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Abstract

Vasectomy is one of the few options men have to manage their reproductive capacity and take on a more equitable role in pregnancy prevention. While the method is underused throughout the United States, the southern states have a lower prevalence rate compared to the rest of the country. Existing survey research does not assess what men know or think about the procedure as a means of understanding why this is the case. We created and conducted an exploratory survey to assess men's knowledge, attitudes, and information-seeking behaviors about vasectomy in the Southern United States. We used targeted Facebook advertising to recruit men ages 25–70 years living in 7 southern states to complete an online survey ($n = 397$). Using regression analyses, we identify that participants who had a vasectomy knew more about the procedure than participants who had not. Participants who had not had a vasectomy had less positive attitudes about the procedure across all six attitude subscales compared to participants with vasectomies. We highlight potential avenues for future research to understand why this may be the case. Finally, the majority of participants knew someone who had had a vasectomy. This suggests that men disclose having a vasectomy to others. The interpersonal dynamics around vasectomy decision-making and disclosure remain unknown and a viable area for future research. Findings from this exploratory survey may be used by public health officials interested in implementing campaigns to increase knowledge about vasectomy and reduce stigma, which may encourage more positive attitudes about the procedure.

Keywords

Vasectomy, male sterilization, contraception

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It has been 25 years since universal access to reproductive health care that integrates men into policies and services was placed on the international agenda (UNFPA, & Population Reference Bureau, 2009). Since the 1994 International Conference on Population and Development in Cairo, researchers and clinicians have largely ignored men's role in the reproductive equation, and women continue to disproportionately bear the contraceptive burden, particularly in the United States (Almeling, 2015; Almeling & Waggoner, 2013; Kimport, 2018a, 2018b). One of the reasons for this inequitable burden is that men's choice of reproductive technologies is limited (Oudshoorn, 2003). In practice, there are more than a dozen female-centered contraceptive methods but only

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three male-centered methods (i.e., withdrawal, male condoms, and vasectomy; Guttmacher Institute, 2020). Vasectomy is one of the few options men have to manage their reproductive capacity and take on a more equitable role in pregnancy prevention. Vasectomy is regarded as a safe, cost-effective, permanent contraceptive method that is 99.9% effective at preventing pregnancy (Patel & Nguyen, 2019; Shih et al., 2011, 2014). As such, it may be an attractive option for men and their female partners to consider when they do not wish to have children or have reached their ideal family size. Yet, vasectomy continues to be underused and understudied in the United States (Shih et al., 2011).

Approximately 500,000 vasectomies are performed each year in the United States (Ostrowski et al., 2018). Knowledge about who gets a vasectomy is primarily derived from the National Survey of Family Growth (NSFG; Anderson et al., 2010, 2012; Eisenberg et al., 2009; Eisenberg & Lipshultz, 2010). The NSFG is a nationally representative survey of women and men aged 15–49 years (Centers for Disease Control and Prevention, 2017). Analyses of the NSFG data estimate that 6% of all men rely on vasectomy for pregnancy prevention (Eisenberg & Lipshultz, 2010), although men who have not been married are unlikely to use the method (Eeckhaut, 2015). Generally, men who have a vasectomy are married, White, over 35 years, and have two or more children (Anderson et al., 2010; Eeckhaut, 2015; Eisenberg et al., 2009). By comparison, an estimated 21.8% of women using contraception rely on tubal ligation for pregnancy prevention, although this method is more invasive, riskier, more expensive, and less effective at preventing pregnancy than vasectomy is (Guttmacher Institute, 2020; Shih et al., 2011).

Research has identified that there are regional disparities in permanent contraceptive use. While measures and data sets vary, research indicates that vasectomy prevalence rates are lower in the southern states compared to those in the other parts of the country (Barone et al., 2006; Ostrowski et al., 2018; Pile & Barone, 2009). Using the Truven Health MarketScan database, Ostrowski et al. (2018) estimate that the proportion of men undergoing vasectomy from 2007 to 2013 was higher in the North Central and Western regions, compared to that in the Southern or Northeast regions of the United States, although statistics by state are not reported. Similarly, data from a 2003 survey of physicians also reported higher rates of vasectomies performed in the Midwest and West, compared to those in the South and Northeast, although no statistics by state are reported (Barone et al., 2006). Data from the 2002 Behavioral Risk Factor Surveillance System suggest that vasectomy prevalence at the state level varies greatly, from a low of 4.7 per 1,000 men in New Jersey to a high of 19.9 per 1,000 men in Idaho, with southern states having consistently low

prevalence rates (Pile & Barone, 2009). At the same time, rates of tubal ligation are higher in the southern states compared to those in the other parts of the country (Douglas-Hall et al., 2018). Improving our understanding of why vasectomy is underused in the south is a needed step toward addressing this inequitable balance of permanent contraception in the region.

The aforementioned research analyzing the NSFG and regional use disparities has been essential for understanding the demographic characteristics of men who decide to have a vasectomy. Little other quantitative work examines what men know or think about the procedure. After an extensive literature review and consultation with colleagues working in the field of sexual and reproductive health, it seems that to date no survey has examined men's knowledge or attitudes about vasectomy in the United States. The goal of the current study was to address this gap by conducting an exploratory survey of men's knowledge, attitudes, and information-seeking behaviors about vasectomy in the Southern United States. This survey serves to provide new knowledge about how men consider vasectomy in a region with a lower uptake while also generating areas of inquiry for future research.

Methods

Study Sample

To be eligible to participate in the study, a participant needed to be a cisgender (i.e., non-transgender), English speaking, heterosexual man between the ages of 25 and 70 years. These eligibility criteria were used because vasectomy is positioned as a contraceptive option for cisgender men who are seeking to prevent pregnancy with their female partners. The age criteria reflect known trends about the age at which men utilize vasectomy, while also capturing men who have the procedure later in life (Anderson et al., 2010, 2012; Barone et al., 2006). We restricted the sample to men living in one of seven southern states (Alabama, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, or Tennessee). The geographic bounding was used to focus on southern states that have lower vasectomy prevalence rates compared to those in other regions of the country. In terms of vasectomy prevalence, the states in this study are ranked 36th (Tennessee), 38th (Georgia), 40th (North Carolina), 41st (Alabama), 44th (South Carolina), 46th (Louisiana), and 48th (Mississippi) in the United States (Pile & Barone, 2009).

We used targeted Facebook advertising to recruit participants. The advertisements used information from members' profile pages to target men over age 18 years who lived in one of the seven aforementioned states. Respondents who were interested in the study clicked on a hyperlink in the Facebook advertisement to link to the survey materials, which were hosted on SurveyMonkey.

Once potential participants reached the SurveyMonkey site, they read a brief statement about the purpose of the research and other information related to informed consent. Those who agreed to participate then encountered the screening questions to ensure they met the eligibility criteria. Those who did not meet the criteria were thanked for their time, and those who qualified proceeded to the beginning of the questionnaire, which took between 10 and 15 min to complete. Participants had the option of providing their email address at the end to be eligible for a drawing for a \$50 Amazon gift card. One gift card was sent for every 50 respondents using computer-generated random selection.

Data were collected during April and May 2019. A total of 652 individuals clicked on the questionnaire link and consented to answer the eligibility questions and participate in the study. One hundred and seventy individuals were ineligible because they did not meet the qualifying criteria for either age, state of residence, or sexual orientation. An additional 85 people met the qualifying criteria but did not complete the questionnaire; these responses were excluded because they did not provide answers to questions about their attitudes, which formed the bulk of the analysis. The 397 completed questionnaire responses that met the age, location, and sexual orientation criteria are included in our analyses. This research was approved by the University of South Carolina's Institutional Review Board.

Questionnaire Development

The questionnaire measured men's vasectomy knowledge, attitudes, and information-seeking behaviors. The questionnaire was informed by a literature review, which revealed no known survey of these constructs in the United States, although related work was recently conducted in Mexico (Hernandez-Aguilera & Marván, 2015, 2016). Drawing on this research in Mexico, information gathered from the literature, and consultations with the coauthors, the first author developed a questionnaire consisting of items querying vasectomy knowledge, attitudes, and information seeking, as well as demographic information. Content and face validity were assessed by the research team, which included experts in reproductive health and survey methodology. Questions were designed to represent the range of meanings within the subscale dimensions. The first author conducted cognitive interviews ($n = 6$) with men recruited through personal networks to identify potential issues with the questionnaire items (Willis, 2005). Cognitive interview participants met the survey criteria and were recruited to ensure diversity across measures including race/ethnicity, number of children, and experience with vasectomy. After minor revisions, the questionnaire was pretested ($n = 37$) with a convenience sample of men recruited using the

first and fourth authors' Twitter and Facebook accounts. No content or deployment issues were noted, and no revisions were made.

Measures

Vasectomy Knowledge. We assessed knowledge of vasectomy by asking how much respondents agreed or disagreed with 7 statements using a 5-point response scale ranging from 1 (*strongly disagree*) to 5 (*strongly agree*; see Table 1). Statements were all measures developed by the authors. Examples included "Vasectomy is an outpatient procedure" and "Vasectomy can be reversed." We created the knowledge variable by summing the responses to each of the seven statements. Scores could range from 5 to 35; a higher score represented greater knowledge about vasectomy.

Vasectomy Attitudes. We assessed attitudes toward vasectomy using 33 items thought to impact the perceived acceptability of having a vasectomy. Items were developed by the authors or based on work by Hernandez-Aguilera and Marván (2015, 2016). All attitude questions used a 5-point Likert scale ranging from *strongly disagree* to *strongly agree*. We used Cronbach's alpha to measure internal consistency reliability and report these values in Table 1. We used randomization to reduce order effects and reverse coding to detect patterned responses. We used exploratory factor analysis to ensure that subscales are unidimensional; the survey data indicated that 25 of the items formed 6 subscales: (a) potential for regret, (b) changes to one's sex life, (c) religious views opposing vasectomy, (d) willingness to disclose having a vasectomy, (e) concerns about the procedure, and (f) concerns about recovery. See Table 1 for item wording. Each variable represented the mean of the items forming each subscale, with higher scores indicating greater endorsement of that attitude.

Information Seeking. We assessed information-seeking behaviors using two measures developed by the authors. First, we asked participants if they knew someone who had had a vasectomy. Second, we asked if the participants had talked to anyone about having a vasectomy. For both questions, answers were reported as either "yes" or "no."

Demographic Characteristics. All respondents were asked to provide their age, state of residence, number of children, relationship status, highest completed level of education, household income, and race/ethnicity. Participants were asked if they had had a vasectomy. While vasectomies are designed to be a permanent form of contraception, there are means of reversal (e.g., vasovasostomy or vasoepididymostomy). Participants who had a vasectomy were asked if they had obtained a reversal.

Table 1. Survey Knowledge and Attitude Scale Information.

Measure	Questions
Knowledge	<p>Vasectomy is an outpatient procedure.</p> <p>Vasectomy is meant to be a permanent means of preventing pregnancy.</p> <p>Vasectomy can be reversed.</p> <p>Vasectomy is more than 99% effective at preventing pregnancy.</p> <p>Having a vasectomy means having your testicles removed.^b</p> <p>Having a vasectomy means no longer having sperm in your semen.</p> <p>Having a vasectomy means you can no longer ejaculate.^b</p>
Potential for regret ($\alpha = 0.79$)	<p>Having a vasectomy makes you less of a man.^{a,b}</p> <p>Men should not have a vasectomy.^{a,b}</p> <p>Men who have a vasectomy will regret it.^{a,b}</p>
Changes to one's sex life ($\alpha = 0.78$)	<p>Once a man has a vasectomy his sex life gets worse.^{a,b}</p> <p>If a man has a vasectomy, he is more likely to cheat on his female partner.^{a,b}</p> <p>Vasectomy causes men to lose interest in sex.^{a,b}</p>
Concerns about the procedure ($\alpha = 0.76$)	<p>Vasectomy is a safe procedure.</p> <p>Vasectomy is a painful procedure.^{a,b}</p> <p>Vasectomy is a complicated procedure.^b</p> <p>Vasectomy is a procedure with serious medical risks.^{a,b}</p> <p>If I thought about getting a vasectomy, I would be worried that something would go wrong.^b</p> <p>If I did get a vasectomy, I trust that the doctor would do a good job.</p>
Concerns about recovery ($\alpha = 0.64$)	<p>If a man has a vasectomy, he will be fully recovered a few weeks after the procedure.</p> <p>Recovering from a vasectomy takes a few days.</p> <p>Recovering from a vasectomy is not a big deal.</p>
Willingness to disclose having a vasectomy ($\alpha = 0.81$)	<p>If I had a vasectomy, I would tell my sexual partner(s) about it.</p> <p>I would feel comfortable talking with a doctor about getting a vasectomy.</p> <p>I would tell my friends that I had a vasectomy.</p> <p>I would be embarrassed to tell people that I had a vasectomy.^b</p> <p>I would be ashamed to tell people that I had a vasectomy.^b</p>
Religious views opposing vasectomy ($\alpha = 0.81$)	<p>My religious beliefs would not influence my decision to have a vasectomy.</p> <p>I consider it a sin to get a vasectomy.^{a,b}</p> <p>Because of my religious beliefs, I would not get a vasectomy.^b</p>
Information seeking	<p>Before today, have you ever talked to anyone about vasectomy?</p> <p>Do you know anyone that has had a vasectomy?</p>

Note. ^aAdapted from Hernandez-Aguilera and Marván (2015, 2016). ^bItem was reverse-scored.

Analysis

We first computed descriptive statistics to characterize the study sample, including the respondents' knowledge, attitudes, and information-seeking behaviors regarding vasectomy. Because only one participant had a reversal, we categorized all participants as having either had ("yes") or not had ("no") a vasectomy and included the one participant with a reversal in the "yes" category. Since small numbers of responses were obtained from

American Indian, Asian American, Black, and Latino men, we categorized race and ethnicity for all participants as either White or non-White. Next, we compared the differences between respondents who had versus had not received a vasectomy. We assessed the differences in knowledge and attitudes using Mann–Whitney *U* tests because these variables were not normally distributed. Differences in information-seeking behavior, which was normally distributed, were assessed using chi-square tests. We tested for differences in knowledge and

attitudes by age, number of children, race/ethnicity, relationship status, educational attainment, and income. Finally, we conducted linear and logistic regression analyses to estimate the relationships between sociodemographic variables and vasectomy-related knowledge, attitudes, and information seeking. We used SPSS version 25 for all analyses (*SPSS Statistics—Overview*, 2020).

Results

Descriptive Characteristics

The mean age of participants was 47.4 years ($SE \pm 0.70$; Table 2). Participants reported having a mean number of 1.5 children ($SE \pm 0.07$). Nearly 18% of the sample had had a vasectomy ($n = 70$). The mean age at vasectomy was 35.8 ($SE \pm 0.77$) years; age at the time of procedure ranged from 30 to 56 years. Four of the men (5.7%) had a vasectomy after they were 49 years old. Among those who had a vasectomy, the average time since the procedure was 17.4 years ($SE \pm 1.3$), with a range between 1 and 36 years. Nearly 90% ($n = 356$) of the sample identified as White. The majority of respondents were married ($n = 260$; 65.5%) or cohabitating ($n = 42$; 10.6%). About half of the sample had at least a bachelor's degree ($n = 205$; 51.6%). More than 40% of the participants reported an annual household income less than \$55,000 ($n = 173$; 43.6%). The mean knowledge score was 29.7 ($SE \pm 0.18$) out of 35. The majority of participants knew someone with a vasectomy ($n = 281$; 70.8%), but only 32% of respondents had talked to someone about the procedure ($n = 127$).

Using Bivariate Analyses to Determine Differences by Vasectomy Status

Participants who had a vasectomy had a higher mean knowledge score of 32.6 ($SE \pm 0.29$) than participants who had not had a vasectomy (29.2 [$SE \pm 0.29$]; $U = 4621$, $p \leq .001$; Table 3). Similarly, respondents who had had a vasectomy had statistically significantly higher mean scores on each of the six attitude subscales than respondents who had not had a vasectomy ($p \leq .001$). There was a statistically significant relationship between having obtained a vasectomy and knowing someone else who had a vasectomy ($\chi^2 = 9.16$, $p = .002$) and talking with someone about vasectomy ($\chi^2 = 106.83$, $p \leq .001$).

Estimating Men's Vasectomy Knowledge and Attitudes Using Linear Regression Models

We conducted multiple linear regression analyses to see whether vasectomy status determined men's knowledge or attitudes while holding demographic variables constant

Table 2. Overall Respondent Descriptive Characteristics ($n = 397$).

	Count Or Range	% Or Mean (SE)
Age	25–70	47.4 (0.70)
Number of children	0–8	1.5 (0.07)
Vasectomy		
No	327	82.4%
Yes	70	17.6%
Race/ethnicity		
White	327	89.7%
Non-White	41	10.3%
Relationship status		
Married	260	65.5%
Cohabitating	42	10.6%
Widowed/divorced/separated	28	7.1%
Dating but not cohabitating	32	8.1%
Not dating	35	8.8%
Educational attainment		
High school/GED	103	25.9%
Associate's degree	89	22.4%
Bachelor's degree	108	27.2%
Graduate degree	97	24.4%
Income		
<\$25,000	44	11.1%
\$25,000–\$55,000	129	32.5%
\$55,000–\$85,000	84	21.2%
\$85,000–\$115,000	73	18.4%
>\$115,000	67	16.9%
State of residence		
Alabama	62	15.6%
Georgia	67	16.9%
Louisiana	27	6.8%
Mississippi	41	10.3%
North Carolina	72	18.1%
South Carolina	65	16.4%
Tennessee	63	15.9%
Knowledge	21–35	29.7 (0.18)
Attitudes		
Regret subscale	3–15	11.7 (0.12)
Sex life subscale	6–15	12.2 (0.11)
Religion subscale	3–15	12.3 (0.15)
Disclosure subscale	8–25	19.8 (0.18)
Procedure subscale	12–30	22.2 (0.18)
Recovery subscale	5–15	11.6 (0.09)
Knew someone with a vasectomy		
Knew nobody	116	29.2%
Knew somebody	281	70.8%
Talked to someone about vasectomy		
Had not talked to someone	270	68.0%
Had talked to someone	127	32.0%

(Table 4). Knowledge about vasectomy was positively associated with having a vasectomy (3.52 [0.45], $p \leq .001$) and having a bachelor's or master's degree (1.09 [0.45],

Table 3. Knowledge, Attitudes, Information Seeking, and Sociodemographic Variables by Vasectomy Status ($n = 397$)

	No Vasectomy ($n = 327$)		Had Vasectomy ($n = 70$)		p Value*
	Count Or Range	% Or Mean (SE)	Count Or Range	% Or Mean (SE)	
Knowledge about vasectomy ^a	21–35	29.2 (0.2)	22–35	32.6 (0.29)	<.001
Attitudes about vasectomy ^a					<.001
Regret subscale	3–15	11.6 (0.13)	4–15	13.1 (0.25)	<.001
Sex life subscale	6–15	11.8 (0.12)	8–15	13.8 (0.19)	<.001
Religion subscale	3–15	12.1 (0.17)	4–15	13.3 (0.26)	.001
Disclosure subscale	8–25	19.2 (0.19)	11–25	22.1 (0.33)	<.001
Procedure subscale	12–30	21.7 (0.19)	15–30	24.8 (0.35)	<.001
Recovery subscale	5–15	11.3 (0.10)	8–15	13.0 (0.21)	<.001
Knew someone with a vasectomy ^b					.002
Knew nobody	106	32.4%	10	14.3%	
Knew somebody	221	67.6%	60	85.7%	
Talked to someone about vasectomy ^b					<.001
Had not talked to someone	259	79.2%	11	15.7%	
Had talked to someone	68	20.8%	59	84.3%	
Age ^a	25–70	45.6 (0.77)	32–70	55.5 (1.20)	<.001
Number of children ^a	0–8	1.3 (0.07)	0–5	2.2 (0.12)	<.001
Race/ethnicity ^b					.921
White	293	89.6%	63	90.0%	
Non-White	34	10.4%	7	10.0%	
Relationship status ^b					.001
Married	200	61.2%	60	85.7%	
Cohabiting	36	11.0%	6	8.6%	
Widowed/divorced/separated	26	7.9%	2	2.9%	
Dating but not cohabiting	31	9.5%	1	1.4%	
Not dating	34	10.4%	1	1.4%	
Educational attainment ^a					.888
High school/GED	86	26.3%	17	24.3%	
Associate's degree	72	22.0%	17	24.3%	
Bachelor's degree	87	26.6%	21	30.0%	
Graduate degree	82	25.1%	15	21.4%	
Income ^a					<.001
<\$25,000	43	13.1%	1	1.4%	
\$25,000–\$54,999	118	36.1%	11	15.7%	
\$55,000–\$84,999	63	19.3%	21	30.0%	
\$85,000–\$114,999	54	16.5%	19	27.2%	
>\$115,000	49	15.0%	18	25.7%	

Note. ^aMann–Whitney U test. ^bChi-square test.

$p \leq .05$; 1.38 [0.49], $p \leq .01$) but negatively associated with non-White race/ethnicity (-2.11 [0.54], $p \leq .001$) or not dating anyone (-1.50 [0.64], $p \leq .05$).

Participants who had a vasectomy had higher mean scores for each of the six attitude subscales. Number of children was negatively associated with both potential regret (-0.22 [0.10], $p \leq .05$) and religious views (-0.36 [0.12], $p \leq .01$). Cohabiting (1.39 [0.50], $p \leq .01$) or being widowed, divorced, or separated was a positive predictor of religious attitudes about vasectomy (1.17

[0.58], $p \leq .01$). Similarly, participants who were cohabiting had more positive attitudes about disclosing vasectomy to others compared to married participants (1.40 [0.61], $p \leq .05$). Having a bachelor's degree was a significant predictor of attitudes about vasectomy's impact on one's sex life (0.61 [0.28], $p \leq .05$). Participants who made between \$25,000 and \$54,999 had more positive attitudes about vasectomy's impact on their sex life compared to men making less than \$25,000 (0.68 [0.36], $p \leq .05$). Finally, participants who made more

Table 4. Linear Regression Models Estimating Men's Vasectomy Knowledge and Attitudes (n = 397)^a.

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
	Knowledge	Regret	Sex Life	Religion	Disclosure	Procedure	Recovery
Vasectomy	3.52 (0.45) ^{***}	1.53 (0.33) ^{***}	2.07 (0.29) ^{***}	1.67 (0.40) ^{***}	3.15 (0.48) ^{***}	2.98 (0.48) ^{***}	1.66 (0.25) ^{***}
Age	-0.03 (0.01) [*]	0.01 (0.01)	-0.01 (0.01)	-0.01 (0.01)	-0.03 (0.01)	0.01 (0.01)	0.01 (0.01)
Number of children	0.13 (0.14)	-0.22 (0.10) [*]	-0.03 (0.09)	-0.36 (0.12) ^{**}	-0.04 (0.15)	-0.06 (0.15)	-0.03 (0.08)
Race/ethnicity	-2.11 (0.54) ^{***}	0.05 (0.39)	-0.14 (0.34)	-0.64 (0.48)	-0.05 (0.58)	-0.69 (0.57)	-0.11 (0.30)
Relationship status							
Cohabiting	-0.33 (0.57)	0.61 (0.41)	0.20 (0.36)	1.39 (0.50) ^{**}	1.40 (0.61) [*]	0.21 (0.60)	0.03 (0.32)
Widowed/divorced/ separated	0.13 (0.66)	0.37 (0.47)	0.04 (0.42)	1.17 (0.58) [*]	0.47 (0.70)	-0.47 (0.70)	0.65 (0.37)
Dating but not cohabitating	-0.91 (0.64)	0.07 (0.46)	0.39 (0.40)	0.65 (0.57)	0.76 (0.68)	0.50 (0.68)	-0.30 (0.36)
Not dating	-1.50 (0.64) [*]	0.05 (0.46)	-0.26 (0.40)	-1.21 (0.56) [*]	-0.28 (0.68)	-1.32 (0.68)	-0.04 (0.35)
Educational attainment							
Associate's degree	0.23 (0.47)	-0.07 (0.34)	0.38 (0.30)	0.12 (0.41)	0.05 (0.50)	-0.05 (0.50)	-0.39 (0.26)
Bachelor's degree	1.09 (0.45) [*]	0.14 (0.32)	0.61 (0.28) [*]	0.04 (0.40)	0.20 (0.48)	-0.22 (0.48)	-0.09 (0.25)
Graduate degree	1.38 (0.49) ^{**}	0.04 (0.35)	0.39 (0.31)	0.09 (0.43)	-0.11 (0.52)	0.16 (0.52)	0.11 (0.27)
Income							
\$25,000-\$54,999	0.46 (0.57)	0.28 (0.41)	0.68 (0.36) [*]	-0.30 (0.50)	0.91 (0.60)	-0.30 (0.60)	0.55 (0.32)
\$55,000-\$84,999	0.27 (0.64)	0.63 (0.46)	0.45 (0.40)	0.24 (0.56)	0.86 (0.68)	-0.21 (0.68)	0.66 (0.35)
\$85,000-\$114,999	0.14 (0.66)	0.44 (0.48)	0.67 (0.42)	-0.24 (0.59)	0.95 (0.71)	-0.03 (0.70)	0.47 (0.37)
> \$115,000	0.38 (0.68)	0.75 (0.49)	1.01 (0.43)	0.39 (0.60)	1.63 (0.73) [*]	-0.03 (0.72)	0.46 (0.38)
R ²	0.22	0.10	0.16	0.12	0.14	0.14	0.15

Note. ^aReference groups: no vasectomy, White, married, high school education, under \$25,000 income.
^{***}p ≤ .001. ^{**}p ≤ .01. ^{*}p ≤ .05.

Table 5. Logistic Regression Models Estimating Men's Vasectomy Information–Seeking Behaviors ($n = 397$)^a.

	Model 8		Model 9	
	Know Someone		Talk to Someone	
	β (SE)	OR [95% CI]	β (SE)	OR [95% CI]
Vasectomy	0.60 (0.40)	1.83 [0.84, 3.99]	3.42 (0.43)	30.58 [13.3, 70.5]***
Age	0.01 (0.01)	1.00 [0.98, 1.02]	-0.04 (0.01)	0.96 [0.94, 0.98]***
Number of children	0.13 (0.11)	1.14 [0.93, 1.41]	0.42 (0.11)	1.52 [1.21, 1.90]***
Race/ethnicity	-1.06 (0.38)	0.34 [0.16, 0.73]***	-0.14 (0.44)	0.87 [0.37, 2.06]
Relationship status				
Cohabiting	0.07 (0.42)	1.08 [0.48, 2.44]	-0.82 (0.46)	0.44 [0.18, 1.09]
Widowed/divorced/separated	0.14 (0.49)	1.15 [0.44, 3.01]	-1.13 (0.51)	0.32 [0.12, 0.88]*
Dating but not cohabiting	1.58 (1.44)	4.88 [2.04, 11.64]***	-0.72 (0.52)	0.48 [0.18, 1.34]
Not dating	1.10 (0.43)	2.99 [1.28, -6.97]**	-0.06 (0.56)	0.94 [0.31, 2.85]
Educational attainment				
Associate's degree	-0.50 (0.36)	0.60 [0.30, 1.22]	0.04 (0.40)	1.04 [0.48, 2.29]
Bachelor's degree	-0.09 (0.33)	0.92 [0.48, 1.76]	-0.14 (0.38)	0.87 [0.41, 1.84]
Graduate degree	-0.13 (0.36)	0.88 [0.43, 1.80]	-0.34 (0.40)	0.71 [0.32, 1.56]
Income				
\$25,000–\$54,999	-0.43 (0.39)	0.65 [0.30, 1.40]	-0.24 (0.52)	0.81 [0.29, 2.24]
\$55,000–\$84,999	-0.15 (0.45)	0.86 [0.36, 2.07]	-1.17 (0.56)	0.31 [0.10, 0.94]*
\$85,000–\$114,999	-0.85 (0.49)	0.43 [0.16, 1.12]	-0.77 (0.60)	0.46 [0.14, 1.51]
>\$115,000	-0.74 (0.51)	0.48 [0.17, 1.30]	-1.40 (0.59)	0.25 [0.08, 0.79]*
HL test ^b	4.79		2.93	

Note. ^aReference groups: no vasectomy, White, married, high school education, under \$25,000 income. ^bHosmer and Lemeshow (HL) test is a goodness of fit test for logistic regression models.

*** $p \leq .001$; ** $p \leq .01$; * $p \leq .05$.

than \$115,000 a year had more positive attitudes about disclosing vasectomy to others compared to participants making less than \$25,000 (1.63 [0.73], $p \leq .05$).

Estimating Men's Vasectomy Information–Seeking Behaviors Using Logistic Regression Models

We conducted multiple logistic regression analyses to see whether vasectomy status determined men's information-seeking behaviors while holding demographic variables constant (Table 5). We detected no association between knowing someone who had obtained a vasectomy and having had a vasectomy. Non-White participants were less likely to know someone who had had a vasectomy compared to White participants (0.34 OR, $p \leq .01$). Compared to respondents who were married, respondents who were dating (4.88 OR, $p \leq .001$) or not dating (2.99 OR, $p \leq .001$) had higher odds of knowing someone who had had a vasectomy.

Participants who had had a vasectomy were 30 times more likely to have talked to someone about a vasectomy than participants who did not have a vasectomy ($p \leq .001$). The odds of talking to someone about vasectomy decreased slightly with age (0.96 OR, $p \leq 0.001$) but

increased based on number of children (1.52 OR, $p \leq .001$). Compared to married men, men who were widowed, divorced, or separated were less likely to have talked to someone about vasectomy (0.32 OR, $p \leq .05$). Respondents who made between \$55,000 and \$84,999 (0.31 OR, $p \leq .05$) or over \$115,000 (0.25 OR, $p \leq .05$) per year were less likely to talk with someone about vasectomy compared to respondents making under \$25,000.

Discussion

In our sample, men who had a vasectomy had greater knowledge and more positive attitudes about the procedure compared to men who had not had the procedure, even when holding other demographic variables constant. It is not unexpected that men who have had a vasectomy know more about it compared to men who have not had a vasectomy. They have personal experience with it while others do not. What remains unknown though is whether men held more positive attitudes about the procedure before having it done or whether they developed these attitudes after the procedure. Because this is a cross-sectional survey, we were not able to assess how attitudes might have changed over time. It may be possible that

because men thought about vasectomy in a positive way, they were willing to have the procedure. However, it is possible that men's attitudes toward vasectomy improved in the time since the procedure, especially if they did not experience adverse side effects.

By contrast, it is interesting to consider why men who did not have a vasectomy had lower scores across all attitude subscales. For example, mean scores for potential regret may have been lower because men without vasectomies were still considering future scenarios where they may want to have additional children. It remains unclear how men might imagine their reproductive futures and whether the permanency of vasectomy is the driver for attitudes about potential regret. Some research has examined vasectomy regret, which has been reported to be higher among men who are younger than 30 years when they had the procedure (Wespes, 2014). However, research has reported that men who were childless at the time of the vasectomy were unlikely to desire reversal (Bryk et al., 2020). Men who have undergone vasectomy reversal are typically more than 5 years after surgery and have a new female partner (Ostrowski et al., 2015). For men interested in reversal, success depends on the man's age and time since sterilization (Johnson & Sandlow, 2017; Shih et al., 2011). Of the 70 men in the sample, only 1 had a reversal; he was 45 years old and had remarried.

Misinformation about vasectomy may be a reason that men who had not had a vasectomy had more negative attitudes about potential changes to their sex life, the procedure, and recovery. Men might believe that vasectomy causes them to lose their libido; however, research has identified that vasectomy can have positive effects on sexual satisfaction (Guo et al., 2015; Mohamad Al-Ali et al., 2014). Similarly, attitudes about the procedure and recovery may be driven by beliefs that vasectomy is invasive, painful, or debilitating. Yet, the majority of vasectomies are minimally invasive outpatient procedures requiring only local anesthesia that take approximately 15 min (Johnson & Sandlow, 2017). Research has demonstrated that men who had a vasectomy found it significantly less painful than they anticipated (Sooltongos & Al-Ausi, 2019). Public health interventions aimed at increasing the visibility of vasectomy would do well to counter potential misperceptions with these findings. Such efforts might include men who have had a vasectomy discussing why they decided to have the procedure, what it was like, and how it has impacted their sex life and relationships. These conversations might address concerns and misperceptions other men have and potentially encourage others to consider whether a vasectomy might be right for them.

What is less clear is how men's attitudes about disclosure and religious concerns should be interpreted and

potentially addressed. The subscale for disclosure included items about discussing vasectomy with partners, peers, and doctors. It is certainly possible, and probably likely, that men may approach talking about vasectomy with different types of people differently. Further, the disclosure subscale included items about shame and embarrassment. Again, these elements may vary depending on who men are talking to and in what contexts, which makes them difficult to disentangle. Similarly, the subscale about religious views assessed whether or not people's beliefs may preclude them from considering a vasectomy. What we do not know, however, is how strict men's views may be, the views of their female partner, and whether religious opposition applies to all forms of contraception. Qualitative research would be well situated to understanding issues around religion and concerns over disclosure. This work would be able to further explore men's reasons and motivations within the scope of their lived experiences.

Surprisingly, other demographic variables had limited influence on measured outcomes, although it is worth considering differences based on race/ethnicity. Among our sample, race/ethnicity was a predictor of knowledge, with non-White men having less knowledge about vasectomy than White men. Other research has similarly suggested that Black and Latino men have lower levels of contraceptive knowledge compared to White men (Borrero et al., 2013). Relatedly, among our sample, non-White men were significantly less likely to know someone who had had a vasectomy. Existing research reports that Black and Latino men have vasectomies less often than White men do (Eisenberg et al., 2009), so it is not unexpected that the non-White participants may not have known other men who had the procedure. Despite these differences, race/ethnicity was not a predictor for any of the attitude subscales. Our findings suggest that it may not be attitudes about vasectomy that are preventing non-White men from having a vasectomy but rather other factors such as generally low rates of counseling about vasectomy (Borrero et al., 2010) or resource constraints in offering vasectomy services (White et al., 2017). Further research into vasectomy disparities based on race/ethnicity are needed.

Finally, our logistic regression model revealed that men who had received a vasectomy were more likely to have talked to someone about the procedure compared to men who had not had a vasectomy. This makes sense because men would likely have had to have conversations with their medical provider, and potentially partners or friends, before having the procedure. However, whether or not a man had a vasectomy was not significantly related to whether or not he knew someone who had undergone the procedure. Our findings indicate that the majority of men in our sample reported knowing someone who had had the procedure. While it appears

that men do disclose their vasectomies to others as part of their interpersonal relationships, we do not know much about how the nature of the disclosure, whether it is a simple "I had the procedure" or a more detailed account. In either case, the ways that men gather information about vasectomy and tell others about it is a compelling area for exploration. Research in New Zealand, England, and Mexico reports that there is a social element in talking about vasectomy and that peers could be a source of social support and inclusion when it came to men's vasectomy decision-making (Amor et al., 2008; Gutmann, 2005; Terry & Braun, 2013). Future research might examine peer-to-peer interactions to understand the interpersonal dynamics around vasectomy decision-making and disclosure. Findings may illuminate ways that men can be used to increase visibility of vasectomy as a contraceptive method to consider among their peers.

Limitations

This research explored men's vasectomy attitudes, knowledge, and information-seeking behaviors based on pertinent demographic characteristics. The primary limitation is that this survey did not use a probability-based sampling approach. Thus, the findings are not generalizable beyond the study population. However, nonprobability sampling strategies are useful as a means of getting a sense of what people think or believe (Czaja & Blair, 2005), and other research focused on aspects of men's reproductive health has similarly utilized nonprobability designs for exploratory research (Garbers et al., 2018; Levant & Wimer, 2014; Roy & Casson, 2017). As with all self-report surveys, there is the potential that participants are not truthful in their responses. We recognize that recruiting online via Facebook can be a source of bias, potentially excluding people without access to the internet or who do not use social media. While the survey sample represented a range of ages, education levels, and income groups, there was limited variation by race/ethnicity. This may have been related to the use of Facebook for online recruitment as well as the fact that a very small percentage of Black and Latino men receive vasectomies (Eisenberg et al., 2009). This precluded more granular analyses based on these characteristics. Similarly, the majority of our sample was married or cohabitating. While men in such relationships may be more likely to consider vasectomy, our results may have been different if we had a larger population of participants who were single or casually dating. The proportion of respondents who have had a vasectomy, however, was slightly higher than existing national estimates (Anderson et al., 2010; Eisenberg & Lipshultz, 2010). Finally, the recovery subscale had

relatively low internal consistency ($\alpha = 0.64$), although alphas for other subscales were all in the respectable or very good range ($\alpha = 0.78$ – 0.81). The lower value for the recovery subscale may have been an artifact of only having three items. Future work may be needed to further improve the reliability of subscales, potentially by rewording or expanding the number of items associated with the variable constructs. The information gathered from this research may be used to design and inform a larger, probability-based survey sample to further investigate these constructs.

Conclusions

Vasectomy remains an understudied and underused contraceptive option. While vasectomy is not the right choice for all men, the method's effectiveness, permanence, and safety may make it an attractive option to consider for men (and their female partners) who do not want to father children or have reached their desired family size. This research brings to light previously unknown pertinent demographic characteristics associated with vasectomy knowledge, attitudes, and information seeking in the Southern United States. Findings may be used by public health officials interested in implementing campaigns to increase knowledge about vasectomy and reduce stigma, which may encourage more positive attitudes about the procedure. Based on our findings, it appears that men often know people who have had a vasectomy. Leveraging the idea that men might speak about their experience to others may be a way to initiate conversations about the procedure. Providers can continue to work to expand sexual and reproductive health services to men and discuss vasectomy as one of many contraceptive options to consider for men and their female partners. Future research efforts can continue to explore how men and women gather information and make judgements about vasectomy. Qualitative research would likely be well suited for this task, particularly given the need to understand how people conceptualize vasectomy and potential barriers to its use. This work may enable more men to choose vasectomy, thereby giving men greater control over their own reproductive capacity while also reducing women's contraceptive burden.

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