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Racial differences in vasectomy utilization in the United States: Data from the National Survey of Family Growth

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Abstract

Objectives—Over 500,000 vasectomies are performed annually in the United States. The safety and efficacy make vasectomy a good family planning option, yet the factors related to use of male surgical sterilization are not well understood. Differences in vasectomy rates are examined in this analysis to explore whether health care, socioeconomic, or personal characteristics could account for observed disparities in use.

Methods—We analyzed data from the male sample of the 2002 National Survey of Family Growth to examine the use of vasectomy among the sample of men aged 30–45 (n=2,161). Demographic, socioeconomic, and reproductive characteristics were analyzed to assess associations with vasectomy.

Results—11.4% of men aged 30–45 years reported having a vasectomy, representing approximately 3.6 million American men. While 14.1% of white men had a vasectomy, only 3.7% of black and 4.5% of Hispanic men reported vasectomy. On multivariate analysis, a significant difference in the odds of vasectomy by race/ethnicity remained, with black (OR 0.20, 0.09–0.45) and Hispanic men (OR 0.41, 0.18–0.95) having a significantly lower rate of vasectomy independent of demographic, partner, and socioeconomic factors. Having ever been married, fathering two or more children, older age, and higher income were all associated with vasectomy.

Conclusions—After accounting for reproductive history, partner, and demographic characteristics, black and Hispanic men were less likely to rely on vasectomy for contraception. Further research is needed to identify the reasons for these race/ethnic differences and to identify factors that impede minority men's reliance on this means of fertility control.

Keywords

Vasectomy; Socioeconomic Factor; Sterilization

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Introduction

Surgical sterilization is a well accepted method of primary contraception in the United States.¹ Due to its relative ease, high efficacy, and low complication rate, vasectomy is an important option for couples interested in pregnancy prevention.²⁻⁴ More than 500,000 vasectomies are performed annually in the United States; however, little is known about the men who choose to undergo the procedure.

In comparison, female surgical sterilization (tubal ligation) is performed more frequently than vasectomy in the United States. Current data suggests that 16% of women undergo surgical sterilization compared with 6% of men.^{5, 6} Given that tubal ligation is more invasive, the reasons for this difference in utilization are unclear. Borrero and colleagues used data from the sixth cycle of the National Survey of Family Growth (NSFG 2002) to show that tubal ligation is more common among African Americans and those with no or public insurance,⁷ but that its utilization was unaffected by vasectomy in male partners.⁸ Earlier data from the NSFG suggested that tubal ligation rates are dependent upon education, religion, and parity, as well as race.¹

Based upon available information on women, we hypothesized that rates of surgical sterilization in men are impacted by race and socioeconomic status. Current data on U.S. vasectomy utilization is limited to partner surveys and questionnaires administered to men undergoing vasectomy. Descriptions of men from a single institution suggest that socioeconomic factors may play a role in vasectomy utilization. The present study aims to describe the demographic, socioeconomic, and reproductive characteristics of men who undergo vasectomy in the U.S. using population based data from cycle six of the National Survey of Family Growth. Racial and ethnic differences in vasectomy rates are examined in this analysis to explore whether health care, socioeconomic, or personal and relationship characteristics could account for observed disparities in use of men undergoing the procedure.^{1,8,9}

Materials and Methods

Study population

We analyzed data from male sample of the 2002 (Cycle 6) National Survey of Family Growth (NSFG, <http://www.cdc.gov/nchs/nsfg.htm>).^{5,6} The NSFG is a multistage probability sample designed to represent the household population of U.S. women and men aged 15–45 to assess trends and group differences on family life, marriage and divorce, pregnancy, infertility, use of contraception, and men's and women's health. Interviews were conducted by trained staff in selected families' homes between March 2002 and February 2003. In all, 4,928 men and 7,643 women representing the population of the United States living in households were surveyed. Certain groups, including black and Hispanic adults, were sampled at higher rates to achieve adequate samples for generating nationally representative point estimates and power to examine differences between racial and ethnic groups. In order to maintain privacy only a single member of a given household was asked to participate. In addition, several of the more sensitive questions administered including sexual practices and drug use were asked via computer and headphones to give the respondent additional privacy. All subjects provided written consent for participation. The survey is available in both English and Spanish. The overall response rate for the male survey was 78%.⁶ Institutional Review Board review at the University of California San Francisco is not required for secondary data analysis of a deidentified national data set.

Description of variables

Outcome—Vasectomy status among surveyed men was determined by asking: “Have you ever had a vasectomy or any other operation that makes it impossible for you to father a child?” followed by the clarification question: “What type of operation did you have? Was it a vasectomy or some other operation?” Vasectomy was coded as a dichotomous variable (Yes/No). Only patients that reported having a vasectomy in response to both questions were credited with having a vasectomy.

Exposure—Demographic, socioeconomic, and reproductive characteristics were analyzed to assess associations with vasectomy. Variables analyzed included self reported race/ethnicity (white, black, Hispanic, Asian, other), age (categorical variable in 5 year intervals), marital history (dichotomous variable - ever married - yes/no), number of children (categorical - none, one, two or more), education level (categorical variable based on highest degree achieved), income level (categorical variable in \$25,000 intervals), insurance status (categorical variable - none, public, or private), past failed or terminated pregnancies (dichotomous - yes/no), and sterilization status of partner (dichotomous - yes/no).

Data analysis

As our goal was a descriptive model of American males who had utilized vasectomy, our inclusion criteria for the multivariate logistic regression model were broad. We created an *a priori* model of socioeconomic, demographic, and reproductive characteristics thought to influence vasectomy utilization based the existing literature. We did not select predictors for inclusion based on bivariable screening as important confounding can be missed.¹⁰ All analyses accounted for the complex survey design of the NSFG. Multivariate logistic regression modeling was used to test differences in vasectomy use by race/ethnicity while adjusting for sociodemographic and health care factors. We used Odds Ratios (ORs) and their 95% confidence intervals to estimate the association between vasectomy utilization and other variables. A p-value of 0.05 was considered statistically significant, and all tests were 2-sided. All statistical analyses were performed using Stata 10 (StataCorp LP, College Station, TX).

Results

Among 2,161 men aged 30–45, 137 (6.8%) reported having a vasectomy. Controlling for age, men have a roughly 11.4% reliance on vasectomy for contraception by age 45. Extrapolated nationally, this implies that approximately 3.6 million American men in this age group have undergone the procedure. In contrast, only 10 of 2767 men (0.4%) aged 15–29 had undergone a vasectomy. Therefore, our analysis focused on men in the 30–45 year age range. The mean patient age at the time of vasectomy was 31.4±5.1. The mean age of the last born child at the time of vasectomy was 2.7±3.4.

While 14.1% of white men aged 30–45 years of age had a vasectomy, only 3.7% of black and 4.5% of Hispanic men reported a vasectomy (Table 1). Race/ethnicity was strongly associated with vasectomy in both bivariate and multivariate analyses. In multivariate analysis, black men were 80% less likely (OR 0.20, 95% CI 0.09–0.45) and Hispanic men 60% less likely (OR 0.41, 95% CI 0.18–0.95) to undergo vasectomy than white men. While Asians had lower vasectomy utilization on bivariate analysis, the association disappeared in the multivariate model (Tables 2).

Age and marital status were both strongly predictive of undergoing vasectomy. In multivariate analysis, ever being married (OR 10.53, 95% CI 1.83–60.68) and older age group (OR 3.49, 95% CI 2.04–5.98) were associated with an increased utilization of vasectomy. Similarly, an increasing number of offspring increased vasectomy utilization with the strongest increase in

rate after siring two or more children (OR 6.15, 95% CI 2.62–14.48). Partner sterilization status was associated with vasectomy whereby having a partner who underwent a tubal ligation strongly reduced the odds of vasectomy (OR 0.16, 95% CI 0.07–0.36; Table 2). Having a pregnancy ending in abortion, miscarriage, or stillbirth was predictive of vasectomy on bivariate but not multivariate analysis.

Income level showed evidence of dose-response on bivariate analysis, but in multivariate analysis only an income of \geq \$50,000 annually was associated with vasectomy utilization compared to men who earn $<$ \$25,000 (OR 2.45, 1.13–5.31). While having private insurance was associated with vasectomy in the bivariate model, on multivariate analysis insurance status did not predict who underwent vasectomy. Education level did not predict vasectomy utilization in either bivariate or multivariate analysis.

Comment

Our analysis found that race/ethnicity is a significant independent predictor of vasectomy utilization in the United States. Compared to white men, blacks and Hispanics are significantly less likely to undergo vasectomy even after accounting for multiple confounding variables. Prior data has shown that race predicted utilization of tubal ligation with higher rates in Hispanic and black women than other races.^{7,8} Furthermore, other studies have reported lower rates of vasectomy utilization among minority men.^{1,8,11} However, published data from prior studies has been limited to female partner report and clinic samples. Two studies relied on female partners reporting their partner's vasectomy status.^{1,8} Another study queried men undergoing vasectomy at multiple locations by utilizing a questionnaire to identify demographics and motivations for vasectomy but did not provide comparison to a similar population of men not undergoing vasectomy.¹¹ To our knowledge, this is the first population based analysis of vasectomy utilization in U.S. men.

Previous studies had suggested that education level may allow stratification of men who undergo vasectomy;^{1,11} however, our analyses did not find an association between education level and vasectomy utilization. This could indicate that vasectomy utilization is decided by culture rather than social or economic status. Alternatively, a majority of subjects represented lower educational levels and the data may have been underpowered to detect a difference.

Somewhat intuitively and similar to studies of tubal ligation, male sterilization rates among those ages 30 to 45 increase with marriage, age, and number of children all of which can be associated with relationship stability and successful past fertility.^{1,7}

Bumpass found that prior abortions decreased rates of tubal ligation in women, postulating that women thereafter viewed abortion as a viable option for family planning.¹ In men, our own experiences suggested that a failed or unwanted pregnancy may be the impetus for vasectomy. While there was an association between failed pregnancies which ended in miscarriage, abortion, or stillbirth leading to an increase in the rate of vasectomy on bivariate analysis, the association disappeared on multivariate analysis suggesting that other confounding variables may explain this finding.

The explanation for the racial disparity in vasectomy is uncertain. A search for cultural causes such as religion did not yield a significant effect as it did for female tubal ligation where Catholicism was protective.^{1,7} While insurance status had no association, the access to health care and services or counseling offered may vary by race. Indeed, other groups have shown racial differences in health care both in the NSFG and in other data sets.^{12–14} Others have postulated that there may be different racial perceptions of fertility whereby masculinity is closely tied to a man's ability to father children.^{15–17} As such, vasectomy may be perceived as emasculating in certain cultures.

Indeed, it is crucial that providers adequately counsel patients about all reproductive options and ensure proper understanding of the true risks, benefits and alternatives of vasectomy. Examination of men who father a child after vasectomy may suggest instances of poor patient - provider communication. The majority (56.3%, 9/16) had a child within six months of their vasectomy. However, there is also a group of 4 men who had a child nine to twelve months after vasectomy. This group may represent those who had an unintended pregnancy by having unprotected intercourse while motile sperm remained in their ejaculate.^{18,19} The literature suggests that approximately three months are required for the motile sperm count to reach zero, and it should be confirmed with a semen analysis prior to unprotected intercourse. By our analysis, men who underwent vasectomy had a 10 fold lower rate of condom use compared to their counterparts. Men must be properly educated to continue to use protection until sterility can be assured after vasectomy. Even with time, there is a failure rate to vasectomy with unintended pregnancies occurring at a rate of 0.1%.^{20,21} Among men surveyed by the NSFG, two men had a child over two years from the time of their vasectomy, however, this must be interpreted with caution as the circumstances of these pregnancies cannot be ascertained.

Additional limitations of this study merit mention. The NSFG is a cross sectional study which surveys participants at a single point in time often several years after the vasectomy. While race will remain constant, other variables such as educational level or income could conceivably change with time. In addition, certain variables (e.g. income) could be incorrectly reported by participants. Such misreporting would likely occur randomly leading to a regression to the mean and favor the null hypothesis. Despite this, income remained a significant predictor of vasectomy. Lastly, the low number of Asian men in this sample preclude accurate analysis of factors associated with vasectomy in this population.

Conclusions

In the United States, there may be racial and socioeconomic biases in the utilization of vasectomy from either the patients, their providers or both. Given the safety, efficacy, and economic viability of vasectomy, such disparities merit further investigation.

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Table 1

Vasectomy utilization in men aged 30–45 years of age.

Characteristic	No Vasectomy n (%) [*]	Vasectomy n (%) [*]
Ever Married		
No	793 (99.5)	4 (0.5)
Yes	1231 (85.5)	133 (14.5)
None	878 (97.7)	11 (2.3)
Children		
1	411 (91.4)	23 (8.6)
2+	735 (81.7)	103 (18.3)
Race		
White	1045 (86.0)	101 (14.1)
Black	417 (96.3)	12 (3.7)
Hispanic	460 (95.5)	17 (4.5)
Asian	52 (97.8)	2 (2.2)
Other	50 (81.8)	5 (18.2)
Age		
30–35	840 (94.7)	32 (5.3)
36–40	677 (88.1)	56 (11.9)
41–45	507 (88.1)	49 (19.0)
Religion		
None	395 (90.2)	24 (9.8)
Catholic	624 (92.4)	27 (7.6)
Protestant	819 (85.7)	71 (14.3)
Other	186 (88.4)	15 (11.6)
Income		
<\$25,000	620 (94.4)	14 (5.6)
\$25,000–49,999	735 (91.5)	40 (8.5)
\$50,000+	669 (83.5)	83 (16.5)
Insurance		
None	477 (94.4)	9 (5.6)
Private	1304 (86.9)	114 (13.1)
Public	243 (89.8)	14 (10.2)
Education Level		
Less than HS	326 (90.6)	9 (9.4)
HS, ± some college	1026 (88.6)	67 (11.4)
College degree	483 (86.9)	46 (13.1)
Higher Degree	189 (90.8)	15 (9.2)
Pregnancies ending in abortion, miscarriage, stillbirth		
No	1440 (90.1)	86 (9.9)
Yes	584 (85.7)	51 (14.3)
Partner with tubal		
No	1857 (87.7)	130 (12.3)
Yes	167 (95.2)	7 (4.8)
Total	2024 (88.7)	137 (11.4)

* Weighted percentages account for the complex survey design in which certain groups are oversampled in order to obtain adequate subjects for analysis. Raw percentages do not account for the individual subject weights.

Table 2

Multivariate logistic regression analysis examining the utilization of vasectomy.

Characteristic	Unadjusted		Adjusted	
	OR (95% CI)	p value	OR (95% CI)	p value
Ever Married	Reference		Reference	
No	89.28 (19.24, 414.20)	<0.01	10.53 (1.83, 60.68)	Reference
Yes	Reference		Reference	0.01
Children	Reference		Reference	
None	8.32 (3.07, 22.59)	<0.01	2.11 (0.70, 6.36)	0.18
1	24.07 (10.76, 53.84)	<0.01	6.15 (2.62, 14.48)	<0.01
2+	Reference		Reference	
Race	Reference		Reference	
White	0.21 (0.10, 0.44)	<0.01	0.20 (0.09, 0.45)	<0.01
Black	0.26 (0.13, 0.50)	<0.01	0.41 (0.18, 0.95)	0.04
Hispanic	0.09 (0.01, 0.71)	0.02	0.22 (0.02, 1.93)	0.17
Asian	1.44 (0.44, 4.72)	0.55	3.08 (0.67, 14.26)	0.15
Other	Reference		Reference	
Age	Reference		Reference	
30–35	2.43 (1.44, 4.10)	<0.01	1.96 (1.16, 3.34)	0.01
36–40	4.20 (2.66, 6.64)	<0.01	3.49 (2.04, 5.98)	<0.01
41–45	Reference		Reference	
Religion	Reference		Reference	
None	0.84 (0.39, 1.81)	0.65	0.59 (0.26, 1.38)	0.22
Catholic	1.68 (0.80, 3.55)	0.17	1.16 (0.50, 2.69)	0.72
Protestant	1.27 (0.50, 3.25)	0.61	1.32 (0.43, 4.07)	0.62
Other	Reference		Reference	
Income	Reference		Reference	
<\$25,000	2.20 (1.04, 4.67)	0.04	1.36 (0.63, 2.92)	0.42
\$25,000–49,999	4.36 (2.05, 9.28)	<0.01	2.45 (1.13, 5.31)	0.02
\$50,000+	Reference		Reference	
Insurance	Reference		Reference	
None	2.82 (1.19, 6.68)	0.02	1.70 (0.72, 4.01)	0.22
Private	1.65 (0.58, 4.71)	0.34	1.43 (0.32, 6.38)	0.63
Public	Reference		Reference	
Education Level	Reference		Reference	
Less than HS	1.30 (0.49, 3.40)	0.59	0.88 (0.35, 2.20)	0.78
HS, ± some college	1.89 (0.66, 5.39)	0.23	0.76 (0.28, 2.07)	0.59
College degree	1.53 (0.53, 4.48)	0.43	0.51 (0.16, 1.62)	0.25
Higher Degree	Reference		Reference	
Pregnancies ending in abortion, miscarriage, stillbirth	Reference		Reference	
No	2.30 (1.51, 3.50)	<0.01	0.99 (0.62, 1.58)	0.97
Yes	Reference		Reference	
Partner with tubal	Reference		Reference	
No	0.59 (0.23, 1.52)	0.27	0.16 (0.07, 0.36)	<0.01
Yes				