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Are pregnancy planning and timing associated with preterm or small for gestational age births?

Aileen M. GARIEPY, MD[a], **Lisbet S. LUNDSBERG, PhD**[a], **Marilyn STOLAR, PhD**[b], **Nancy L. STANWOOD, MD**[a], and **Kimberly A. YONKERS, MD**[a,c]

[a]Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale School of Medicine, 310 Cedar Street, New Haven, New Haven, CT 06510

[b]Yale Center for Analytical Sciences, Yale School of Public Health, 300 George Street, Suite 555, New Haven, CT 06520

[c]Department of Psychiatry, Yale School of Medicine, 142 Temple Street, Suite 301, New Haven, CT 06510

Abstract

Objective—Investigate whether unplanned or poorly timed pregnancies (self-reported at enrollment) are associated with preterm or small for gestational age births.

Design—Prospective cohort of 2,654 pregnant women with individual assessments.

Setting—Offices (n=137) providing prenatal care in Connecticut and Western Massachusetts March 2005 to May 2009.

Patient(s)—Women less than 18 weeks estimated gestational age with a singleton pregnancy.

Intervention(s)—None.

Main Outcome Measure(s)—Preterm and small for gestational age births.

Results—In adjusted analyses, pregnancy planning was not significantly associated with preterm (Odds Ratio 1.18, 95%CI 0.85-1.65) nor small for gestational age birth (Odds Ratio 1.17, 95%CI 0.69-1.97). Similarly, poorly timed pregnancies were not significantly associated with preterm (Odds Ratio 0.85, 95%CI 0.53-1.38) nor small for gestational age birth (Odds Ratio 0.92, 95%CI

Corresponding author: Aileen M. Gariepy, MD, MPH, Department of Obstetrics, Gynecology, and Reproductive Sciences, Yale School of Medicine, 310 Cedar Street, New Haven, CT 06510, Work Phone: 203-737-4665, Private phone: 203-737-6476, Fax: 203-737-6195, aileen.gariepy@yale.edu.
aileen.gariepy@yale.edu
lisbet.lundsberg@yale.edu
marilyn.stolar@yale.edu
kimberly.yonkers@yale.edu

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0.65-1.29). Combining pregnancy planning (yes/no) and timing (yes/no) into a 4-level category showed no significant association with preterm birth or small for gestational age.

Conclusion(s)—In a large cohort with antenatally assessed pregnancy planning and timing, outcome data collected from medical record abstraction, and robust analysis adjusting for multiple confounding factors including maternal demographics, medical conditions, and other risk factors, neither pregnancy planning nor pregnancy timing showed a significant association with preterm or small for gestational age infants. This study improves upon previous analyses that lack adjustment for confounding, and use retrospective self-reporting to assess pregnancy planning and timing, and preterm and small for gestational age birth. Findings may differ in higher risk populations with higher prevalence of preterm or small for gestational age births.

Capsule—Neither pregnancy planning nor timing showed a significant association with preterm or small for gestational age births in this large prospective cohort controlling for confounders.

Keywords

preterm birth; small for gestational age; unplanned pregnancy

INTRODUCTION

Unplanned pregnancy, which includes pregnancies that are unintended, mistimed, or unwanted, is common (1, 2). More than half (51%) of all pregnancies in the U.S. are unplanned (1). The burden of unplanned pregnancy is highest among women ages 18 to 24; women who were cohabiting but not married; women whose income is below the poverty line; women with less than a high school diploma; and Black or Hispanic women (1).

Unplanned pregnancies that result in live births (60% of unplanned pregnancies and 40% of all births) (1-3) have been associated with a variety of adverse maternal and fetal outcomes including delayed prenatal care, increased physical violence during pregnancy, depression, reduced breastfeeding, decreased inter-pregnancy intervals, lower likelihood of advanced educational attainment and higher likelihood of behavioral issues for children from unplanned pregnancies (4-7).

Whether unplanned pregnancy is associated with preterm birth and/or delivery of a small for gestational age (SGA) or low birth weight infant is not clear. While there is support for an association between unplanned pregnancy and either preterm birth (7-17), SGA, or low birth weight (3,10,11,13,14,17-22), not all studies agree (15,23-27). More clearly understanding risk factors for preterm and SGA births is a public health priority.

Preterm birth, defined as a live birth before 37 completed weeks gestation, is the leading cause of perinatal morbidity and mortality in developed countries (28). In fact, more infants (35%) die from preterm-related problems, including low birth weight, than from any other single cause in the U.S. (29). Preterm birth also significantly increases the risk of cerebral palsy, vision impairment, cognitive or hearing impairment (30).

In 2012, approximately 1 in 9 infants (11.6% of live births) was born preterm in the U.S. (31). The disparity in demographic distribution of preterm birth mirrors the pattern for

unplanned pregnancy. The U.S. rate of preterm birth is highest for non-Hispanic black infants (16.8%), followed by Native Americans (13.6%), Hispanics (11.7%), whites (10.5%) and Asians (10.3%) (31,32). Preterm birth is highest among women with a history of preterm birth; women younger than 18 or older than 40 years of age; women with income below the poverty line; women with less than a high school diploma; and women with increased stress during pregnancy (31,32). Birth weight is another important predictor of infant health, and SGA may be associated with intrauterine fetal demise, neonatal morbidity and mortality (31, 33). Studies that explore the impact of pregnancy planning and timing on birth outcomes are vulnerable to false associations if they do not take these critical socio-economic and demographic factors into consideration.

We sought to gain a better understanding of the relationship between unplanned or poorly timed pregnancy and preterm or SGA birth, and variables (e.g. depression, anxiety, stress, social support) that affect this relationship. We hypothesized that women with unplanned or poorly timed pregnancies would have a higher risk of preterm birth and SGA. By investigating this relationship, there may be an opportunity to identify individual women with unplanned or poorly timed pregnancy and develop interventions to decrease the risk of preterm or SGA birth. And if pregnancy planning and timing are associated with preterm or SGA births, decreasing unplanned or poorly timed pregnancies could be a potentially effective strategy for decreasing the national preterm birth rate. By prospectively assessing pregnancy planning and timing prior to delivery, collecting outcome data from medical record abstraction instead of birth certificate data or retrospective survey responses from parents, and performing robust adjustments for multiple confounding factors including maternal demographics, medical conditions, and other risk factors, our analysis adds to and improves upon the previous literature.

MATERIALS AND METHODS

Recruitment, Enrollment, and Assessment Procedures

We performed a secondary analysis of a prospective cohort study designed to explore the associations of major depressive episodes and/or antidepressant medication use in pregnancy with adverse birth outcomes, including the risk for preterm birth (34,35). To be eligible for the study, women had to be at least 18 years of age (16 at the Yale site), less than 18 weeks estimated gestational age with a singleton pregnancy, speak English or Spanish, and have access to a telephone. Women with insulin-dependent diabetes, plans to terminate their pregnancy, or intention to relocate were ineligible. Study size was calculated to show a 2-fold difference in preterm birth among women exposed to depression or antidepressant medication, compared to those who were not exposed, with 85% power assuming a 5% preterm birth rate (34). Detailed study methods, including recruitment, enrollment and assessment procedures, staff training and quality control, have been described previously (34,35). Yale University School of Medicine and participating hospitals provided human subjects approval for the study.

Study staff recruited and enrolled pregnant women receiving prenatal care from 137 obstetrical practices and hospital-based clinics in Connecticut and Western Massachusetts between March 2005 and May 2009. Study follow-up continued until September 2009.

After verbal consent was obtained, staff administered a screening questionnaire to collect information on gestational age, current mood, lifetime and current mood and anxiety disorders, antidepressant treatment, and exclusion criteria. In order to meet the study's primary goal of exploring associations between major depressive episodes and/or antidepressant medication use in pregnancy with adverse birth outcomes, all women who met the above criteria and had a current or recent major depressive episode, post-traumatic stress disorder, or were undergoing antidepressant treatment, and a randomly selected comparator group with none of those characteristics.

After enrolled participants gave written consent for interviews and medical record review, study staff conducted an initial home interview before 18 weeks estimated gestational age (EGA). Staff also interviewed participants by phone at 28 (± 2) weeks gestation and 8 (± 4) weeks after delivery. All staff interviewers received extensive training including at least 4 days of instruction and 4 supervised interviews.

Exposure and Outcome Measures

At the initial interview, interviewers obtained data on demographic and potential confounding variables, including mental health outcomes (e.g. depression, post-traumatic stress disorder) perceived stress, and social support. Maternal age, race, ethnicity, education, marital status, parity, pregnancy history including previous preterm birth, tobacco use, alcohol use, other illicit drug use, and medication use was collected. The Edinburgh Postnatal Depression Scale (EPDS), the modified Post-traumatic Stress Disorder (PTSD) Symptom Scale, the Cohen Perceived Stress Scale, and the modified Kendler Social Support Interview (MKSSI) were administered at the first visit (36-39). The Cohen Perceived Stress Scale evaluates the degree to which individuals feel that life events are unpredictable and uncontrollable (38).[38] The modified PTSD Symptom Scale assesses the presence and severity of DSM-IV PTSD symptoms related to a single identified traumatic event in individuals (37). The MKSSI is a reliable and valid tool for assessing social support (emotional and instrumental support) in pregnant women (39).

At each of the three interviews, participants answered questions about major depressive disorder, post-traumatic stress disorder, generalized anxiety disorder, and panic disorder from the World Mental Health Composite International Diagnostic Interview v2.1 (WMH-CIDI) (40). The WMH-CIDI is a valid and reliable lay interview instrument whether administered in person or over the telephone, is acceptable for use in pregnant women, and is further described in previous publications regarding this study (34,35). A standard algorithm was used to determine whether a participant met criteria for a major depressive episode during pregnancy. Perceived stress, and social support were not assessed at the second or third visit.

We measured our exposure of interest at the first study visit (before 18 weeks EGA). Interviewers assessed pregnancy intention by asking women whether their pregnancy was planned ("Was this pregnancy planned? Yes/No"), and whether they thought it was a good time for them to be pregnant ("Do you think this is a good time for you to be pregnant? Yes/No").

Medical-record reviewers, who were masked from interview information, abstracted data on outcomes of preterm birth and SGA infants from hospital records. We used standard of care definitions for outcome measurement. Preterm birth was defined as delivery before 37 completed weeks of pregnancy (41). Gestational age was verified by a first-trimester ultrasound where available, last menstrual period, due date set by a physician, or earliest prenatal ultrasound. SGA refers to newborns whose birth weight is less than the 10th percentile for gestational age (33).

Statistical Analysis

We used bivariate and multivariable logistic regression models to estimate the association of pregnancy planning and timing with preterm and SGA birth, and calculated unadjusted and adjusted odds ratios, controlling for potential confounding variables. We identified possible demographic factors (chosen *a priori*) that might confound the relationship between pregnancy planning or timing and preterm or SGA birth. Use of tobacco, alcohol or illicit drugs, depression (major depression 6 months before pregnancy and/or during pregnancy), and stress are all correlates of pregnancy planning/timing, preterm birth and SGA (1,21,41-47). Mother's age, education, race, marital status, gravidity, history of preterm birth, history of sexual abuse prior to age 18, and social support are all correlates of both pregnancy planning/timing and preterm birth (1,5,41,42,46-51). Use of selective serotonin reuptake inhibitor during pregnancy, panic disorder during pregnancy, benzodiazepine use during pregnancy, and post-traumatic stress disorder before pregnancy are correlated with depression and preterm birth (34). Participants with missing data were excluded from the regression models and are reported in Tables 1 and 2.

To estimate the risk of preterm or SGA birth, we generated separate models for pregnancy planning and timing. In addition to the independent, binary exposures of planning and timing, we created a 4-level exposure variable: (1) women with an unplanned pregnancy occurring at a bad time, (2) women with an unplanned pregnancy occurring at a good time, (3) women with a planned pregnancy occurring at a bad time, and (4) women with a planned pregnancy occurring at a good time (reference category). Analyses were conducted using SAS 9.3 (SAS Institute, Cary, NC).

RESULTS

The cohort is comprised of 2654 women with singleton, live births who completed the initial interview assessing exposures of pregnancy planning and timing status, after exclusion of women with multiple births, miscarriage, stillbirth, abortion, and withdrawals. Data on birth outcomes were available for 99%. Of these 2654 women, 2487 (94%) completed at least 1 of the 2 remaining interviews (at 28 weeks EGA or 8 weeks postpartum), and 2008 women (83%) completed both (34).

Our study population was primarily white (73.7%), educated (56.6% of women reported 16 or more years of education), married or living with a partner (87%), and older (mean age 31, 83.5% age 25 or older). Table 1 presents demographic and other characteristics for all participants, and compares those with term versus preterm pregnancies.

Thirty-seven percent of participants reported unplanned pregnancies and 13% reported that it was not a good time to be pregnant (Table 1). Information on pregnancy planning was missing for 3 participants and information on pregnancy timing was missing for 23 participants. Approximately 8.5% of participants experienced a preterm birth and 8.3% delivered a SGA infant. Information on birth weight was missing for 4 participants.

Compared to women with planned or well-timed pregnancies, multivariate adjusted models did not support the hypothesis that women with unplanned pregnancies had a significantly higher probability of preterm (Odds Ratio [OR] 1.18, 95% CI 0.85-1.65) or SGA birth (OR 1.17, 95% CI 0.69-1.97), or that women reporting a poorly timed pregnancy had a significantly higher probability of preterm (OR 0.85, 95% CI 0.53-1.38) or SGA birth (OR 0.92, 95% CI 0.65-1.29) (Tables 1 and 2). Covariates that were significantly associated with an increased odds of preterm birth included: previous preterm birth (OR 4.43, 95% CI 3.00-6.52) and panic disorder during pregnancy (OR 2.00, 95% CI 1.08-3.71) (Table 1). Maternal age 25 to 34 years was associated with a lower risk of preterm birth (OR 0.62, 95% CI 0.44-0.86) (Table 1) compared to age 35 and greater. For SGA, less than 12 years of education (OR 1.84, 95% CI 1.01-3.35) and cigarette use (OR 1.78, 95% CI 1.19-2.65) was associated with higher risk, while history of 1 or more previous births (OR 0.69, 95% CI 0.50-0.95) was associated with a lower risk of SGA (Table 2). Neither pregnancy planning nor timing, modelled as a 4-level exposure variable, in logistic regression and adjusted for the above covariates showed a significant association with preterm birth or SGA (Table 3 and 4).

DISCUSSION AND CONCLUSIONS

In this prospective cohort study, we found no significant association between pregnancy planning and pregnancy timing and the risk of preterm or SGA birth. A major strength of these findings includes analysis of data from a large, carefully characterized cohort of women who were prospectively assessed during early pregnancy for planning and timing. Outcome data were collected from medical record abstraction, rather than self-report, and the analysis was robust in its adjustment for multiple confounding factors.

Previous studies demonstrating a significant increase in preterm (10-15,16,17) or SGA births (3,10,11,13,14,17-22) among unplanned pregnancies have multiple methodological limitations. Most studies showing a positive association relied on retrospective assessment of pregnancy intention,(3,10-15,17-22) which may be subject to recall and reporting bias (2,52). Prospective longitudinal analyses of pregnancy planning and timing demonstrate that women's answers change over time, especially *after* childbirth and women are more likely to report a pregnancy as planned, possibly due to rationalization (2,52). Women giving birth to infants with health problems due to prematurity or SGA may also be more likely to report a pregnancy as unplanned (53). In addition to limitations in exposure assessment, many studies employed methods to ascertain birth outcomes that are less reliable than review of individual medical charts, including retrospective parental surveys and use of birth certificate data (10,12-15, 17, 19, 20, 22). Studies reporting an increased risk of preterm or SGA births among women with unplanned pregnancies are also hampered by lack of control for potential confounding variables (11,15,18). In our analyses among women with

unplanned pregnancy, we also found a significant unadjusted odds for preterm birth (OR1.39, 95% CI 1.05-1.83) which was attenuated and non-significant after adjustment for confounders. Studies that do not control for confounding factors, such as socioeconomic status and race, may falsely associate pregnancy planning and timing with preterm and SGA birth.

There are only 4 studies in the published literature reporting antenatal assessment of pregnancy planning and timing, with abstracted preterm and SGA birth outcome data from medical records (16,23,25,26), and only 1 study meeting the same criteria that reports SGA outcomes (25). Three prospective studies did not find a significant association between pregnancy planning and timing, and preterm and/or SGA birth (23,25,26) and one study showed a significant association between pregnancy planning and timing and preterm birth (SGA not evaluated) (16). However, none of the 4 prospective studies comprehensively adjusted for potential confounding (16,23,25,26), including lack of adjustment for history of prior preterm birth (23,26), which is the strongest risk factor for preterm birth (28), and lack of adjustment for age (16), race (25,26), education (16,25,26), marital status (16,25), mental health disorders (16,25,26) or use of tobacco (23,26), alcohol (23, 26), or illicit substances (23,25,26).

Strengths and Limitations

To the best of our knowledge, this analysis of the relationship between pregnancy planning and timing with preterm birth and SGA is the largest prospective cohort of pregnant women with individual assessments reported. As noted, previous analyses have evaluated pregnancy intention retrospectively (e.g. up to 5 years postpartum) (15). Our study also evaluated comprehensive information on multiple potential confounders, including maternal demographics, medical conditions, and other risk factors, which improves upon previous analyses that did not adjust for possible confounders (11,15,18,16,23,25,26). Another strength of our dataset is that it used two standard measures of pregnancy planning (one direct question about whether the pregnancy was planned and a second question about whether the timing of pregnancy was good) that were asked during the first interview, before 18 weeks EGA, prior to birth outcomes. Finally, our study reviewed medical records of all participants to capture robust outcome measurements for gestational age and birth weight at delivery, instead of using administrative data (birth certificates) or retrospective survey responses from parents (10,12-15, 17, 19, 20, 22).

This dataset is limited by its assessment of pregnancy planning and timing by the 2 measures used. While these 2 assessments are standard measures, they have been criticized as being imprecise. For example, many find fault with the assumption that pregnancy is a conscious and deliberate decision for women (2,52-56) and point out that a dichotomous response option does not account for the approximately 30-60% of women who may be ambivalent about pregnancy planning (52,57). Therefore, this analysis may have been enriched by more in-depth questions, such as whether pregnancy was unplanned but desired or unplanned and undesired, and by including questions about prenatal preparation and whether pregnancy was discussed with and agreed upon by the male partner (55,58). Analysis of pregnancy desirability would also benefit from multiple longitudinal assessments, with questions

repeated at each study visit. To further address issues of reverse causality, it would have been helpful to assess perceived stress and social support before pregnancy and throughout pregnancy, since they may be acting as mediators for the relationship between unplanned pregnancy and preterm birth.

Generalizability of our findings may be limited by the characteristics of study participants. Compared to national statistics, participants in this cohort exhibited a similar rate of unplanned pregnancy (40% vs. 37%), but a lower rate of preterm birth (11.6% vs. 8.5%), respectively. Compared to regional statistics from the same time period (2005-2009), participants in this cohort exhibited a lower rate of preterm birth (on average 10.4% in Connecticut and 11.1% in Massachusetts vs. 8.5%), respectively (32). Our cohort was also predominantly 25-34 years old, white and non-Hispanic, highly educated, married or living with a partner, and therefore our findings may not be applicable to other populations of pregnant women. Furthermore, potential participants who chose to terminate their pregnancy were excluded from this study as the main outcome was preterm birth. Since women with unplanned, undesired pregnancies are more likely to choose abortion, it is not surprising that our cohort would have a relatively high population of planned pregnancies, occurring at a good time in women's lives.

Among our cohort, having an unplanned or poorly timed pregnancy was not associated with preterm or SGA birth. However, future research examining whether pregnancy planning and timing is associated with preterm or SGA birth in specific sub-groups of high-risk women is warranted, utilizing prospective assessments of pregnancy planning and timing, medical record abstraction to optimize validity of clinical outcome measures, and collection of salient information on potential confounding variables. If pregnancy planning and/or timing is associated with preterm or SGA birth in some groups of high-risk women, targeted screening and interventions could improve maternal and neonatal health.

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REFERENCES

1. Finer LB, Zolna MR. Shifts in intended and unintended pregnancies in the United States, 2001-2008. Am J Public Health. Feb; 2014 104(Suppl 1):S43–8. PMID: 24354819. [PubMed: 24354819]
2. Santelli J, Rochat R, Hatfield-Timajchy K, Gilbert BC, Curtis K, Cabral R, et al. Unintended Pregnancy Working Group. The measurement and meaning of unintended pregnancy. Perspect Sex Reprod Health. Mar-Apr;2003 35(2):94–101. PMID: 12729139. [PubMed: 12729139]
3. Mosher WD, Jones J, Abma JC. Intended and unintended births in the United States: 1982-2010. Natl Health Stat Report. Jul 24.2012 (55):1–28. PMID: 23115878.
4. Cleland K, Peipert JF, Westhoff C, Spear S, Trussell J. Family planning as a cost-saving preventive health service. N Engl J Med. May 5.2011 364(18):e37. PMID: 21506736. [PubMed: 21506736]
5. Cheng D, Schwarz E, Douglas E, Horan I. Unintended pregnancy and associated maternal preconception, prenatal and postpartum behaviors. Contraception. Mar; 2009 79(3):194–8. [PubMed: 19185672]

6. Logan, C.; Holcombe, E.; Manlove, J.; Ryan, S. The consequences of unintended childbearing: A white paper [Internet]. Child Trends, Inc.; Washington: May. 2007 Available from: http://www.childtrends.org/Files//Child_Trends-2007_05_01_FR_Consequences.pdf
7. Brown, SS.; Eisenberg, L., editors. The best intentions: Unintended pregnancy and the well-being of children and families. National Academies Press; 1995.
8. Haider S, Stoffel C, Donenberg G, Geller S. Reproductive health disparities: a focus on family planning and prevention among minority women and adolescents. Glob Adv Health Med. Sep; 2013 2(5):94–9. PMID: 24416701; PMCID: PMC3833575. [PubMed: 24416701]
9. Takahashi S, Tsuchiya KJ, Matsumoto K, Suzuki K, Mori N, Takei N, HBC Study Team. Psychosocial determinants of mistimed and unwanted pregnancy: the Hamamatsu Birth Cohort (HBC) study. Matern Child Health J. Jul; 2012 16(5):947–55. PMID: 21915677. [PubMed: 21915677]
10. Flower A, Shawe J, Stephenson J, Doyle P. Pregnancy planning, smoking behaviour during pregnancy, and neonatal outcome: UK Millennium Cohort Study. BMC Pregnancy Childbirth. Dec 19.2013 13:238. PMID: 24354748; PMCID: PMC3878353. [PubMed: 24354748]
11. Shah PS, Balkhair T, Ohlsson A, Beyene J, Scott F, Frick C. Intention to become pregnant and low birth weight and preterm birth: a systematic review. Matern Child Health J. Feb; 2011 15(2):205–16. PMID: 20012348. [PubMed: 20012348]
12. Afable-Munsuz A, Braveman P. Pregnancy intention and preterm birth: differential associations among a diverse population of women. Perspect Sex Reprod Health. Jun; 2008 40(2):66–73. PMID: 18577138. [PubMed: 18577138]
13. Keeton K, Hayward RA. Pregnancy intention and birth outcomes: does the relationship differ by age or race? J Womens Health (Larchmt). May; 2007 16(4):510–6. PMID: 17521254. [PubMed: 17521254]
14. Mohllajee AP, Curtis KM, Morrow B, Marchbanks PA. Pregnancy intention and its relationship to birth and maternal outcomes. Obstet Gynecol. Mar; 2007 109(3):678–86. PMID: 17329520. [PubMed: 17329520]
15. Pulley L, Klerman LV, Tang H, Baker BA. The extent of pregnancy mistiming and its association with maternal characteristics and behaviors and pregnancy outcomes. Perspect Sex Reprod Health. Jul-Aug;2002 34(4):206–11. PMID: 12214911. [PubMed: 12214911]
16. Orr ST, Miller CA, James SA, Babones S. Unintended pregnancy and preterm birth. Paediatr Perinat Epidemiol. Oct; 2000 14(4):309–13. PMID: 11101017. [PubMed: 11101017]
17. Sharma R, Synkewecz C, Raggio T, Mattison DR. Intermediate variables as determinants of adverse pregnancy outcome in high-risk inner-city populations. J Natl Med Assoc. Nov; 1994 86(11):857–60. PMID: 7807574; PMCID: PMC2607623. [PubMed: 7807574]
18. D'Angelo DV, Gilbert BC, Rochat RW, Santelli JS, Herold JM. Differences between mistimed and unwanted pregnancies among women who have live births. Perspect Sex Reprod Health. Sep-Oct; 2004 36(5):192–7. PMID: 15519961. [PubMed: 15519961]
19. Korenman S, Kaestner R, Joyce T. Consequences for infants of parental disagreement in pregnancy intention. Perspect Sex Reprod Health. Jul-Aug;2002 34(4):198–205. PMID: 12214910. [PubMed: 12214910]
20. Eggleston E, Tsui AO, Kotelchuck M. Unintended pregnancy and low birthweight in Ecuador. Am J Public Health. May; 2001 91(5):808–10. PMID: 11344894; PMCID: PMC1446688. [PubMed: 11344894]
21. Ahluwalia IB, Merritt R, Beck LF, Rogers M. Multiple lifestyle and psychosocial risks and delivery of small for gestational age infants. Obstet Gynecol. May; 2001 97(5 Pt 1):649–56. PMID: 11339910. [PubMed: 11339910]
22. Sable MR, Spencer JC, Stockbauer JW, Schramm WF, Howell V, Herman AA. Pregnancy wantedness and adverse pregnancy outcomes: differences by race and Medicaid status. Fam Plann Perspect. Mar-Apr;1997 29(2):76–81. PMID: 9099571. [PubMed: 9099571]
23. Messer LC, Dole N, Kaufman JS, Savitz DA. Pregnancy intendedness, maternal psychosocial factors and preterm birth. Matern Child Health J. Dec; 2005 9(4):403–12. PMID: 16249944. [PubMed: 16249944]

24. Joyce TJ, Kaestner R, Korenman S. The effect of pregnancy intention on child development. Demography. Feb; 2000 37(1):83–94. PMID: 10748991. [PubMed: 10748991]
25. Bitto A, Gray RH, Simpson JL, Queenan JT, Kambic RT, Perez A, et al. Adverse outcomes of planned and unplanned pregnancies among users of natural family planning: a prospective study. Am J Public Health. Mar; 1997 87(3):338–43. PMID: 9096531; PMCID: PMC1381002. [PubMed: 9096531]
26. Phipps MG, Nunes AP. Assessing pregnancy intention and associated risks in pregnant adolescents. Matern Child Health J. Dec; 2012 16(9):1820–7. PMID: 22160612. [PubMed: 22160612]
27. Kost K, Landry DJ, Darroch JE. The effects of pregnancy planning status on birth outcomes and infant care. Fam Plann Perspect. Sep-Oct;1998 30(5):223–30. PMID: 9782045. [PubMed: 9782045]
28. Goldenberg R, Culhane JF, Iams J, Romero R. Epidemiology and causes of preterm birth. Lancet. 2007; 371:73–82.
29. Mathews TJ, MacDorman MF. Infant mortality statistics from the 2010 period linked birth/infant death data set. National Vital Statistics Reports. 2013; 62(8)
30. Saigal S, Doyle LW. An overview of mortality and sequelae of preterm birth from infancy to adulthood. Lancet. Jan 19; 2008 371(9608):261–9. 1. PMID: 18207020. [PubMed: 18207020]
31. Martin JA, Hamilton BE, Osterman MJ, Curtin SC, Mathews MA, Mathews TJ. Births: Final data for 2012. National Vital Statistics Reports. Dec 30.2013 62(9)
32. [Retrieved March 2, 2015] National Center for Health Statistics, final natality data. from www.marchofdimes.com/peristats. Data on CT v MA births retrieved 7/15/15
33. American College of Obstetricians and Gynecologists. Fetal Growth Restriction. Practice Bulletin No. 134. Obstet Gynecol. 2013; 121:1122–1133. [PubMed: 23635765]
34. Yonkers KA, Norwitz ER, Smith MV, Lockwood CJ, Gotman N, Luchansky E, et al. Depression and serotonin reuptake inhibitor treatment as risk factors for preterm birth. Epidemiology. Sep; 2012 23(5):677–85. PMID: 22627901; PMCID: PMC3415566. [PubMed: 22627901]
35. Yonkers KA, Gotman N, Smith MV, Forray A, Belanger K, Brunetto WL, et al. Does antidepressant use attenuate the risk of a major depressive episode in pregnancy? Epidemiology. Nov; 2011 22(6):848–54. PMCID: PMC3188383. [PubMed: 21900825]
36. Cox, J.; Holden, J. Perinatal Psychiatry. Use and Misuse of the Edinburgh Postnatal Depression Scale. The Royal College of Psychiatrists; Glasgow: 1994.
37. Falsetti S, Resnick H, Pesick P, Kilpatrick D. The modified PTSD symptom scale: a brief self-report measure of posttraumatic stress disorder. Behav Ther. 1993; 16:161–162.
38. Cohen, S.; Williamson, GM. Perceived stress in a probability sample of the United States. In: Spacapan, S.; Oskamp, S., editors. The social psychology of health. Sage Publications; New York: 1988. p. 31-67.
39. Spoozak L, Gotman N, Smith MV, Belanger K, Yonkers KA. Evaluation of a social support measure that may indicate risk of depression during pregnancy. J Affect Disord. Apr; 2009 114(1-3):216–23. PMCID: PMC2654337. [PubMed: 18765164]
40. WHO. Composite International Diagnostic Interview (CIDI, Version 2.1). Version 2.1. World Health Organization; Geneva, Switzerland: 1997.
41. Committee on Practice Bulletins—Obstetrics, The American College of Obstetricians and Gynecologists. Practice bulletin no. 130: prediction and prevention of preterm birth. Obstet Gynecol. Oct; 2012 120(4):964–73. PMID: 22996126. [PubMed: 22996126]
42. Iams JD. Clinical practice. Prevention of preterm parturition. N Engl J Med. Jan 16; 2014 370(3): 254–61. PubMed PMID: 24428470. [PubMed: 24428470]
43. Hall KS, Kusunoki Y, Gatny H, Barber J. The risk of unintended pregnancy among young women with mental health symptoms. Soc Sci Med. Jan.2014 100:62–71. PMID: 24444840; PMCID: PMC3898511. [PubMed: 24444840]
44. Terplan M, Cheng D, Chisolm MS. The relationship between pregnancy intention and alcohol use behavior: an analysis of PRAMS data. J Subst Abuse Treat. Apr; 2014 46(4):506–10. PMID: 24462222. [PubMed: 24462222]

45. Heil SH, Jones HE, Arria A, Kaltenbach K, Coyle M, Fischer G, et al. Unintended pregnancy in opioid-abusing women. J Subst Abuse Treat. Mar; 2011 40(2):199–202. PMID: 21036512; PMCID: PMC3052960. [PubMed: 21036512]
46. Grote NK, Bridge JA, Gavin AR, Melville JL, Iyengar S, Katon WJ. A meta-analysis of depression during pregnancy and the risk of preterm birth, low birth weight, and intrauterine growth restriction. Arch Gen Psychiatry. Oct; 2010 67(10):1012–24. PMCID: PMC3025772. [PubMed: 20921117]
47. Diego MA, Field T, Hernandez-Reif M, Schanberg S, Kuhn C, Gonzalez-Quintero VH. Prenatal depression restricts fetal growth. Early Hum Dev. Jan; 2009 85(1):65–70. PMID: 18723301; PMCID: PMC2651570. [PubMed: 18723301]
48. Harris LF, Roberts SC, Biggs MA, Rocca CH, Foster DG. Perceived stress and emotional social support among women who are denied or receive abortions in the United States: a prospective cohort study. BMC Womens Health. Jun 19.2014 14:76. PMID: 24946971; PMCID: PMC4080695. [PubMed: 24946971]
49. Allsworth JE, Secura GM, Zhao Q, Madden T, Peipert JF. The impact of emotional, physical, and sexual abuse on contraceptive method selection and discontinuation. Am J Public Health. Oct; 2013 103(10):1857–64. PMID: 23948012; PMCID: PMC3780737. [PubMed: 23948012]
50. Bloch JR, Webb DA, Mathew L, Culhane JF. Pregnancy intention and contraceptive use at six months postpartum among women with recent preterm delivery. J Obstet Gynecol Neonatal Nurs. May-Jun;2012 41(3):389–97. PMID: 22834885; PMCID: PMC3409429.
51. Orr ST, Miller CA. Unintended pregnancy and the psychosocial well-being of pregnant women. Womens Health Issues. Jan-Feb;1997 7(1):38–46. PMID: 9009862. [PubMed: 9009862]
52. Kavanaugh ML, Schwarz EB. Prospective assessment of pregnancy intentions using a single- versus a multi-item measure. Perspect Sex Reprod Health. Dec; 2009 41(4):238–43. PMID: 20444179; PMCID: PMC2939374. [PubMed: 20444179]
53. Grimes DA, Schulz KF. Bias and causal associations in observational research. Lancet. Jan 19; 2002 359(9302):248–52. PubMed PMID: 11812579. [PubMed: 11812579]
54. Petersen R, Moos MK. Defining and measuring unintended pregnancy: issues and concerns. Womens Health Issues. Jul-Aug;1997 7(4):234–40. PMID: 9283277. [PubMed: 9283277]
55. Barrett G, Smith SC, Wellings K. Conceptualisation, development, and evaluation of a measure of unplanned pregnancy. J Epidemiol Community Health. May; 2004 58(5):426–33. PMID: 15082745; PMCID: PMC1732751. [PubMed: 15082745]
56. Gipson JD, Koenig MA, Hindin MJ. The effects of unintended pregnancy on infant, child, and parental health: a review of the literature. Stud Fam Plann. Mar; 2008 39(1):18–38. PMID: 18540521. [PubMed: 18540521]
57. Schwarz EB, Lohr PA, Gold MA, Gerbert B. Prevalence and correlates of ambivalence towards pregnancy among nonpregnant women. Contraception. Apr; 2007 75(4):305–10. PMID: 17362711. [PubMed: 17362711]
58. Barrett G, Wellings K. What is a ‘planned’ pregnancy? Empirical data from a British study. Soc Sci Med. Aug; 2002 55(4):545–57. PMID: 12188462. [PubMed: 12188462]

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Table 1

Description of the Sample, by Preterm Birth

Characteristic	Total [a] n=2654	Term n=2429 (91.5%)	Preterm n=225 (8.5%)	Unadjusted OR (95% CI)	Adjusted OR[b,c] (95% CI)
Age (years) (NA=2)[d]					
Mean ± SD	31 ± 5.7	31 ± 5.7	31 ± 6.5	0.24 (−0.54-1.03)[e]	0.43 (−0.22-1.07)
< 25	438 (16.5)	395 (16.3)	43 (19.1)	0.88 (0.59-1.30)	0.85 (0.51-1.42)
25-34	1509 (56.9)	1405 (57.9)	104 (46.2)	**0.60 (0.44-0.81)**	**0.62 (0.44-0.86)**
≥ 35	705 (26.6)	627 (25.8)	78 (34.7)	1.00	1.00
Race ethnicity of participant					
Black, Hispanic, Asian, Mixed, Other	697 (26.3)	630 (25.9)	67 (29.8)	1.21 (0.90-1.63)	1.15 (0.81-1.64)
White, non-Hispanic	1957 (73.7)	1799 (74.1)	158 (70.2)	1.00	1.00
Education of participant (years)					
Mean ± SD	15.3 ± 2.8	15.3 ± 2.8	15.0 ± 2.7	−0.32 (−0.70-0.06)[e]	−0.15 (−0.46-0.16)
<12	172 (6.5)	158 (6.5)	14 (6.2)	1.09 (0.61-1.94)	0.79 (0.39-1.63)
=12	382 (14.4)	345 (14.2)	37 (16.4)	1.32 (0.89-1.95)	1.09 (0.67-1.75)
12-15	599 (22.6)	538 (22.2)	61 (27.1)	**1.39 (1.00-1.93)**	1.25 (0.86-1.81)
16+	1501 (56.6)	1388 (57.1)	113 (50.2)	1.00	1.00
Marital status					
Married/living with partner	2314 (87.2)	2122 (87.4)	192 (85.3)	1.00	1.00
Divorced/separated/widowed/never married	340 (12.8)	307 (12.6)	33 (14.7)	1.19 (0.81-1.75)	0.97 (0.60-1.58)
Number of previous pregnancies (NA=2)[d]					
0	742 (28.0)	684 (28.2)	58 (25.8)	1.00	1.00
≥1	1910 (72.0)	1743 (71.8)	167 (74.2)	1.13 (0.83-1.54)	0.82 (0.57-1.16)
History of prior preterm birth					
No	2446 (92.2)	2272 (93.5)	174 (77.3)	1.00	1.00
Yes	208 (7.8)	157 (6.5)	51 (22.7)	**4.24 (2.98-6.03)**	**4.43 (3.00-6.52)**
Planned pregnancy (NA=3)[d]					
No	987 (37.2)	887 (36.6)	100 (44.4)	**1.39 (1.05-1.83)**	1.18 (0.85-1.65)

Characteristic	Total [a] n=2654	Term n=2429 (91.5%)	Preterm n=225 (8.5%)	Unadjusted OR (95% CI)	Adjusted OR[b,c] (95% CI)
Yes	1664 (62.8)	1539 (63.4)	125 (55.6)	1.00	1.00
Good time to become pregnant (NA=23)[d]					
No	343 (13.0)	311 (12.9)	32 (14.3)	1.12 (0.76-1.66)	0.85 (0.53-1.38)
Yes	2288 (87.0)	2096 (87.1)	192 (85.7)	1.00	1.00
Small for gestational age (SGA), current pregnancy (NA=4)[d]					
No	2430 (91.7)	2237 (92.2)	193 (86.6)	1.00	1.00
Yes	220 (8.3)	190 (7.8)	30 (13.5)	**1.83 (1.21-2.76)**	**1.90 (1.23-2.93)**
Major Depressive disorder during pregnancy					
No	2432 (91.6)	2233 (91.9)	199 (88.4)	1.00	1.00
Yes	222 (8.4)	196 (8.1)	26 (11.6)	1.49 (0.96-2.30)	1.33 (0.78-2.28)
Panic disorder during pregnancy (anytime)					
No	2556 (96.3)	2347 (96.6)	209 (92.9)	1.00	1.00
Yes	98 (3.7)	82 (3.4)	16 (7.1)	**2.19 (1.26-3.81)**	**2.00 (1.08-3.71)**
Smoking during pregnancy					
No	2265 (85.3)	2074 (85.4)	191 (84.9)	1.00	1.00
Yes	389 (14.7)	355 (14.6)	34 (15.1)	1.04 (0.71-1.52)	0.73 (0.46-1.15)
Cohen Perceived Stress score ≥ 20 (NA=15)[d]					
Mean ± SD	15.2 ± 7.1	15.1 ± 7.1	15.8 ± 7.2	0.70 (−0.27-1.67)[e]	0.01 (−0.80-0.81)
No	1913 (72.5)	1760 (72.9)	153 (68.3)	1.00	1.00
Yes	726 (27.5)	655 (27.1)	71 (31.7)	1.25 (0.93-1.68)	1.05 (0.73-1.50)
Kendler Social Support score ≤ 3.2					
Mean ± SD	3.6 ± 0.6	3.6 ± 0.6	3.6 ± 0.6	−0.01 (−0.09- 0.06)[e]	0.03 (−0.04- 0.10)
No	2031 (76.5)	1851 (76.2)	180 (80.0)	1.00	1.00
Yes	623 (23.5)	578 (23.8)	45 (20.0)	0.80 (0.57-1.13)	0.70 (0.48-1.01)

[a] Counts may not sum to column totals due to missing data; column percentages may not sum to 100% due to rounding

[b] Each categorical variable adjusted for all other categorical variables in table, excluding SGA, and for additional variables not shown in table: Major depressive disorder 6 months prior to pregnancy, selective serotonin reuptake inhibitor use during pregnancy, posttraumatic stress disorder prior to pregnancy, sexual abuse before age 18, alcohol during pregnancy (≥4 drinks/week), substance use during pregnancy, benzodiazepine use during pregnancy

[c]Each continuous variable adjusted for the 3 other continuous measures, as well as other categorical variables (except SGA, and categorical variables for age, education, Cohen and Kendler scores)

[d]NA= not available, the number of participants with missing data

[e]Unadjusted difference of means between preterm and term

Note: **Bold** signifies statistically significant differences

Table 2

Description of the Sample, by Small for Gestational Age (SGA)

Characteristic	**Total[a] n=2650**	**Not SGA n=2430 (91.7%)**	**SGA n=220 (8.3%)**	**Unadjusted OR (95% CI)**	**Adjusted OR[b,c] (95% CI)**
Age (years) (NA=2)[d]					
Mean ± SD	31.0 ± 5.7	31.1 ± 5.7	29.8± 6.1	**−1.31 (−2.10– −0.52)** [e]	−0.17 (−0.82–0.48)
< 25	437 (16.5)	387 (15.9)	50 (22.8)	**1.89 (1.24–2.88)**	1.14 (0.67–1.94)
25-34	1508 (57.0)	1384 (57.0)	124 (56.6)	1.31 (0.92–1.87)	1.16 (0.81–1.68)
≥ 35	703 (26.6)	658 (27.1)	45 (20.6)	1.00	1.00
Race ethnicity of participant					
Black, Hispanic, Asian, Mixed, Other	697 (26.3)	632 (26.0)	65 (29.6)	1.19 (0.88–1.62)	1.03 (0.72–1.48)
White, non-Hispanic	1953 (73.7)	1798 (74.0)	155 (70.5)	1.00	1.00
Education of participant (years)					
Mean ± SD	15.3 ± 2.8	15.4 ± 2.8	14.7 ± 3.0	**−0.71 (−1.10– −0.33)** [e]	−0.26 (−0.57–0.05)
<12	172 (6.5)	144 (5.9)	28 (12.7)	**2.48 (1.58–3.88)**	**1.84 (1.01–3.35)**
=12	382 (14.4)	343 (14.1)	39 (17.7)	1.45 (0.99–2.13)	1.22 (0.76–1.95)
12-15	598 (22.6)	554 (22.8)	44 (20.0)	1.01 (0.70–1.46)	0.91 (0.61–1.36)
16+	1498 (56.5)	1389 (57.2)	109 (49.6)	1.00	1.00
Marital status					
Married/living with partner	2311 (87.2)	2133 (87.8)	178 (80.9)	1.00	1.00
Divorced/separated/widowed/never married	339 (12.8)	297 (12.2)	42 (19.1)	**1.70 (1.19–2.42)**	1.25(0.79–1.98)
Number of previous pregnancies (NA=2)[d]					
0	739 (27.9)	661 (27.2)	78 (35.6)	1.00	1.00
≥1	1909 (72.1)	1768 (72.8)	141 (64.4)	**0.68 (0.51–0.90)**	**0.69 (0.50–0.95)**
History of prior preterm birth					
No	2442 (92.2)	2241 (92.2)	201 (91.4)	1.00	1.00
Yes	208 (7.9)	189 (7.8)	19 (8.6)	1.12 (0.68–1.84)	1.02(0.60–1.74)
Planned pregnancy (NA=3)[d]					
No	986 (37.3)	897 (37.0)	89 (40.5)	1.16 (0.87–1.54)	1.17 (0.69–1.97)

Characteristic	Total[a] n=2650	Not SGA n=2430 (91.7%)	SGA n=220 (8.3%)	Unadjusted OR (95% CI)	Adjusted OR[b,c] (95% CI)
Yes	1661 (62.8)	1530 (63.0)	131 (59.6)	1.00	1.00
Good time to become pregnant (NA=23)[d]					
No	342 (13.0)	313 (13.0)	29 (13.2)	1.02 (0.68–1.53)	0.92 (0.65–1.29)
Yes	2285 (87.0)	2094 (87.0)	191 (86.8)	1.00	1.00
Preterm birth, current pregnancy					
No	2427 (91.6)	2237 (92.1)	190 (86.4)	1.00	1.00
Yes	223 (8.4)	193 (7.9)	30 (13.6)	**1.83 (1.21–2.76)**	**1.90 (1.23–2.93)**
Major Depressive disorder during pregnancy					
No	2429 (91.7)	2228 (91.7)	201 (91.4)	1.00	1.00
Yes	221 (8.3)	202 (8.3)	19 (8.6)	1.04 (0.64–1.71)	0.73 (0.45–1.19)
Panic disorder during pregnancy (anytime)					
No	2552 (96.3)	2341 (96.3)	211 (95.9)	1.00	1.00
Yes	98 (3.7)	89 (3.7)	9 (4.1)	1.12 (0.56–2.26)	0.98 (0.46–2.08)
Sexual abuse before age 18 (NA=44)[d]					
No	2169 (83.2)	2000 (83.7)	169 (78.2)	1.00	1.00
Yes	437 (16.8)	390 (16.3)	47 (21.8)	**1.43 (1.01–2.01)**	1.27 (0.87–1.85)
Smoking during pregnancy					
No	2262 (85.4)	2098 (86.3)	164 (74.6)	1.00	1.00
Yes	388 (14.6)	332 (13.7)	56 (25.5)	**2.16 (1.56–2.99)**	**1.78 (1.19–2.65)**
Cohen Perceived Stress score ≥ 20 (NA=15)[d]					
Mean ± SD	15.2 ± 7.1	15.1 ± 7.1	16.1 ± 7.1	0.96 (−0.02–1.94)[e]	0.43 (−0.38–1.25)
No	1911 (72.5)	1756 (72.7)	155 (70.8)	1.00	1.00
Yes	724 (27.5)	660 (27.3)	64 (29.2)	1.10 (0.81–1.49)	1.05 (0.73–1.51)
Kendler Social Support score ≤ 3.2					
Mean ± SD	3.6 ± 0.6	3.6 ± 0.6	3.5 ± 0.5	−0.06 (−0.14–0.02)[e]	−0.01 (−0.08–0.06)
No	2029 (76.6)	1858 (76.5)	171 (77.7)	1.00	1.00
Yes	621 (23.4)	572 (23.5)	49 (22.3	0.93 (0.67–1.30)	0.76 (0.53–1.10)

[a] Counts may not sum to column totals due to missing data; column percentages may not sum to 100% due to rounding

[b] Each categorical variable adjusted for all other categorical variables in table, excluding preterm birth, and for additional variables not shown in table: Major depressive disorder 6 months prior to pregnancy, selective serotonin reuptake inhibitor use during pregnancy, post-traumatic stress disorder prior to pregnancy, alcohol during pregnancy (≥4 drinks/week), substance use during pregnancy, benzodiazepine use during pregnancy

[c] Each continuous variable adjusted for the 3 other continuous measures, as well as other categorical variables (except preterm birth, and categorical variables for age, education, Cohen and Kendler scores)

[d] NA= not available, the number of participants with missing data

[e] Unadjusted difference of means between preterm and term

Note: **Bold** signifies statistically significant differences

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Table 3

Risk of preterm birth by pregnancy planning and timing

Exposure			Term	Preterm	Unadjusted OR (95% CI)	Adjusted[a] OR (95% CI)
Pregnancy Unplanned	**Bad time to be pregnant**	**n= 2628**	**n= 2404 (91.5%)**	**n=224 (8.5%)**		
Yes	Yes	285 (10.8)	258 (10.7)	27 (12.1)	1.29 (0.83–2.00)	0.98 (0.57–1.67)
Yes	No	684 (26.0)	612 (25.5)	72 (32.1)	**1.45 (1.07–1.98)**	1.21 (0.86–1.71)
No	Yes	57 (2.2)	52 (2.2)	5 (2.2)	1.19 (0.47–3.03)	1.09 (0.40–2.92)
No[b]	No[b]	1602 (61.0)	1482 (61.7)	120 (53.6)	1.00	1.00

[a] Adjusted for: age, race, education, marital status, gravidity, prior preterm birth, major depressive disorder during pregnancy, major depressive disorder 6 months before pregnancy, selective serotonin reuptake inhibitor (SSRI) use during pregnancy, panic disorder during pregnancy, post-traumatic stress disorder (PTSD) during pregnancy, sexual abuse, smoking, alcohol, substance abuse, benzodiazepine use, perceived stress, social support

[b] Reference category

Table 4

Risk of small for gestational age by pregnancy planning and timing

Exposure			Not SGA	SGA	Unadjusted OR (95% CI)	Adjusted[a] OR (95% CI)
Pregnancy Unplanned	**Bad time to be pregnant**	**n=2624**	**n=2404 (91.6%)**	**N=220 (8.3%)**		
Yes	Yes	284 (10.8)	259 (10.8)	25 (11.4)	1.12 (0.71–1.75)	0.68 (0.39–1.18)
Yes	No	684 (26.1)	620 (25.8)	64 (29.1)	1.20 (0.87–1.64)	0.91 (0.63–1.29)
No	Yes	57 (2.2)	53 (2.2)	4 (1.8)	0.88 (0.31–2.46)	0.65 (0.22–1.91)
No[b]	No[b]	1599 (60.9)	1472 (61.2)	127 (57.7)	1.00	1.00

[a] Adjusted for: age, race, education, marital status, gravidity, prior preterm birth, major depressive disorder during pregnancy, major depressive disorder 6 months before pregnancy, selective serotonin reuptake inhibitor (SSRI) use during pregnancy, panic disorder during pregnancy, post-traumatic stress disorder (PTSD) during pregnancy, sexual abuse, smoking, alcohol, substance abuse, benzodiazepine use, perceived stress, social support

[b] Reference category