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Postpartum Contraceptive use and Rapid Repeat Pregnancy Among Women who use Substances

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Abstract

Background—Postpartum contraception is especially important for women who use alcohol and other substances, given the risk of possible rapid repeat pregnancy and prenatal substance exposure. However, little is known about postpartum contraceptive use among women with substance use histories.

Objective—To characterize postpartum contraceptive initiation, 24-month continuation, and rapid repeat pregnancy among women who used substances during pregnancy.

Methods—This is a secondary analysis of 161 pregnant women who enrolled in a randomized clinical trial to treat substance use in pregnancy and completed at least one follow-up assessment. Women were eligible if they were less than 28 weeks gestation and reported alcohol or illicit drug use within the past 30 days. Participants were recruited from two hospital-based OB/GYN clinics between 2006 and 2010, and completed assessments at delivery and 3-, 12-, and 24-months postpartum.

Results—Past 30-day use of any substance (not including tobacco) was 52.4%, 58.3%, and 59.8% at 3-, 12-, and 24-month follow-up, respectively. Marijuana was the most commonly reported illicit substance (as high as 48.1%). Rates of any contraceptive use were 71.3%, 66.7% and 65.3% at 3-, 12-, and 24-month follow-up, respectively; DepoProvera and condoms were the most common methods. Rapid repeat pregnancy occurred in 28% of participants by 24-month follow-up.

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Declaration of interest

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

Conclusions/Importance—Postpartum contraceptive use among substance using women was at or near 70%, which is comparable to other samples of postpartum women. Innovative efforts are needed to promote effective contraceptive use among postpartum women in general and among those who use substances in particular.

Keywords

Contraception; postnatal; substance misuse; unplanned pregnancy; LARC

Introduction

Rapid repeat pregnancy (RRP), which are intended or unintended pregnancies conceived within 18–24 months of the previous pregnancy, is associated with increased risk of preeclampsia, preterm birth, low birth weight, and congenital anomalies (Conde-Agudelo, Rosas-Bermúdez, & Kafury-Goeta, 2006; Khoshnood, Lee, Wall, & Hsieh, 1998; Klerman, Cliver, & Goldenberg, 1998; Kwon, Lazo-escalante, Villaran, & Li, 2012). Within a nationally representative sample of women, 35% experienced RRP, with nearly 7% occurring within the first 6 months postpartum (Gemmell & Lindberg, 2013). Some women may be at higher risk of RRP, including adolescents (Gemmell & Lindberg, 2013). However, previous investigations have not examined whether women who use substances are at higher risk for RRP, and we were unable to find estimates in the literature for RRP among women who used substances in pregnancy or had a substance use disorder (SUD). Considering that rates of unintended pregnancy are high among women who use substances (Abdala, Kershaw, Krasnoselskikh, & Kozlov, 2011; Heil et al., 2011; Orr, James, & Reiter, 2008; Terplan, Cheng, & Chisolm, 2014; Than et al., 2005), it is possible that rates of RRP may also be high among this subgroup. Understanding this subgroup's risk of RRP is important given the range of adverse pregnancy and infant outcomes associated with prenatal substance exposure, including spontaneous abortion, fetal alcohol spectrum disorders, low birth weight, and long-term cognitive and behavioral difficulties (Forray, 2016; Shankaran et al., 2007); these potential risks underscore the need for effective contraception in women with SUDs.

Postpartum contraceptive planning and implementation is one preventive effort aimed at reducing RRP. The immediate postpartum period is an ideal time to implement contraception for women given that patients are typically engaged in care and motivated to prevent pregnancy while they are caring for a newborn (Speroff & Mishell, 2008). Few studies have examined rates of contraception use beyond the first few months postpartum (Damle, Gohari, McEvoy, Desale, & Gomez-Lobo, 2015; Glazer, Wolf, & Gorby, 2011; Tocce, 2012). One survey study found that 29% of postpartum women reported using no contraceptive method, 32% reported using a method that was not highly effective, and only 5% reported using a long-acting reversible contraceptive (LARC) method such as an intrauterine device (IUD); however, given that only 34% of participants completed follow-up, results may be biased (Glazer et al., 2011).

Although the proportion of postpartum contraception among women with a substance use history is not known, general estimates of contraceptive use in childbearing aged women

who use substances vary widely. Women with opioid and other SUDs use contraception less often, with 56% of women with SUDs relying upon contraception compared to 81% of women without a SUD (Terplan, Hand, Hutchinson, Salisbury-Afshar, & Heil, 2015). Prevalence of contraceptive use ranges widely from 6–77% (median = 55%) (Terplan et al., 2015) for women with a SUD. Condoms are the most common method of choice in this group (median = 62%), whereas use of IUDs is much less prevalent (8%) (Terplan et al., 2015). By comparison, for women of childbearing age in general, the rate of IUD use is similar, whereas the condom use rate is actually much lower (16% for 2006–2010) (Jones, Mosher, & Daniels, 2012). However, we lack longitudinal data on contraceptive initiation and continuation among postpartum women who misuse substances.

The present study prospectively examines postpartum contraception among a sample of women with substance use histories in order to better understand and characterize contraceptive initiation and continuation, and RRP through two years postpartum.

Methods

We performed secondary analysis of a prospective, randomized clinical trial (Psychosocial Research to Improve Drug Treatment in Pregnancy/PRIDE Trial (Forray & Foster, 2015; Yonkers et al., 2012)), designed to compare substance use outcomes (percentage of days substances were used in previous 28 days within 4 weeks of delivery and 3 months postpartum) for motivational enhancement therapy combined with cognitive behavioral therapy (intervention group) vs. brief advice from obstetrical providers (control group).

Participants

Women (N=184) who were at least 16 years of age, fluent in English or Spanish and within the first 28 weeks of their pregnancy were recruited from two hospital-based OB/GYN clinics in New Haven and Bridgeport, CT. Eligibility criteria included self-report of any alcohol or illicit drug use (marijuana, cocaine, opioids, other drugs) or prescription opioid misuse in the 30 days prior to screening or a modified TWEAK (Chang, Wilkins-Haug, Berman, & Goetz, 1999; Russell et al., 1996) score of 3 or more. The TWEAK is a 5-item screener for risky alcohol use, with scores ranging from 0 to 7; a score of 3 indicates a positive response to at least two items (Chang et al., 1999; Russell et al., 1996). For this study, the TWEAK was modified to include drugs in addition to alcohol (e.g., “In the past year did friends or family worry or complain about your use of alcohol or drugs?”). Women who were already engaged in substance use treatment, used opioids as their primary drug, or nicotine as their only substance were ineligible to participate. A total of 184 women enrolled and 161 completed at least one of the three follow-up visits; 143 (78%) returned for 3-month follow-up, 108 (59%) for 12-month follow-up, and 127 (69%) for 24-month follow-up. All study procedures were approved by the Yale School of Medicine Institutional Review Board.

Data collection

Study visits were conducted in conjunction with prenatal and postnatal care visits. No differences in substance use outcomes were found between intervention and control groups

(Forray & Foster, 2015; Yonkers et al., 2012). Assessments occurred at intake, delivery, and 3-, 12-, and 24-months postpartum.

Measures

Participants completed comprehensive assessments via computer, including demographic items, the Addictions Severity Index-Lite (ASI) (McLellan, Luborsky, Woody, & O'Brien, 1980) and questions related to sexual behaviors and contraceptive use. The ASI, a widely used measure with high external reliability, test-retest reliability, and internal consistency (Hodgins & el-Guebaly, 1992; McLellan et al., 1992), was used to assess substance use. For the present analyses, ongoing risky use at follow-up was defined as past 30-day self-reported use of alcohol to the point of intoxication (i.e., “felt the effects of alcohol, felt high, got a buzz or had 3 or more drinks in one sitting or 5 or more drinks in one day”) and/or any use of marijuana, cocaine, opioids, and other illegal drugs (e.g., hallucinogens, amphetamine); non-risky use of substances at follow-up included no substance use or use of alcohol but not to the point of intoxication.

Regarding sexual behavior and contraceptive use, participants were asked the following: “Since you delivered on [delivery date], have you used DepoProvera?” Oral contraceptive pills? Birth control patch? If yes, “when did you last get a DepoProvera shot/take birth control pills/use a patch?”; “Since you delivered on [delivery date], have you and your partner used any method of birth control (including condoms)?” If yes, “when did you last use any birth control method?” And, “what method did you use?” Of note, standard care for postpartum women treated within these clinics included recommending and prescribing DepoProvera; therefore, discontinuation of DepoProvera was also tracked. The number of male sexual partners since delivery was assessed with a single item: “Since your delivery on [delivery date], how many men have you had sex with?” To assess pregnancy intention, at intake participants were asked: “Was this pregnancy planned?” Rapid repeat pregnancy was determined at 12- and 24-month by responses to the following question: “Since delivering [delivery date] have you been pregnant again?” Rapid repeat pregnancy was not assessed at the 3-month follow-up.

Statistical analysis

All analyses were conducted using IBM SPSS version 22.0. Descriptive analyses were used to analyze participant characteristics and calculate rates of risky substance use, contraceptive use and rapid repeat pregnancy. Stepwise logistic regression was conducted in order to compare risky substance-using and non-risky-using women on contraception and RRP outcomes. Covariates including age, race/ethnicity, relationship status, education, parity at intake, number of lifetime male sexual partners, and number of male sexual partners since delivery were included in regression analyses.

Results

Participant characteristics

The study population was predominantly 22 to 30 years old, Black, and single (Table 1). At intake, 80% of women indicated that their pregnancy was unintended.

Past 30-day risky substance use

The majority of the sample endorsed ongoing risky substance use during follow-up (Table 2); 52.4% at 3 months, 58.3% at 12 months, and 59.8% at 24 months. Of the risky users, many reported polysubstance use (20.0%, 41.3%, and 35.5% at 3-, 12-, and 24-months, respectively). Across all follow-up points, marijuana was the most commonly used illicit substance (39.2%, 48.1%, and 48.0% at 3-, 12-, and 24-months, respectively) among women who had used in the past 30 days, followed by using alcohol to intoxication (15.4%, 25.0%, and 22.0% at 3-, 12-, and 24-months, respectively).

Sexual behavior and postpartum contraceptive use

At intake, participants reported having an average of 15.08 (SD = 34.16; range = 1–300) male sexual partners in their lifetime. At follow-up, the mean number of male sexual partners since delivery was 1.04 (SD = 1.16; range = 0–10), 1.34 (SD = 1.14; range = 0–9), and 1.89 (SD = 1.85; range = 0–15) for the 3-, 12- and 24-month follow-up periods respectively; the median for all time points was 1. Regarding postpartum contraceptive use across follow-up periods (Table 3), approximately 30% of women reported no contraception use since delivery (28.7% at 3-month, 33.3% at 12-month, and 34.7% at 24-month follow-up periods). Among women who used postpartum contraception, DepoProvera was the most commonly used method, followed by condoms and oral contraceptive pills (OCP). Of the 58 (36.0%) women placed on DepoProvera during their study participation, 7 (12.1%) discontinued DepoProvera by the 12-month follow-up and 9 additional women (15.5%) discontinued by the 24-month follow-up.

Rapid repeat pregnancy

Out of those who returned for follow-up, 40 (28.4%) women reported that they had become pregnant again, 6 of whom indicated that they had been pregnant twice within the 24-month follow-up timeframe for a total of 46 rapid repeat pregnancies.

Multivariate analyses

Adjusting for potential confounds, there was no difference in postpartum contraceptive use between women with and without ongoing risky substance use at 3-, 12- and 24-month follow-up. Age (at all follow-up points) and parity at intake (24-month follow-up only) were the only factors retained in the adjusted model (see Table 4 for adjusted odds ratios). There was also no difference in RRP between women with and without ongoing risky substance use, and no factors were retained in the final models for 12- and 24-month follow-up.

Discussion

In this prospective study of pregnant women who use substances, we found that 80% considered their pregnancy to be unintended. Across the 24-month postpartum follow-up period, roughly two-thirds of women reported use of contraception, with most using DepoProvera, condoms, or OCPs. Rates of non-use of contraceptives was somewhat comparable to other samples of postpartum women. Use of LARC methods (namely, IUDs) ranged from 5 to 11%, which is also comparable to other samples of reproductive aged and postpartum women (Daniels, Daugherty, & Jones, 2014; Daniels, Daugherty, Jones, &

Mosher, 2015; Glazer et al., 2011; Zapata et al., 2015); although, methodological differences in assessing contraceptive use make these comparisons cautious. Over a quarter of women in this study experienced RRP by 24-month follow-up; women with current risky substance use no more likely to become pregnant again during the RRP timeframe than women without ongoing substance use. The rate of RRP in this study was somewhat lower than that found in a nationally representative study of postpartum women (35%) (Gemmill & Lindberg, 2013). Of note, although use of substances can impact fertility (Sharma, Biedenharn, Fedor, & Agarwal, 2013), the rate of unintended pregnancy among women who use substances is still higher—roughly twice as high in some samples, including the present study—compared to women in the general population (Finer & Zolna, 2016; Heil et al., 2011; Orr et al., 2008; Sinha, Guthrie, & Lindow, 2007; Than et al., 2005). Thus, given the potential for prenatal substance exposure in the context of unintended pregnancy, innovative efforts are needed to improve contraceptive initiation and continuation in the pre-pregnancy and postpartum period for women who misuse substances. It is possible that some clinicians may be more concerned about heightened risks associated with RRP for substance-using women and thus may be more likely to take extra precautions in planning and implementing postpartum care for this subpopulation, such as starting DepoProvera or LARC methods during the postpartum period; however, this is not necessarily standard practice and providers may not be aware of which patients are at greater risk of substance use or misuse.

In addition to factors contributing to unintended pregnancy for women in general, women who use substances may face other substantial barriers to accessing or using contraception. Some women who use substances may be poorly informed about their reproductive health and available contraceptive options (Jessup, 2005; Lundsberg et al., 2014), fear being stigmatized by providers (Black & Day, 2016), or perceive contraception to be a low priority in the face of other significant psychosocial stressors associated with substance use and/or recovery, including poverty, interpersonal violence and unstable housing (Hans, 1999). Furthermore, some women who use substances may be uncertain about how substance use impacts fertility (Black & Day, 2016) or a developing fetus (Peadon et al., 2010). Among opioid-using women, for example, menstrual irregularities including amenorrhea are common (Katz, 2009), and women may think this reduces their fertility.

Sinha and colleagues (Sinha et al., 2007) examined postnatal contraceptive use among a cohort of opioid-using women. Of the 14 women who began DepoProvera postnatally (either immediately postpartum or at a later date), none continued use after the first injection. However, among 20 women who received implants, there was a 95% continuation rate over the 11-month follow-up period. This higher continuation rate for implants is likely driven by the fact that they provide contraceptive protection for many years and therefore do not require patients to return to the clinic every 3 months for subsequent injections. Initiation of other contraceptive methods including OCP, IUD, and sterilization were very low, ranging from 2.5 to 5%. Although continuation rates for one LARC method were encouraging, this study had a limited sample size and focused solely on opioid-using women. By comparison, within the present study in which a much larger group of women who used a variety of substances were followed up to 24-months postpartum, initiation of DepoProvera was more common and use of implants was very uncommon. Notably, IUDs, another effective LARC method, were underutilized by women in Sinha and colleagues' (Sinha et al., 2007) study

and the present study, which suggests the need for improved efforts to increase access to and use of LARC methods for women who use substances.

Providing LARC methods during the immediate postpartum period is a cost-effective approach for preventing unintended pregnancies (Garipey, Duffy, & Xu, 2015). Offering reproductive healthcare including contraception in conjunction with substance use treatment could also be an efficient and cost-effective approach to engaging women who use substances (Jessup, 2005; Terplan et al., 2015). Such an option may be particularly appealing to women with substance misuse who express mistrust of the healthcare system and may be deterred from seeking reproductive healthcare in traditional settings due to potential consequences of disclosing use (e.g., child protective services involvement). Finally, considering that in general many women lack knowledge about their reproductive health (Jessup, 2005), it is likely that women using substances have similar needs. Targeted outreach and education efforts are needed, including web-based tools (Gressel, Lundsberg, Illuzzi, & Danton, 2014; Lundsberg et al., 2014) or other technologies capable of reaching a greater proportion of women to facilitate education and prevention efforts.

Limitations and future directions

The present study represents secondary analysis of data from a larger clinical trial, using self-report of ongoing risky substance use, contraceptive use and repeat pregnancy. Although the present study recruited a large sample of pregnant women with substance use histories, multivariate analyses may have been underpowered. Compared to larger-scale studies that have examined contraceptive use and pregnancy-postpartum periods, such as the Centers for Disease Control and Prevention's Pregnancy Risk Assessment Monitoring System surveillance project or the nationally representative National Survey of Family Growth, the present study may have been more vulnerable to demand characteristics, since participants knowingly took part in a treatment study for pregnant women with a history of substance use. Additionally, some participants—22% at 3-month follow-up, 41% at 12-month follow-up, and 31% at 24-month follow-up—did not complete all three follow-up assessments, which may have impacted estimates of contraceptive use and RRP. Participants who returned for follow-up may have been more likely to follow through on medical recommendations, including use of contraceptives. All participants were recruited from and received care within an academic medical center, and thus standard of care may differ from other community settings. Since examining postpartum contraceptive use among substance-using women was not the primary focus of the larger trial, several relevant aims could not be explored, including assessing the extent to which women had knowledge of, preferences for, and accessibility to the full range of contraceptive methods, as well as how adherent women were to their chosen contraceptive method. As a result, it is possible that methods including withdrawal, fertility awareness, and sterilization may not have been captured as “any method of birth control”, if women do not classify these options as contraception. It is also possible that women may not have been fully adherent to the contraceptive methods they were using, particularly if they relied on non-LARC methods, or may have discontinued use of a method without notifying study personnel. Therefore, rates for various methods may be overestimated in the present study given that participants were asked to report on use of methods since delivery rather than since the previous assessment or at present. Future

research that more thoroughly assesses contraceptive adherence among women who use substances—perhaps employing Timeline Followback, ecological momentary assessment, or related methodology—may be helpful in identifying common errors or risky timeframes for lapses in adherence. In addition, given that this study focused on women with substance misuse who continued their pregnancy, those who terminated their pregnancy were not included. It is possible that compared to women who decide to continue their pregnancy, those who decide to terminate their pregnancy may differ in some ways, including with respect to the contraceptive methods they use after pregnancy. Further, it is unclear whether there are other factors driving reproductive health choices that are specific to women who use substances. Future investigations should consider the reasons or motivations behind the reproductive health choices made by women with substance use histories in order to better inform prevention and intervention efforts aimed at reducing unintended and potentially substance-exposed pregnancies and empowering women to participate in their reproductive healthcare.

Conclusion

Initiation of contraception during the postpartum period can diminish rates of RRP, especially among vulnerable populations such as women who use substances. Greater uptake of LARC may reduce rates even further and allow for better pregnancy planning.

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Glossary

Intrauterine device (IUD)

a small contraceptive device implanted in the uterus for up to 5–10 years

Long-acting reversible contraception (LARC)

contraceptive methods (e.g., IUD or birth control implant) that are highly effective at preventing pregnancy and can last for several years

Parity

number of pregnancies that reach a viable gestational age (e.g., live births, stillbirths)

Rapid repeat pregnancy

pregnancy conceived within 24 months of a previous pregnancy

References

Abdala N, Kershaw T, Krasnoselskikh TV, Kozlov AP. Contraception use and unplanned pregnancies among injection drug-using women in St Petersburg, Russia. *Journal of Family Planning and*

- Reproductive Health Care. 2011; 37(3):158–164. DOI: 10.1136/jfprhc-2011-0079 [PubMed: 21493618]
- Black KI, Day CA. Improving access to long-acting contraceptive methods and reducing unplanned pregnancy among women with substance use disorders. *Substance Abuse*. 2016; 10(Suppl 1):27–33. DOI: 10.4137/SART.S34555 [PubMed: 27199563]
- Chang G, Wilkins-Haug L, Berman S, Goetz MA. The TWEAK: application in a prenatal setting. *Journal of Studies on Alcohol*. 1999; 60(3):306–309. [PubMed: 10371256]
- Conde-Agudelo A, Rosas-Bermúdez A, Kafury-Goeta AC. Birth spacing and risk of adverse perinatal outcomes: A meta-analysis. *JAMA: The Journal of the American Medical Association*. 2006; 295(15):1809–1823. DOI: 10.1001/jama.295.15.1809 [PubMed: 16622143]
- Damle LF, Gohari AC, McEvoy AK, Desale SY, Gomez-Lobo V. Early initiation of postpartum contraception: does it decrease rapid repeat pregnancy in adolescents? *Journal of Pediatric & Adolescent Gynecology*. 2015; 28(1):57–62. DOI: 10.1016/j.jpjag.2014.04.005 [PubMed: 25555302]
- Daniels K, Daugherty J, Jones J. Current contraceptive status among women aged 15–44: United States, 2011–2013. *NCHS Data Brief*. 2014; (173):1–8.
- Daniels K, Daugherty J, Jones J, Mosher W. Current contraceptive use and variation by selected characteristics among women aged 15–44: United States, 2011–2013. *Natl Health Stat Report*. 2015; (86):1–14.
- Finer LB, Zolna MR. Declines in unintended pregnancy in the United States, 2008–2011. *New England Journal of Medicine*. 2016; 374(9):843–852. DOI: 10.1056/NEJMs1506575 [PubMed: 26962904]
- Forray A. Substance use during pregnancy. *F1000Res*. 2016; 5:881. (F1000 Faculty Rev). doi: 10.12688/f1000research.7645.1 [PubMed: 27303631]
- Forray A, Foster D. Substance use in the perinatal period. *Current Psychiatry Reports*. 2015; 17(11): 91. doi: 10.1007/s11920-015-0626-5 [PubMed: 26386836]
- Gariepy AM, Duffy JY, Xu X. Cost-effectiveness of immediate compared with delayed postpartum etonogestrel implant insertion. *Obstetrics & Gynecology*. 2015; 126(1):47–55. DOI: 10.1097/AOG.0000000000000907 [PubMed: 26241255]
- Gemmill A, Lindberg LD. Short interpregnancy intervals in the United States. *Obstetrics & Gynecology*. 2013; 122(1):64–71. DOI: 10.1097/AOG.0b013e3182955e58 [PubMed: 23743455]
- Glazer AB, Wolf A, Gorby N. Postpartum contraception: needs vs. reality. *Contraception*. 2011; 83(3): 238–241. DOI: 10.1016/j.contraception.2010.07.002 [PubMed: 21310285]
- Gressel GM, Lundsberg LS, Illuzzi JL, Danton CM. Patient and provider perspectives on Bedsider.org, an online contraceptive information tool, in a low income, racially diverse clinic population. *Contraception (Stoneham)*. 2014; 90(6):588–593. DOI: 10.1016/j.contraception.2014.07.010
- Hans SL. Demographic and psychosocial characteristics of substance-abusing pregnant women. *Clinics in Perinatology*. 1999; 26(1):55–74. [PubMed: 10214543]
- Heil SH, Jones HE, Arria A, Kaltenbach K, Coyle M, Fischer G, ... Martin PR. Unintended pregnancy in opioid-abusing women. *Journal of Substance Abuse Treatment*. 2011; 40(2):199–202. DOI: 10.1016/j.jsat.2010.08.011 [PubMed: 21036512]
- Hodgins DC, el-Guebaly N. More data on the addiction severity index. reliability and validity with the mentally ill substance abuser. *Journal of Nervous and Mental Disease*. 1992; 180(3):197–201. [PubMed: 1588339]
- Jessup MA. Issues in reproductive health and empowerment in perinatal women with substance use disorders. *Journal of Addictions Nursing*. 2005; 16(3):97–105. DOI: 10.1080/10884500500196693
- Jones J, Mosher W, Daniels K. Current contraceptive use in the United States, 2006–2010, and changes in patterns of use since 1995. *National Health Statistics Reports*. 2012; (60):1–25.
- Katz NN. The impact of opioids on the endocrine system. *The Clinical Journal of Pain*. 2009; 25(2): 170–175. DOI: 10.1097/AJP.0b013e3181850df6 [PubMed: 19333165]
- Khoshnood B, Lee KS, Wall S, Hsieh HL. Short interpregnancy intervals and the risk of adverse birth outcomes among five racial/ethnic groups in the United States. *American Journal of Epidemiology*. 1998; 148(8):798–805. [PubMed: 9786235]

- Klerman LV, Cliver SP, Goldenberg RL. The impact of short interpregnancy intervals on pregnancy outcomes in a low-income population. *American Journal of Public Health*. 1998; 88(8):1182–1185. [PubMed: 9702144]
- Kwon S, Lazo-escalante M, Villaran MV, Li CI. Relationship between interpregnancy interval and birth defects in Washington State. *Journal of Perinatology*. 2012; 32(1):45–50. DOI: 10.1038/jp.2011.49 [PubMed: 21546941]
- Lundsberg LS, Pal L, Garipey AM, Xu X, Chu MC, Illuzzi JL. Knowledge, attitudes, and practices regarding conception and fertility: a population-based survey among reproductive-age United States women. *Fertility and Sterility*. 2014; 101(3):767–774.e762. DOI: 10.1016/j.fertnstert.2013.12.006 [PubMed: 24484995]
- McLellan AT, Kushner H, Metzger D, Peters R, Smith I, Grissom G, ... Argeriou M. The fifth edition of the addiction severity index. *Journal of Substance Abuse Treatment*. 1992; 9(3):199–213. [PubMed: 1334156]
- McLellan AT, Luborsky L, Woody GE, O'Brien CP. An improved diagnostic evaluation instrument for substance abuse patients. The addiction severity index. *Journal of Nervous and Mental Disease*. 1980; 168(1):26–33. [PubMed: 7351540]
- Orr ST, James SA, Reiter JP. Unintended pregnancy and prenatal behaviors among urban, black women in Baltimore, Maryland: the Baltimore preterm birth study. *Annals of Epidemiology*. 2008; 18(7):545–551. DOI: 10.1016/j.annepidem.2008.03.005 [PubMed: 18504137]
- Peadon E, Payne J, Henley N, D'Antoine H, Bartu A, O'Leary C, ... Elliott EJ. Women's knowledge and attitudes regarding alcohol consumption in pregnancy: a national survey. *BMC Public Health*. 2010; 10:510.doi: 10.1186/1471-2458-10-510 [PubMed: 20727217]
- Russell M, Martier SS, Sokol RJ, Mudar P, Jacobson S, Jacobson J. Detecting risk drinking during pregnancy: a comparison of four screening questionnaires. *American Journal of Public Health*. 1996; 86(10):1435–1439. [PubMed: 8876514]
- Shankaran S, Lester BM, Das A, Bauer CR, Bada HS, Lagasse L, Higgins R. Impact of maternal substance use during pregnancy on childhood outcome. *Seminars in Fetal and Neonatal Medicine*. 2007; 12(2):143–150. DOI: 10.1016/j.siny.2007.01.002 [PubMed: 17317350]
- Sharma R, Biedenharn KR, Fedor JM, Agarwal A. Lifestyle factors and reproductive health: taking control of your fertility. *Reproductive Biology and Endocrinology*. 2013; 11:66.doi: 10.1186/1477-7827-11-66 [PubMed: 23870423]
- Sinha C, Guthrie KA, Lindow SW. A survey of postnatal contraception in opiate-using women. *Journal of Family Planning and Reproductive Health Care*. 2007; 33(1):31–34. DOI: 10.1783/147118907779399738 [PubMed: 17389093]
- Speroff L, Mishell DR Jr. The postpartum visit: it's time for a change in order to optimally initiate contraception. *Contraception*. 2008; 78(2):90–98. DOI: 10.1016/j.contraception.2008.04.005 [PubMed: 18672108]
- Terplan M, Cheng D, Chisolm MS. The relationship between pregnancy intention and alcohol use behavior: an analysis of PRAMS data. *Journal of Substance Abuse Treat*. 2014; 46(4):506–510. DOI: 10.1016/j.jsat.2013.11.001
- Terplan M, Hand DJ, Hutchinson M, Salisbury-Afshar E, Heil SH. Contraceptive use and method choice among women with opioid and other substance use disorders: A systematic review. *Preventive Medicine*. 2015; 80:23–31. DOI: 10.1016/j.ypmed.2015.04.008 [PubMed: 25900803]
- Than LC, Honein MA, Watkins ML, Yoon PW, Daniel KL, Correa A. Intent to become pregnant as a predictor of exposures during pregnancy: is there a relation? *Journal of Reproductive Medicine*. 2005; 50(6):389–396. [PubMed: 16050563]
- Tocce KM. Rapid repeat pregnancy in adolescents: do immediate postpartum contraceptive implants make a difference? *American Journal of Obstetrics and Gynecology*. 2012; 206(6):481.e481–481.e487. DOI: 10.1016/j.ajog.2012.04.015 [PubMed: 22631865]
- Yonkers KA, Forray A, Howell HB, Gotman N, Kershaw T, Rounsaville BJ, Carroll KM. Motivational enhancement therapy coupled with cognitive behavioral therapy versus brief advice: a randomized trial for treatment of hazardous substance use in pregnancy and after delivery. *General Hospital Psychiatry*. 2012; 34(5):439–449. DOI: 10.1016/j.genhosppsych.2012.06.002 [PubMed: 22795046]

Zapata LB, Murtaza S, Whiteman MK, Jamieson DJ, Robbins CL, Marchbanks PA, ... Curtis KM. Contraceptive counseling and postpartum contraceptive use. *American Journal of Obstetrics & Gynecology*. 2015; 212(2):171.e171–178. DOI: 10.1016/j.ajog.2014.07.059 [PubMed: 25093946]

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Table 1

Participant characteristics at enrollment.

Demographic Variable	Total 161 N (%)	Ongoing risky users 95 N (%)	Non-risky users 62 N (%)
Age			
16 to 21	41 (25.2)	22 (23.2)	18 (29.0)
22 to 30	78 (48.4)	47 (49.5)	28 (45.2)
31 and up	29 (18.0)	20 (21.1)	9 (14.5)
Race/ethnicity			
White	33 (20.5)	19 (20.0)	14 (22.6)
Black	76 (47.2)	51 (53.7)	23 (37.1)
Hispanic	48 (29.8)	21 (22.1)	25 (40.4)
Other	4 (2.4)	4 (4.2)	0 (0)
Relationship status			
Married	14 (8.7)	5 (5.3)	8 (12.9)
Dating, living with partner	38 (23.6)	22 (23.2)	16 (25.8)
Dating, not living with partner	28 (17.4)	16 (16.8)	10 (16.1)
Single	71 (44.1)	48 (50.5)	22 (35.5)
Divorced/separated	10 (6.2)	4 (4.2)	6 (9.7)
Pregnancy intention			
Intended	32 (19.9)	17 (17.9)	13 (21.0)
Unintended	129 (80.1)	78 (82.1)	49 (79.0)
Gravidity			
1	34 (21.1)	18 (18.9)	16 (25.8)
2	44 (27.3)	29 (30.5)	14 (22.6)
3	24 (14.9)	13 (23.7)	11 (17.7)
4 or more	59 (36.7)	35 (36.8)	21 (33.9)
Parity			
0	67 (41.6)	37 (38.9)	28 (45.2)
1	45 (28.0)	30 (31.6)	15 (24.2)
2 or more	49 (30.4)	28 (29.5)	19 (30.6)
Education (years)			
Less than 12	44 (27.3)	26 (27.4)	17 (27.4)
12	45 (28.0)	26 (27.4)	19 (30.6)
13 to 15	26 (16.1)	19 (20.0)	7 (11.3)
16 or more	7 (4.3)	3 (3.2)	4 (6.5)
Number of lifetime male sexual partners at intake			
1–5	53 (32.9)	31 (32.6)	21 (33.9)
6–10	57 (35.4)	34 (35.8)	21 (33.9)
11–20	30 (18.6)	19 (20.0)	11 (11.7)
21 or more	18 (11.2)	10 (10.5)	8 (12.9)

Note: Of the 184 enrolled at intake, only 161 participants completed at least one follow-up visit and were included in analyses; of the 161 participants with follow-up data, information on postpartum substance use was not available for 4 participants. Ongoing risky vs. non-risky use categories were determined using data from follow-up as opposed to intake data.

Table 2

Past 30-day self-reported risky substance use across time points.

Substance	Intake <i>N</i> (%)	3-month <i>N</i> (%)	12-month <i>N</i> (%)	24-month <i>N</i> (%)
Any alcohol	51 (31.7)	65 (44.2)	57 (52.8)	71 (55.9)
Alcohol intoxication	16 (9.9)	22 (15.4)	27 (25.0)	28 (22.0)
Marijuana	74 (46.0)	56 (39.2)	52 (48.1)	61 (48.0)
Cocaine	20 (13.4)	7 (4.9)	6 (5.6)	10 (7.9)
Opioids	6 (3.7)	3 (2.1)	6 (5.6)	8 (6.3)
Hallucinogens	3 (1.9)	3 (2.1)	0 (0)	1 (0.8)
Amphetamine	0 (0)	0 (0)	0 (0)	1 (0.8)

Note: Past 30-day substance use based on responses to Addiction Severity Index (ASI); alcohol intoxication indicated by positive response to “felt the effects of alcohol, felt high, got a buzz or had 3 or more drinks in one sitting or 5 or more drinks in one day.”

Table 3

Self-reported contraceptive use across time points.

Method	3-month <i>N</i> = 143 <i>N</i> (%)	12-month <i>N</i> = 108 <i>N</i> (%)	24-month <i>N</i> = 127 <i>N</i> (%)
DepoProvera®	46 (32.2)	27 (25.0)	32 (25.2)
OCP	27 (18.9)	15 (13.9)	14 (11.0)
Patch	2 (1.4)	0 (0.0)	2 (1.6)
IUD	8 (5.6)	12 (11.1)	13 (10.2)
Condoms	27 (18.9)	25 (23.2)	35 (27.6)
Other	2 (1.4)	4 (3.7)	3 (2.4)
None reported	41 (28.7)	36 (33.3)	34 (34.7)

Note: Participants could report using >1 form of contraception; OCP=oral contraceptive pills; IUD = intrauterine device.

Table 4

Logistic regression analyses examining factors related to contraceptive use at follow-up.

Variable	3-month		12-month		24-month	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Age	0.90	[0.83, 0.97]	0.86	[0.78, 0.95]	0.88	[0.80, 0.97]
Parity at intake	—	—	—	—	0.67	[0.43, 1.03]

Note: only factors retained in the final model are shown; AOR=adjusted odds ratio; CI = confidence interval; adjusted for age, race/ethnicity, education, marital status, parity at intake, number of lifetime male sexual partners, number of male sexual partners since delivery, past 30-day risky substance use; age and parity at intake are continuous variables.