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Original article

Postpartum Contraception Use by Urban/Rural Status: An Analysis of the Michigan Pregnancy Risk Assessment Monitoring System Data

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A B S T R A C T

Objective: We sought to examine rural/urban differences in postpartum contraceptive use, which are underexplored in the literature.
Methods: We analyzed phase 5 (2004–2008) of the Michigan Pregnancy Risk Assessment Monitoring System (PRAMS) survey. Using Rural–Urban Commuting Area codes and weighted multinomial logistic regression, we examined the association between self-reported postpartum contraceptive method and rural/urban residence among postpartum women not desiring pregnancy ($n = 6{,}468$).
Results: Postpartum (mean, 16.5 weeks after delivery), 14.4% of respondents were using sterilization, 6.7% long-acting reversible contraception (LARC), 37.3% moderately effective hormonal methods, 38.4% less effective methods or no method, and 3.2% abstinence. Multivariable analysis yielded sporadic geographic patterns. Odds of method use varied significantly by age, parity, body mass index, and breastfeeding status. Not discussing contraception with a prenatal healthcare provider decreased odds of postpartum LARC use (odds ratio, 0.52; 95% CI, 0.36–0.75). Number of prenatal visits and weeks since delivery were not associated with postpartum contraception method.
Conclusions: We did not observe strong variation in postpartum contraceptive use based on geography. Low uptake of highly effective contraception across rural and urban areas suggests a need for education and outreach regarding these methods.

The postpartum period is a crucial time for contraception. Resumption of ovulation can occur as early as 25 days postpartum in non-breastfeeding women (Jackson & Glasier, 2011) and 50% of women resume sexual activity before the traditional 6-week postpartum visit (Speroff & Mishell, 2008). An estimated 10% to 44% of postpartum women in the United States have an unintended pregnancy in the first year after delivery (Chen et al., 2010). Short interpregnancy intervals are associated with numerous adverse outcomes, including maternal nutritional deficiencies, subsequent preterm deliveries, and—when following an index cesarean delivery—higher rates of cesarean scar ectopic pregnancies, placenta previa, and placenta accrete (Conde-Agudelo, Rosas-Bermudez & Kafury-Goeta, 2006; Getahun, Oyelese, Salihu & Ananth, 2006; Zhu, 2005).

General patterns of contraceptive use among postpartum women in the United States have been described. A 2009 analysis of Pregnancy Risk Assessment Monitoring System (PRAMS) data from 12 states and the District of Columbia estimated that 88% of postpartum women (2–9 months after delivery) use at least one

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contraceptive method, with 62% using a "highly effective" method (Centers for Disease Control and Prevention, 2009). Here, highly effective included sterilization, implants, and intrauterine devices (IUDs), methods that maintain 99% or greater effectiveness with minimal user requirements, as well as hormonal methods that only remain highly effective when used correctly, consistently, and on time (i.e., depot medroxyprogesterone acetate, combined oral contraceptive pills, the contraceptive patch, and the vaginal ring).

In the United States , rural women are at risk for disparities in health care owing to poverty, lack of insurance coverage, longer distances to health care facilities, and limited transportation (American College of Obstetricians and Gynecologists, 2014). Reproductive health disparities for these women include a lower rate of Papanicolaou smear screening and family planning visits (American College of Obstetricians and Gynecologists, 2014). Limited access to reproductive health care is also a problem owing to fewer obstetrician-gynecologists and abortion providers in rural compared with urban areas (Bennett, 2002). Rural/urban differences in use of postpartum contraception have not been well-explored in the literature.

We analyzed data from Michigan (MI) PRAMS, a population-based survey of postpartum women, to examine the association between method of postpartum contraception and rural/urban residence. We chose MI PRAMS because of its robust sample size and the paucity of literature pertaining to the reproductive health of women in Midwestern states. We hypothesized that 1) use of long-acting reversible contraception (LARC) would decrease across the urban/rural spectrum, from most urban to most rural and 2) rural women would be more likely to use sterilization for postpartum contraception.

Methods

Data Source

PRAMS is an ongoing surveillance project conducted jointly between the Centers for Disease Control and Prevention and health departments in 40 states and New York City (Centers for Disease Control and Prevention, 2012). Cross-sectional surveys are administered 2 to 4 months postpartum and monitor characteristics, behaviors, and experiences of women before, during, and after pregnancies resulting in live births. Nonrespondents receive both mail and telephone follow-up. PRAMS survey data are linked with maternal and infant variables from states' vital statistics records.

We obtained data from phase 5 of MI PRAMS, which was administered by the Michigan Department of Community Health (MDCH) from 2004 to 2008. The 14-page self-administered questionnaire included core questions used by all participating states and 21 supplemental questions selected by the MDCH. MI PRAMS oversamples women who had low birth weight infants in the index pregnancies and uses stratified sampling to ensure adequate representation of women from rural and urban areas. Women with multiple gestations greater than triplets, those with diminished mental capacity, and those who are deceased are excluded. The PRAMS survey is available in both English and Spanish.

From 2004 to 2008, 631,168 women in Michigan had a live birth and 9,400 (1.5% of birth population) were surveyed by PRAMS. The response rate during the study period was 79%, yielding 7,427 observations. This analysis of a de-identified database was deemed exempt from review by the Institutional Review Boards of the MDCH and the University of Chicago.

Variables

We derived an exposure variable for rural/urban status using Rural–Urban Commuting Area (RUCA) codes (WWAMI Rural Health Research Center, 2014). These 33 codes categorize all U.S. Census tracts (2000) regarding their rural/urban status and relationships; a ZIP code approximation was later developed. We collapsed RUCA codes into a four-level scheme: 1) urban, 2) large rural city/micropolitan, 3) small rural town, and 4) isolated small rural town. PRAMS data were merged with RUCA codes by the MDCH using respondent ZIP codes, which were then removed from the file before we obtained access to the data.

The analysis file included other independent variables that are empirically or theoretically linked with both rural/urban residence and postpartum contraceptive use. We drew from existing research (e.g., Centers for Disease Control and Prevention, 2009; Jones, Mosher & Daniels, 2012; Zite, Wuellner & Gilliam, 2005), but also assessed variables that have been underexplored in the literature. The full covariate set included demographics (age, race/ethnicity, marital status), socioeconomic variables (insurance status at delivery, educational attainment), pregnancy/obstetric variables (parity, gestational age, delivery type, prenatal care visits, discussion of contraception with prenatal care provider, intimate partner violence during pregnancy, weeks since delivery, breastfeeding status), comorbidities (current smoking, body mass index calculated from maternal weight and height), contraceptive use at time of index pregnancy, and wantedness of index pregnancy (wanted, unwanted, mistimed).

Respondents reported whether they were currently using a contraceptive method and, if so, indicated which method(s) using a pre-populated checklist or write-in field. These data were used to derive a five-level categorical outcome variable for postpartum contraceptive method: 1) sterilization, 2) LARC (IUDs and implant), 3) moderately effective oral contraceptive pills, patch, ring, injectables), 4) abstinence, and 5) less effective (all others, including no method). These groupings were primarily based on published, "typical-use" effectiveness rates (Trussell, 2011), with abstinence and sterilization given their own categories. Women who reported the use of more than one method of contraception in the postpartum period were classified according to the most effective method used.

Analysis

Analyses were conducted with the 'svy' commands in STATA 12.1 (StataCorp LP, 2013), all of which included PRAMS sampling and weighting variables. Bivariate relationships between all categorical independent variables and postpartum contraceptive method category were examined using a design-based F statistic; interpretation of resulting p-values is analogous to Pearson's χ^2 (StataCorp LP, 2013). For continuous independent variables, bivariate associations were evaluated using F statistics generated from weighted linear regression models; unlike t tests, these models were able to incorporate the PRAMS weighting variables. For all bivariate analyses, statistical significance was determined at $p < .05$. Weighted multinomial logistic regression was performed to measure the adjusted association between rural/urban residence and postpartum contraceptive method category, using odds ratios (ORs) reported with 95% CIs. Initially, the model included all covariates significant at $p < .10$ from bivariate analysis. Covariates not significant at $p < .05$ in the adjusted model were removed, as were observations with any missing