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Geographic Variation in Characteristics of Postpartum Women Using Female Sterilization

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A B S T R A C T

Background: Southern states have higher rates of female sterilization compared with other areas of the United States, and the reasons for this are not well understood. We examined whether low-income and racial/ethnic minority women, who were previous targets of coercive practices, disproportionately report using sterilization in the South.
Methods: We used data from 12 states participating in the Pregnancy Risk Assessment Monitoring System that collected information on women's contraceptive method use between 2006 and 2009. We categorized states according to geographic region: South, Midwest/West, and Northeast. Within each region, we computed the percentage of women using sterilization according to their demographic and obstetric characteristics and estimated multivariable-adjusted prevalence ratios to evaluate whether the same characteristics were associated with sterilization use.
Findings: The percentage of postpartum women using sterilization ranged from 5.0% to 9.9% in the Northeast, 8.9% to 10.6% in the Midwest/West, and 11.6% to 22.4% in the South. Women in nearly all subgroups in Southern states were more likely to use sterilization than women in the Northeast. After multivariable adjustment, there were no differences in the prevalence of sterilization for Blacks compared with Whites in the Northeast (0.76; 95% CI, 0.55–1.06), Midwest/West (0.91; 95% CI, 0.80–1.04), and South (0.96; 95% CI, 0.85–1.07). Women with Medicaid-paid deliveries (vs. private insurance) had a higher prevalence of sterilization in all regions ($p < .05$).
Conclusions: These findings do not indicate that low-income and racial/ethnic minority women in the South use sterilization at disproportionately higher rates compared with other regions, and suggest that other differences, such as social norms and family planning policies, may contribute to this geographic variation.

Female sterilization is one of the most widely used contraceptives in the United States (Jones, Mosher, & Daniel, 2012), but there is considerable geographic variation in women's use of this method. Southern states have significantly higher rates of sterilization use compared with other parts of the United States (Chan & Westhoff, 2010; MacKay, Kieke, Koonin, & Beattie, 2001; Whiteman et al., 2012). A recent study of postpartum women found that the rate of female sterilization was 988 per 10,000 deliveries in the South compared with 683 per 10,000 in the West, the region with the next highest rate of use (Whiteman et al., 2012).

The reasons for this variation are not well-understood, and previous studies have had limited ability to examine potential underlying sources of variation owing to small sample size or incomplete patient data (Borrero et al., 2007; Chan & Westhoff, 2010; MacKay et al., 2001). One possibility that has led to concern is that higher rates of female sterilization in the South may be owing to the persistence of coercive practices targeting low-income and racial/ethnic minority women who are pressured into getting sterilized during labor and delivery, not informed that the procedure is permanent, or told they will not receive public benefits or medical care if they do not agree to be sterilized (Bass & Warehime, 2009; Kluchin, 2009; Schoen, 2005). However, the most recent documented case of women being coerced into sterilization occurred in California, not the South (Center for Investigative Reporting, 2013). Instead, others have argued that geographic variation in sterilization, along with

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use of other contraceptive methods, is owing to women's preferences, provider attitudes toward the procedure, and differences in health care delivery (Bumpass, Thomson, & Godecker, 2000; Chan & Westhoff, 2010; White, Potter, Hopkins, & Grossman, 2014). For example, women in the South may prefer a method that provides long-term protection against pregnancy owing to earlier ages at childbearing, and, before the 2012 implementation of the Affordable Care Act (ACA), fewer Southern states had insurance coverage mandates for reversible contraceptive methods, and some of these existing plans may still be exempt from contraceptive coverage requirements (Chan & Westhoff, 2010; Guttmacher Institute, 2015).

In this analysis, we use data from the Pregnancy Risk Assessment Monitoring System (PRAMS) to further investigate hypotheses put forward in previous studies on variation in female sterilization. Specifically, we assess whether women in socially disadvantaged subgroups in the South report disproportionately higher use of sterilization and examine the extent to which demographic and obstetric characteristics of women relying on female sterilization postpartum varies across region. The more detailed information on the potential sources of geographic variation in women's postpartum contraceptive practice that this analysis can identify areas for future research that would inform the development and implementation of programs and policies addressing contraceptive use in the months after delivery.

Materials and Methods

The PRAMS is a survey of a representative sample of women delivering a live born infant each year in 41 reporting areas in the United States (i.e., 40 states and New York City). Two to 4 months after delivery, postpartum women in each reporting area are mailed a self-administered survey inquiring about their socioeconomic and demographic characteristics and health behaviors before, during, and after pregnancy; those who do not respond are contacted via telephone (Centers for Disease Control and Prevention & Division of Reproductive Health, 2012). The survey for all reporting areas includes a question asking women if they are currently using a contraceptive method, but only a subset of reporting areas include an optional question about the specific method women are using.

For this analysis, we used data from 2006 through 2009 (before the ACA) for the 12 reporting areas that included the question on the specific postpartum method used and that achieved the minimum response rate required for public release of the data ($\geq$70% in 2006; $\geq$65% between 2007 and 2009): Arkansas, Colorado, Michigan, Mississippi, Nebraska, New York state, New York City, North Carolina, Oregon, Rhode Island, South Carolina, and West Virginia. This sample included 44,984 women age 20 years and older with information on postpartum contraceptive use. Because we were interested in assessing use of sterilization among low-income women, we only wanted to include those who met the minimum age requirement ($\geq$21 years old) to have the procedure paid for by Medicaid. However, we included women age 20 in our sample because the public use dataset only included age categories (rather than women's specific age) and women age 20 were grouped with those between 21 and 24 years old.

In addition to age, other variables that we included in our analysis were women's parity at the time of delivery, educational attainment, race/ethnicity, and payment source for delivery (i.e., private insurance, Medicaid), which have been associated with use of sterilization in other studies (Bass & Warehime, 2009; Borrero et al., 2007; Bumpass et al., 2000; Lunde, Rankin, Harwood, & Chavez, 2013; White & Potter, 2014). Women's chances of undergoing sterilization also have been associated with their type of delivery and body mass index (BMI), with women who have a Caesarian section (C-section) being more likely to undergo the procedure and obese women, particularly those having vaginal deliveries, being less likely to be sterilized (Allen, Desimone, & Boardman, 2013; Whiteman et al., 2012). Therefore, we created a composite variable using information on delivery type and BMI: C-section, vaginal delivery with a BMI of 29.9 kg/m^2 or less, and vaginal delivery with a BMI of 30.0 kg/m^2 or greater.

As a first step in our analysis, we categorized reporting areas according to geographic region: South (Arkansas, Mississippi, North Carolina, South Carolina, West Virginia), Midwest/West (Colorado, Michigan, Nebraska, Oregon), and Northeast (New York state, New York City, Rhode Island). We combined states in the Midwest and West because there were few states in each region, and previous studies have reported similar rates of sterilization in these areas (Chandra, Martinez, Mosher, Abma, & Jones, 2005; Whiteman et al., 2012). We excluded women who reported their delivery was paid by a source other than private insurance or Medicaid (n = 1,656) owing to small sample sizes within each region. We also excluded women who were missing information on parity, educational attainment, type of delivery, or BMI (n = 2,253), yielding a final sample of 41,075 postpartum women.

Within each region, we computed the distribution of postpartum women's demographic and obstetric characteristics. Next, we calculated the percentage of women reporting sterilization as their current method for each demographic and obstetric characteristic within region; for each characteristic, the significance of differences between regions in the percentage of women using sterilization was determined using Poisson regression. Finally, we calculated prevalence ratios for use of sterilization versus other contraceptive methods or no method to evaluate whether the same characteristics were associated with postpartum sterilization in each region, after adjusting for other factors. Prevalence ratios were calculated using Poisson regression models, stratified by region that included all variables simultaneously. Differences in the associations of demographic and obstetric characteristics with sterilization across region was determined with multivariable-adjusted Poisson models that included all reporting areas and interaction terms between women's characteristics and region (e.g., Black race * Midwest/West and Black race * South). The results of this analysis would indicate, for example, whether Black women were more likely to be sterilized than White women if they lived in the South than if they lived in the Northeast.

Using Stata 13.0, we weighted all analyses to account for the complex sampling design and nonresponse in the PRAMS. The first author's university institutional review board determined this research was exempt from human subjects review.

Results

Overall, 5,328 postpartum women (11.0%) reported using female sterilization at the time of the survey. In PRAMS reporting areas in the Northeast, the percentage of postpartum women who relied on female sterilization ranged from 5.0% in New York City to 9.9% in Rhode Island (Figure 1). Among Midwest/West reporting areas, the percentage using female sterilization was