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Trends and Disparities in Postpartum Sterilization after Cesarean Section, 2000 through 2008

Ginny Garcia, PhD [a,*], Dawn M. Richardson, DrPH, MPH [b], Kelly L. Gonzales, MPH, PhD [b], Adolfo G. Cuevas, PhD [c]

[a] Department of Sociology, Portland State University, Portland, Oregon
[b] School of Community Health, College of Urban and Public Affairs, Portland State University, Portland, Oregon
[c] Department of Social and Behavioral Sciences, Harvard School of Public Health, Boston, Massachusetts

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A B S T R A C T

Purpose: Tubal sterilization patterns are influenced by factors including patient race, ethnicity, level of education, method of payment, and hospital size and affiliation. However, less is known about how these factors influence tubal sterilizations performed as secondary procedures after cesarean sections (C-sections). Thus, this study examines variations in the prevalence of postpartum tubal sterilizations after C-sections from 2000 to 2008.
Methods: We used data from the National Hospital Discharge Survey to estimate odds ratios for patient-level (race, marital status, age) and system-level (hospital size, type, region) factors on the likelihood of receiving tubal sterilization after C-section.
Results: A disproportionate share of postpartum tubal sterilizations after C-section was covered by Medicaid. The likelihood of undergoing sterilization was increased for Black women, women of older age, and non-single women. Additionally, they were increased in proprietary and government hospitals, smaller hospital settings, and the Southern United States.
Conclusions: Our findings indicate that Black women and those with Medicaid coverage in particular were substantially more likely to undergo postpartum tubal sterilization after C-section. We also found that hospital characteristics and region were significant predictors. This adds to the growing body of evidence that suggests that tubal sterilization may be a disparity issue patterned by multiple factors and calls for greater understanding of the role of patient-, provider-, and system-level characteristics on such outcomes.

Tubal sterilization is the second leading method of contraception among American women (Mosher & Jones, 2010), with approximately 700,000 procedures performed annually (Bartz & Greenberg, 2008), and of all postpartum sterilizations, 42% occur after cesarean section (C-section; MacKay, Kieke, Koonin, & Beattie, 2001). Indeed, a recent report by the American College of Obstetricians and Gynecologists (ACOG, 2012) suggests that the postpartum period is ideal for performing the procedure, and the likelihood of sterilization has been shown to increase with C-section (Zite, Wuellner, & Gilliam, 2005). However, minimal racial and ethnic variations are observed in rates of C-section (Osterman & Martin, 2013), whereas a greater share of Black and Latina women undergo sterilization, a pattern that has remained unchanged since 1995 (Mosher & Jones, 2010). Tubal sterilizations are also more common in those with lower levels of income and education as well as those with public insurance (ACOG, 2012; Borrero et al., 2011; Chan & Westhoff, 2010; MacKay et al., 2001; Mosher & Jones, 2010; Zite & Wallace, 2007). This lack of congruence in usage patterns may indicate that medically underserved women face limited reproductive options and warrants further examination of the patient- and system-level factors that increase the likelihood of undergoing tubal sterilization after C-section.

Prior studies have posited that variations in tubal sterilization rates may be attributable to cultural preference among patients (Borrero et al., 2011), insurance status (Bass & Warehime, 2009; Borrero et al., 2007), bias and/or discrimination on the part of

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* Correspondence to: Ginny Garcia, PhD, Department of Sociology, Portland State University, 1721 SW Broadway, #217, Portland, OR 97201. Phone: 503-725-9572; fax: 503-725-3957.
E-mail address: gin5@pdx.edu (G. Garcia).

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providers (Downing, LaVeist, & Bullock, 2007), or system-level characteristics (ACOG, 2012; MacKay et al., 2001; Zite et al. 2005); however, few have focused on the disparate nature of tubal sterilizations. A notable exception is work by Bass and Warehime (2009), which highlights the need to examine this issue; they have found that disadvantage (as measured by Medicaid coverage and place of residence) is tied to greater likelihood of tubal sterilization. Indeed, these authors argue that increased restrictions associated with Medicaid coverage have led to a lack of alternative contraceptive choices among low-income women and thus sterilization related decision making should be viewed as constrained (Bass & Warehime, 2009). We extend this research by examining sterilization in the context of C-sections; it has been observed that sterilization completion rates are higher during C-section (Zite et al., 2005), as are rates of poststerilization regret (Hillis, Marchbanks, Tylor, & Peterson, 1999). Additionally, we use discharge records over several years (National Hospital Discharge Survey [NHDS] 2000–2008) and are able to incorporate system-level factors (hospital size and ownership) in addition to patient-level characteristics (insurance status, race, marital status, and age).

At the patient level, low levels of education and income are connected to greater likelihood of tubal sterilization as is race (ACOG, 2012; Borrero et al., 2011; Chan & Westhoff, 2010; MacKay et al., 2001; Mosher & Jones, 2010; Zite & Wallace, 2007). Such variations may be explained in part by racially driven attitudinal differences and/or preference for the procedure (Potter et al., 2012). For instance, Black women are more likely to express familiarity with the procedure and to desire a method that does not require insertion of a foreign object (Borrero et al., 2011). Nonetheless, given the higher likelihood of Medicaid usage in low-income Black and Latina women (Borrero, Zite, & Creinin, 2012) coupled with persistent findings that a disproportionate share of sterilizations are covered by Medicaid (ACOG, 2012; Bass & Warehime, 2009; Chan & Westhoff, 2010; Hillis et al., 1999; MacKay et al., 2001); we agree with Bass' argument that greater usage may reflect a restricted set of reproductive options (2009). In fact, women who use Medicaid coverage are subject to a loss of coverage[1] 60 days after delivery (MacKay et al., 2001). This lapse may encourage women to choose long-term, irreversible procedures rather than to forego contraception altogether (Bass & Warehime, 2009). Lending additional support to this assertion is the finding that coverage improvements for those with employment-based or private insurance have led to a decline in overall tubal sterilizations in favor of oral contraceptives or reversible methods (Chan & Westhoff, 2010).

Variations in rates of sterilization may also be impacted via system-level factors, which include health administration, financing, access, and location (Smedley, Smith, & Nelson, 2009). Prior research has linked lack of operating room availability (ACOG, 2012; Zite et al., 2005) and religious affiliation of the hospital (ACOG, 2012) with decreased rates of postpartum tubal sterilization. Additional studies have documented regional variations in rates of tubal sterilization. These studies note higher postpartum tubal sterilization rates in the Southern and Western United States (MacKay et al., 2001). Such regional differences may result from variations in providers' tendency to suggest sterilization, in addition to different care delivery systems (Chan & Westhoff, 2010; MacKay et al. 2001). It is also possible that economic interests at the hospital level exerts some influence as a broader shift toward the maximization of billed services in managed care settings (Wang, Wan, Falk, & Goodwin, 2001). Taken together, these findings suggest that factors external to the individual are influential in the prediction of tubal sterilization rates, and may further limit medically underserved women's reproductive choices.

We are particularly motivated to investigate tubal sterilization as a representation of a health disparity because previous findings have consistently illustrated that they are disproportionately performed on those with Medicaid coverage (ACOG, 2012; Bass & Warehime, 2009; Chan & Westhoff, 2010; Hillis et al., 1999; MacKay et al., 2001). In fact, 12% of women receive Medicaid coverage yet 41% of postpartum tubal sterilizations are paid by Medicaid (ACOG, 2013). Prompting additional concerns are higher rates of regret and sterilization misinformation among Black women (Borrero et al., 2007), and findings that low-income Black and Latina women are more often advised to limit childbearing (Downing et al., 2007).

Further motivating our research is the dearth of information on postpartum sterilizations performed during C-section. To our knowledge none have examined variations in this group, although it is warranted based on previous findings, which indicate that sterilization completion rates are higher in those who undergo C-section (Zite et al., 2005) as is postpartum sterilization regret (Hillis et al., 1999). Thus, we examine 1) who was most likely to undergo sterilization after C-section from 2000 to 2008, and 2) the role of patient- and system-level factors in predicting postpartum sterilizations after C-section. We hypothesize that Black race, Medicaid coverage, and larger hospital size will be associated with an increased likelihood of sterilization after C-section.

Material and Methods

We used data from the NHDS, a series of national probability samples of non-federal short stay hospitals that collects medical and demographic information from inpatient discharge records (National Center for Health Statistics, 2014). The current NHDS sampling frame covers hospitals with an average length of stay of fewer than 30 days for all patients. Data for 2000 through 2008 are pooled so that trends may be observed over time. Additionally, we restricted our sample to women between the ages of 15 and 49 who underwent a C-section in the specified time frame. This resulted in a final sample of 79,304 women.

Dependent Variable

The dependent variable is whether or not a woman who underwent C-section also underwent tubal sterilization. This variable was identified using ICD-9 procedure codes.[2,3] It is

[1] The United States' history of coercive sterilization practices involving low-income and minority women led to the creation of strict regulations surrounding federally funded sterilization (Borrero et al., 2012). Thus, a standardized consent form (Medicaid Title XIX-SCF) and 30-day waiting period became required for those obtaining sterilization on public insurance as of 1978.

[2] We identified C-section and tubal sterilization using ICD-9 procedure codes. Identified codes include 74.0–74.2, 74.4, and 74.99 for C-section and 66.2–66.3 for tubal sterilization.

[3] ICD-9 codes were obtained from computerized data files from hospitals or coded centrally by NCHS staff if medical information was coded manually. Thus, it should be noted that the codes are subject to transcription errors, variations in coding by facility, and/or missing codes.