

Trends and Disparities in Postpartum Sterilization following C-Section, 2000-2008

Abstract

Objectives. We examined variations in the prevalence of postpartum tubal sterilizations following cesarean sections (C-sections) from 2000 to 2008.

Methods. We used data from the National Hospital Discharge Survey (NHDS) to estimate odds ratios for patient- (race, marital status, age) and system-level factors (hospital size, type, region) on the likelihood of receiving tubal sterilization after C-section.

Results. A disproportionate share of postpartum tubal sterilizations following 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 Midwest and Southern regions of the country.

Conclusions. Our findings indicate that Black women and those with Medicaid coverage in particular were substantially more likely to receive a postpartum tubal sterilization following 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 is a disparity issue patterned by multiple factors and calls for greater understanding of the role of patient-, provider-, and system-level characteristics.

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Introduction

Tubal sterilization is the second leading method of contraception among American women,¹ with approximately 700,000 procedures performed annually.² Many of these procedures are conducted postpartum following C-section (42% of all postpartum sterilizations).³ Indeed, a recent report by the American College of Obstetricians and Gynecologists (ACOG) suggests that the postpartum period is ideal for performing the procedure,⁴ and the likelihood of sterilization has been shown to increase with cesarean delivery.⁵ However, minimal racial and ethnic variations are observed in rates of C-section⁶ while a greater share of Black and Latina women undergo sterilization- a pattern which has remained unchanged since 1995.¹ Tubal sterilizations are also more common in those with lower levels of income and education and with public insurance.^{1,3-4,7-9} 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 following C-section.

Prior studies have posited that variations in tubal sterilization rates may be attributable to cultural preference among patients,⁸ insurance status,¹⁰⁻¹¹ bias and/or discrimination on the part of providers,¹² or system-level characteristics;³⁻⁵ however, few have focused on the disparate nature of tubal sterilizations. A notable exception is work by Bass and Warehime, which highlights the need to examine this issue as they find that disadvantage (as measured by Medicaid coverage and place of residence) is tied to greater likelihood of tubal sterilization.¹⁰ Indeed the 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.¹⁰ We extend this research by examining sterilization in the

context of C-sections as it has been observed that sterilization completion rates are higher during cesarean delivery⁵ as are rates of post-sterilization regret.¹³ Additionally, we utilize discharge records over several years (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, several factors may shape women's decisions regarding tubal sterilization. Low levels of education and income are connected to greater likelihood of tubal sterilization as is race.^{1,3-4,7-9} Such variations may be explained in part by racially driven attitudinal differences and/or preference for the procedure¹⁴. 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.⁸ However, given that low-income, Black and Latina women are more likely to use Medicaid¹⁵ coupled with persistent findings that a disproportionate share of sterilizations are covered by Medicaid,^{3-4,7,10,13} we agree with Bass' argument that higher usage may be a reflection of a restricted set of reproductive options.¹⁰ In fact, women who utilize Medicaid coverage are subject to a loss of coverage^a 60 days after delivery.³ This may encourage women to choose long-term irreversible procedures rather than forego contraception altogether.¹⁰ 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.⁷

Observed disparities in rates of sterilization may also be impacted via system-level factors. These include those related to health administration, financing, access, and location.¹⁶ In terms of sterilization, lack of operating room availability,⁴⁻⁵ or religious affiliation of the hospital⁴ have been shown to decrease 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 South and West.³ Some have suggested that variations in providers' tendency to suggest sterilization, in addition to different care delivery systems, may partially explain regional differences.^{3,7} 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 settings¹⁷ versus cost minimization models has been observed. 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.

The foregoing studies indicate the relevance of patient- and system-level factors on health outcomes. 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.^{1,3-4,7,10-11, 13} In fact, 12% of women receive Medicaid coverage yet 41% of post-partum tubal sterilizations are paid by Medicaid.¹⁸ Prompting further concerns are higher rates of regret and sterilization misinformation in Black women,¹¹ and findings that low-income Black and Latina women are more often advised to limit childbearing.¹² Thus, we examined the relative contribution of patient- and system-level factors on tubal sterilization outcomes. Specifically, older age,³ Medicaid coverage, and Black or Latina race/ethnicity^{1,3-4,7,10,11,13} are associated with increased rates. Married women are also more likely to undergo sterilization except in the case of Black women who were more likely to be single at the time of their procedure.^{10,19} Accordingly, we include measures of age, marital status, race, and type of insurance at the patient-level. At the system-level, hospital characteristics including religious affiliation⁴ and availability of operating

rooms⁴ have been shown to have an inverse association with rates of tubal sterilization, thus we include measures of hospital size and ownership. Finally, regional variations are observed and suggest that rates of postpartum tubal sterilization rates are highest in the South and West.³ 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 though it is warranted based on previous findings which indicate that sterilization completion rates are higher in those who undergo cesarean delivery⁵ as is postpartum sterilization regret.¹³ Thus, we examine: 1) who was most likely to undergo sterilization following C-section over the period 2000-2008; and 2) the role of patient- and system-level factors in predicting postpartum sterilizations following cesarean delivery. We hypothesize significant variations on the basis of race, type of insurance, and by hospital size and ownership.

Methods

Data

We used data from the National Hospital Discharge Survey (NHDS), 2000-2008, a series of national probability samples of non-Federal short stay hospitals that collects medical and demographic information from inpatient discharge records.²⁰ The National Center for Health Statistics (NCHS) has conducted the NHDS continuously since 1965. The current NHDS sampling frame covers hospitals with an average length of stay less than 30 days for all patients. Because of the complex, multistage design, data must be weighted to produce national estimates. Analyses and weighting were performed using STATA 12.0. Additionally, data for the study years were pooled so that trends could be observed over time. Because we were interested specifically in outcomes among women who underwent sterilization following C-section, our analyses were limited to women between the ages of 15-49 who experienced cesarean delivery

between 2000 and 2008. This resulted in a final sample of 79,396 women. Table 1 presents race-stratified characteristics of these women.

[Table 1 here]

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^b. It is dichotomous with women ages 15-49 who received a cesarean section coded as “0” and women who received a C-section and tubal sterilization coded as “1”. We used logistic regression to estimate the odds of undergoing tubal sterilization following C-section.

Independent Variables. At the patient-level, variables include age, race, marital status, and type of insurance. The NHDS race categories include White, Black, other, and race not stated and are reported via provider intake forms^c. Marital status includes never married, married, widowed/divorced/separated, and not stated. Insurance coverage includes six categories: private (Blue Cross/Blue Shield, HMO/PPO, and other), Medicaid (excludes Indian Health Services), self-pay, and other. At the hospital level, we include hospital ownership (proprietary, government, and non-profit^d) and size of hospital (bed size categories include: 6-99, 100-199, 200-299, 300-499, and 500+). Owing to regional variations in tubal sterilization we include region; and because we examined several years of data, we control for year.

Results

Overall, the proportion of tubal sterilizations performed on women who underwent C-section remained relatively stable from 2000 to 2007 (~17%), though a marked decrease was observed in 2008 (14.83%) (Figure 1). Among Black women, we observed the highest proportions of simultaneous procedures of any race group in every year except 2008. Women classified as

other generally had the lowest rates of combined procedures, and white women remained fairly stable at around 16%.

[Figure 1 here]

Table 2 presents race-stratified characteristics of women who received tubal sterilization following C-section. As expected, a slightly larger proportion of Black women underwent sterilization relative to the number who received a C-section, and Medicaid covered 51% of this group's sterilizations. It is also observed that Black women were more likely to be in the 20-29 age range and report single as their marital status. On the other hand, White and other women were more likely to be married and in the 30-39 age range. Medicaid coverage was the modal response category across all groups. At the system level, sterilizations were more commonly performed in non-profit settings regardless of race. Some racial distinctions were observed on the basis of hospital size. Specifically, the most common setting for white women was a relatively smaller hospital (100-199 beds) while Black and other were more likely to have the procedure in a larger hospital (300-399 beds). Finally, tubal sterilizations were most commonly performed in the South.

[Table 2 here]

Logistic regressions were used to test hypotheses and assess the likelihood of undergoing tubal sterilization following cesarean delivery. The odds ratios may be interpreted as the log odds that a tubal ligation occurred (Table 3). We considered the patient-level characteristics first (Model 1) and added in system-level factors in stepwise fashion (Models 2-4). In accordance with our hypotheses, the results indicated that age is highly influential and that those in younger age categories (15-19 and 20-29) have much lower odds while those in the 40-49 age range experienced 90% greater odds of sterilization (reference: 30-39 age range). Type of insurance

also emerged as a significant predictor, as we observed that those using Medicaid had nearly twice the odds of tubal sterilization than those in any other group. Black women were 28% more likely to undergo tubal sterilization, all else equal. Both married and ever married women had greater odds of simultaneous procedures versus single. System-level characteristics also exerted a significant influence and provided partial support for our hypotheses. As expected, the odds were lower in non-profit hospitals versus government and proprietary settings. However, the odds were higher in small hospitals (6-99 beds and 100-199 beds), which was unexpected based on previous findings that suggest operating room availability decreases the odds of tubal sterilization. Finally, partial support for hypothesized relationships with respect to region was observed. Compared with the South, the odds of tubal sterilization were higher in the Midwest, while no significant differences were observed for the Northeast or West regions. Outcomes did not vary significantly by year.

[Table 3 here]

We tested for effect measure modification and observed significant variations on the basis of marital status. Thus, regressions stratified on the basis of marital status are shown in Table 4 (Model 1 represents outcomes among married women; Model 2 represents outcomes among never married women). Among married women, hypothesized relationships were further supported. Insurance coverage exerted the greatest influence as it was observed that Medicaid coverage increased the odds of undergoing tubal sterilization by approximately 50% compared with other forms of insurance. The odds of getting the procedure were also increased by 14% for Black women compared to White women, all else equal. Other significant outcomes include increased odds for those in older age categories, in small hospital settings, and in the Midwestern region of the country (ref=South).

[Table 4 here]

Among never married women, Medicaid coverage increased the odds of dual procedures relative to all other types of insurance. Notably, Black women remained more likely to receive the procedure. This supports previous studies that observed important racial and insurance-based distinctions in sterilization outcomes. As above, women in the older age ranges also experienced greater odds of tubal sterilization. Finally, hospital ownership exerted relatively more influence than most patient-level characteristics with the exception of Medicaid coverage, which exerted the greatest influence.

Conclusion

Race-stratified descriptive statistics indicated distinct variations in patient-level characteristics for those who received tubal sterilization following C-section. Specifically, it was observed that Black women who underwent postpartum sterilization were younger, more likely to be single, and have Medicaid coverage. This provides further support for the argument that underserved women may indeed face a restricted set of contraceptive options.¹⁰ Regression outcomes further supported previous studies which observed relatively higher rates of tubal sterilization among Black women, married and ever-married women, those in the middle age categories, and with Medicaid coverage. In our stratified models, it was observed that Black women were more likely to undergo sterilization whether they were single or married. This is potentially reflective of a disparity issue as increased odds among Black women may be explained by a constrained set of reproductive choices (via Medicaid restrictions). Their choices may be further hindered by restrictive reproductive advice issued by providers and a reduced ability to rely on vasectomy for contraception as it is virtually absent in Black males.¹⁹

While we were unable to assess the role of provider bias on the likelihood of sterilization, persistently higher rates of sterilization in underserved women may suggest it plays some role.

Studies have increasingly shown that providers manifest negative stereotypes of minority patients, which influence decision-making.^{16,21-23} In the context of sterilizations, findings have shown that low income Black and Latina women receive more restrictive reproductive advice and are more often encouraged to limit childbearing.¹² Additional studies have shown that providers report that they communicate different options regarding available contraceptive methods based on race, ethnicity, and income.^{5,24} Such findings suggest that provider biases may ultimately translate into a greater tendency to suggest sterilization on the basis of race and class and warrant further consideration.

We further contribute to previous studies by including system-level characteristics that have been shown to be influential.³⁻⁴ Our findings generally confirm expectations as it was observed that sterilizations were more likely in proprietary and government settings versus non-profit.

Unexpectedly, the procedure was observed to be more likely in smaller hospital settings and in the Midwest. We are unable to account for findings related to the size of the hospital though higher odds in the Midwest may be explained by large, urban minority populations in this region.

Limitations

Our study is not without limitations, most notably the inability to include self-reported race or ethnicity. We were also unable to include level of education, which has been shown to produce significant variations in usage patterns of sterilization.¹ Future studies should include race/ethnicity, and education or income to further clarify their influence on sterilization decision-making. Future studies should also include parity, which potentially exerts a great deal of influence as women are increasingly likely to utilize sterilization upon completion of desired childbearing. Finally, we have no direct measure of whether the procedure resulted because of a patient request, on the advice of a provider, or was medically necessary. Nonetheless, our

findings are strengthened by the use of a nationally representative dataset (over a period of years) that provides the opportunity to examine the role of patient- and system-level factors on tubal sterilization. Ultimately, our findings provide evidence of the need to more closely investigate the role of these factors as both were shown to be influential and may ultimately reflect a restricted set of reproductive choices in medically underserved women.

Notes

^a 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.¹⁵ 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.

^b We identified cesarean delivery and tubal sterilization using ICD-9 procedure codes. Identified codes include 74.0-74.2, 74.4, and 74.99 for cesarean delivery and 66.2-66.3 for tubal sterilization.

^c Race not stated is excluded from logistic regression analyses as has been done in previous studies utilizing the NHDS data. Additional models were run that included the race not stated category and maintained significance. Additionally, previous studies have confirmed that race was underreported to a greater extent for White patients than those of other races.³

^d Non-profit hospital includes church.

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