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Short Interpregnancy Intervals: Results from the First Baby Study

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A B S T R A C T

Background: Short interpregnancy interval (SIPI), defined as 18 months or fewer between delivery and subsequent conception, has become an independent marker of maternal and child health.
Methods: We performed a secondary analysis of 18 months of data from The First Baby Study, a prospective cohort of women followed from pregnancy through 3 years after their first birth. Women with SIPIs by 6, 6 to 12, and 12 to 18 months were compared with those without conceptions at those times. We then analyzed pregnancy intention of the subpopulation of women with a SIPI of 18 months or fewer. Logistic regression analyses determined associations between maternal characteristics, including sociodemographic and reproductive indicators, and SIPI incidence and intention.
Findings: Of 3,006 participants, 795 (26.5%) had a repeat pregnancy within 18 months: 58 (1.9%) occurred within 6 months, 242 (8.1%) between 6 and 12 months, and 495 (16.5%) between 12 and 18 months. Incidence of SIPI at each interval differed by maternal characteristics, including income, marital status, and intention. Most women (84%) with a SIPI of 6 months or less classified them as unintended. Less than 2% of women with SIPIs of 18 months or fewer reported any contraceptive use in the postpartum period and no pregnancies occurred with the use of very effective methods, including long-acting reversible contraception.
Conclusions: The population of women at risk for SIPI is not homogenous. Among those with SIPIs, there is a stark contrast in intention between those who conceive early (≤6 months) versus later (≥12 months). Given that almost no pregnancies occurred when women used postpartum contraception, contraceptive counseling and unfettered access should be available for those at greatest risk for an early, repeat, unintended pregnancy.

The relationship between adverse perinatal outcomes and a short interpregnancy interval (SIPI), defined as less than 18 months between live birth and a subsequent pregnancy (Copen, Thoma, & Kirmeyer, 2015), has led to birth interval becoming an independent marker of maternal and child health. Infants born after a SIPI have been shown to be at higher risk of prematurity, low birth weight, and infant mortality (Conde-Agudelo, Rosas-Bermudez, & Kafury-Goeta, 2006; Hussaini, Ritenour, & Coonrod, 2013; Zhu, Rolfs, Nangle, & Horan, 1999). Maternal risks include bleeding, infection, preterm premature rupture of membranes, and uterine rupture during a trial of labor after cesarean, as well as maternal death (Conde-Agudelo & Belizán, 2000). Recent evidence even links SIPI to autism spectrum disorder (Zerbo, Yoshida, Gunderson, Dorward, & Croen, 2015).

Retrospective data from the National Survey of Family Growth (NSFG) suggest that 30% of women have had a SIPI (Copen et al., 2015), and that more than one-half of those pregnancies (55%)

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were unintended (Gemmill & Lindberg, 2013). Women with SIPI are more likely to be young, non-Hispanic Black, and to have lower income and lower educational attainment (Cheslack Postava & Winter, 2015; Copen et al., 2015; Gemmill & Lindberg, 2013). They are also less likely to report use of highly effective methods of contraception (Thiel de Bocanegra, Chang, Howell, & Darney, 2014; White, Teal, & Potter, 2015).

Less is known about whether these maternal characteristics, including pregnancy intention, vary by timing of conception within the 18-month interval. Risks of the noted adverse outcomes have been shown to be higher when conception occurs earlier in the SIPI interval, such as less than 6 months (Conde-Agudelo & Belizán, 2000; Conde et al., 2006; Zerbo et al., 2015). Gaining insight into whether there are disparities in who may be at greatest risk for these earliest SIPI pregnancies can facilitate tailored interventions, which maximizes resources. Additionally, although most SIPI pregnancies have been characterized as unintended, it is unclear whether any disparities in intention exist among women with SIPI pregnancies. To answer these questions, we accessed data from The First Baby Study (FBS), the first large prospective data collection on reproductive health behaviors and outcomes, intention, and subsequent pregnancies. There were two aims of this analysis: 1) to determine SIPI incidence by 6 or fewer, 12 or fewer, or 18 or fewer months and compare characteristics of women with SIPI to those with no conception at each interval (≤6, 6–12, and 12–18 months) and 2) to assess pregnancy intention among women who had a repeat pregnancy within 18 months.

Materials and Methods

Study Design, Setting, and Participants

The FBS is a prospective cohort study conducted by researchers at the Pennsylvania State College of Medicine and funded by the National Institutes of Health. Detailed methodology of the FBS is available in prior publications (Kjerulff et al., 2013). To be eligible, women needed to be nulliparous, pregnant with a singleton pregnancy, between the ages of 18 and 35, planning to deliver in a Pennsylvania hospital, able to speak English or Spanish, and willing and able to participate in intermittent interviews for a 3-year period.

Recruitment was completed between January 2009 and April 2011. Data collection was completed in May 2014. The baseline interview took place between 30 and 42 weeks of gestation. The data for this analysis were gathered at baseline, 1-month, 6-month , 12-month, and 18-month postpartum interviews. All women included had a live birth. The study was approved by the institutional review board at participating sites in Pennsylvania, and written informed consent was obtained from each participant by the FBS staff. For the purposes of this study, the de-identified dataset examined was considered exempt by the Institutional Review Board at Northwestern University.

Measures

Demographic characteristics

Participant characteristics investigated in this study were chosen based on large, national, retrospective studies that have assessed SIPI, such as the NSFG. Demographic information included maternal age, race and ethnicity, income, educational attainment, and marital status; all variables were assessed at time of first birth. Educational attainment was categorized into high school degree or less, some college or technical school, and college degree or higher. Household income adjusted for household size was categorized relative to the U.S. Census Bureau poverty threshold guidelines for the year before the participant's baseline interview. The categories chosen were "higher income" (≥200% of the threshold), "near poverty" (101%–199% of the threshold), and "poverty" (≤100% of the threshold). Baseline marital status information was dichotomized into two categories: "married or living with partner" and "single" (divorced, separated, widowed, or single).

Obstetric and reproductive health characteristics

At the 1-month postpartum interview, women were asked about the mode of delivery of their first baby, sexual activity since delivery, and plans for and use of contraception. At each of the 6-, 12-, and 18-month interviews, women were asked, "How soon after delivery did you first have sexual intercourse?" For our analysis, we categorized these responses into whether resumption of sexual activity began before or after 6 weeks postpartum. Women were then asked to recount contraceptive use and frequency of sexual activity, including unprotected intercourse. The questions began open-ended, with "What kinds of birth control are you currently using or do you plan to use?" To determine actual contraception use, participants were given the following scenario, "Let's begin with month 1." For women who stated that they had engaged in sexual intercourse, investigators asked, "What was the main form of birth control that you used in month 1?" Women were also asked, "Can you tell me were there any times when you had sexual intercourse in month 1 without using any type of birth control or protection?" We classified this answer as "any unprotected sex." Women were then asked these questions for each month that had passed since the previous interview.

If the participant reported use of a contraceptive method, it was categorized as very effective (intrauterine devices, implant, or sterilization), effective (birth control pill, the shot, diaphragm, the patch, the ring, lactational amenorrhea, emergency contraception), or moderate/less effective (foam, jelly, cream, spermicide, sponge, cervical cap, rhythm method, withdrawal, male condom, female condom, "I don't know," or "other"). These categories were chosen based on published failure rates and categorization of effectiveness for typical use of various contraceptive methods (Trussell, 2011; World Health Organization, 2011).

Women were also asked at each interview about health care use. From the 6-month survey, we used the answers to the question, "Have you been to see an obstetrician-gynecologist since we last interviewed you?" as a proxy for the attendance of a 6-week postpartum visit. Although there were other interview questions about health care visits since delivery, we could not ascertain if they were related to birth; thus, to capture our best proxy for postpartum visit, we limited the responses to a reported visit to the obstetrician/gynecologist.

Aim 1: Analysis of SIPI incidence and differing maternal characteristics by 6, 12, and 18 months postpartum

At each of the follow-up interviews (6, 12, and 18 months postpartum), SIPI incidence was determined by participant responses to the following question, "How many times have you been pregnant since the previous interview?" If they answered with anything greater than zero, this was coded as a subsequent pregnancy, regardless if pregnant at the time of the interview. Characteristics of women with any SIPI by each interval up to