent drinking only and 15% reporting both behaviors (Jagodzinski and Fleming, 2007a). Another study found that women who reported at risk drinking postpartum were almost six times more likely to have had at risk drinking prior to pregnancy (Jagodzinski and Fleming, 2007b). However, there are no studies that evaluated women's patterns for drinking from pregnancy through delivery and into the postpartum period. Very little is known about the relapse process for illicit substance use following pregnancy. The only information currently available on the relapse process postpartum was collected nearly 20 years ago from a cross-sectional national survey (Ebrahim and Gfroerer, 2003).

Prospectively collected data can explore complicating factors such as concurrent substance use, and present a detailed picture of the abstinence and relapse process in perinatal women. The goal of this report is to chart the prospective course of substance use in a cohort of perinatal women with a pre-pregnancy history of substance use, and to compare rates of abstinence and relapse to the various substances, during pregnancy and after delivery. Specifically, the course of cigarettes, alcohol, marijuana and cocaine use in pregnancy and after delivery was examined. Patterns of concurrent substance use during this period were also examined. Data from a psychotherapy treatment trial for pregnant substance using women that included two years of post-pregnancy follow-up were analyzed.

2. Methods

2.1. Participants

The analytic cohort was drawn from the Psychosocial Research to Improve Drug Treatment in Pregnancy trial, a comprehensive, multicenter, prospective study, which has been described elsewhere in detail (Yonkers et al., 2012). Briefly, data where gathered between 2006 and 2012 as part of a randomized controlled trial to compare drug treatment outcomes for nurse-delivered motivational enhancement therapy (MET) coupled with cognitive behavioral therapy (CBT) and brief advice from an obstetrical provider. Women were eligible to participate if they had not yet completed their 28th week of pregnancy and were at least 16 years of age. Please refer to Table 1 for participant demographic information. Potential participants must have reported use of alcohol or an illicit drug, during the 28 days prior to screening or scored at least 3 on the TWEAK (Chang et al., 1999; Russell et al., 1996), which was modified by adding "and drugs" to questions for alcohol (Yonkers et al., 2010). A score of two or more on the TWEAK indicates a positive outcome for use in pregnant women (Chang, 2001). Women were ineligible if they were already engaged in substance use treatment, were using an opiate as their primary drug, or nicotine as their only substance. Women with primary use of opiates were not offered participation in the parent trial, as the standard of care for opiate use in pregnancy is opiate agonist treatment through centers that provide counseling. While smoking was not an eligibility criterion for the parent study, smoking status and amount was assessed at intake and all subsequent study visits. Women were recruited from three local prenatal clinics affiliated with the Yale School of Medicine, and the study procedures were approved by the Institutional Review Board.

2.2. Data collection

Women were interviewed throughout pregnancy and postpartum while attending a prenatal or postnatal care visit; a minority of visits occurred at the authors' research offices. Study visits were of two types, treatment and assessment only. The number of treatment visits was unlimited in pregnancy and limited to two postpartum. The average number of treatment visits was six. An analysis of treatment efficacy showed no difference between treatments at three months post the intervention trial (Yonkers et al., 2012). Assessment only visits occurred at intake, delivery, 3-months post-delivery, 12-months post-delivery, and 24-months post-delivery. The 12-month and 24-month visits and data collection were also part of an economic evaluation, the results of which are reported elsewhere (Xu et al., 2014).

2.3. Measures

Participants completed a comprehensive, computerized intake assessment that included the Addictions Severity Index-Lite (ASI; McLellan et al., 1980), the Inventory of Depressive Symptomatology (IDS-SR; Rush et al., 1996), the Mini-International Neuropsychiatric Interview 5.0.0 Clinician-Rated (MINI-CR; Sheehan et al., 1998), and the Substance Use Calendar (SuCal). We used the brief version of the ASI to assess substance related severity and impairment, and elicit information on seven functional areas often affected by substance abuse: medical status, employment and support, drug use, alcohol use, legal status, family or social status, and psychiatric status. The ASI provides information on frequency, duration, and severity of problems over the patient's lifetime and in the past 30 days, and has been extensively studied and shows very good external reliability (0.89), test-retest reliability (0.92), and internal consistency (Cronbach's alpha ranging from 0.62 to 0.87; Hodgins and el-Guebaly, 1992; McLellan et al., 1992). The IDS-SR was administered to gauge the severity of any ongoing mood symptoms. The IDS-SR measures severity of cognitive features of depression/anxiety and reverse neurovegetative symptoms of depression. Despite the fact that the measure is short (28-items), it is comprehensive and has high internal consistency with a Chronbach's alpha of 0.94 (Rush et al., 1996). The MINI-CR was used to generate diagnoses of depression, anxiety disorders (including trauma and stress disorders), psychotic disorders and substance and alcohol abuse and dependence. The MINI-CR is a 120-item, closed-ended instrument developed to assess 17 Axis I disorders and 10 subtypes, along with suicide risk, and correlates moderately well with the SCID (0.43–0.90), and the Composite International Diagnostic Interview (CIDI; 0.36–0.82) but has the advantage of being shorter and easier to administer (Sheehan et al., 1998). The SuCal was based upon the Time Line Follow Back (Sobell et al., 1996), a calendar method that allows collection of data on individual substances (cigarettes, alcohol, marijuana, cocaine) on a daily basis.

Research staff assessed participants during each of their subsequent prenatal visits after intake assessment. Research staff had a background in maternal mental health and addictions and were further trained on structured psychiatric interviewing, best practices for working as University researchers in a primary care setting, and empathy skills, including a non-judgmental approach to working with pregnant with a history of substance use. At each encounter the IDS-SR and the SuCal were administered. At intake the SuCal collected daily information on substance use for the previous 28 days, and at follow-up visits data were collected dating back to the previous completed visit. In addition, urine toxicology and alcohol breath tests were obtained. A commercially available immune-chromatographic test (one-step Status Stik®) was used to detect cannabinoids, cocaine, opiates and their major metabolites in urine. The Redwood Labs Breath Alcohol Test® was used to monitor alcohol use. For biological measures, any detected amount was categorized as positive.

2.4. Development of substance use risk sets for analysis

From the intent to treat cohort, the subset of women who met minimum baseline criteria for use of cigarettes, alcohol, marijuana or cocaine in the six months before pregnancy was included. Since a solo diagnosis of nicotine abuse or dependence was not an eligibility criterion of the main study, cigarette use data were only available for the three months prior to pregnancy.

Women who never used a particular substance were not "at risk" for becoming abstinent to that substance since they never used it. Similarly, only women who used a substance before pregnancy and achieved abstinence in pregnancy were "at risk" for relapse postpartum. Because of this, we assessed the likelihood of abstinence and risk of relapse, by substance, after segregating participants into "risk sets". The abstinence risk sets included all women who had used a substance of interest prior to pregnancy, and thus were eligible for abstinence in pregnancy. The relapse risk sets included participants from the abstinence risk sets that achieved abstinence in pregnancy, and thus were eligible for relapse postpartum. Women could be assigned to more than one risk set if they used more than one substance. Risk sets were built separately for abstinence and relapse, and consisted of one risk set for each of the four substances examined. Thus, there were four risk sets for abstinence and four risk sets for relapse. The women in each risk set comprised the "substance use group" described at the bottom of Table 1. The criteria for inclusion in the particular risk set were the following: five or more cigarettes per day in the three months before or in pregnancy for smoking; seven drinks per week or three or more per day during the six months prior to or in pregnancy for alcohol; any marijuana use during the six months prior to or in pregnancy for marijuana; or any cocaine use in the six