Vasectomy interest and awareness among patients and their partners in prenatal clinics in the United States

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ABSTRACT

Objective Although vasectomy is safer, more effective and less expensive than tubal ligation, rates of permanent contraception are consistently higher in women than in men. We sought to explore vasectomy interest and awareness in patients and their partners during prenatal visits, a time when contraceptive counselling is typically performed.

Methods Anonymous surveys were distributed between January and July 2019 to a cross-sectional, convenience sample of pregnant women and their partners, if available, presenting for outpatient prenatal care at two hospitals (one public, one private) serving different patient populations in Chicago, Illinois, USA. Survey questions gauged participant awareness and interest in vasectomies.

Results Surveys were completed by 436 individuals (78% female, 24% male). Seventy percent of respondents indicated interest in vasectomy after achieving optimal family size, but most respondents had never discussed it with their healthcare provider. Factors associated with vasectomy interest included being partnered, having a lower household income, and knowing someone who has had a vasectomy. Almost 50% of respondents would be interested in obtaining information about vasectomies from their obstetrician or prenatal care provider.

Conclusions Many patients and their male partners in the prenatal clinic setting were interested in vasectomy as a method for permanent contraception, but most respondents had never received counselling. Since comprehensive prenatal care includes contraceptive planning, obstetric providers are uniquely positioned to educate individuals on vasectomy.

Key messages

- More than 70% of women and their partners who presented for prenatal care at two US clinics expressed interested in vasectomy.
- Few respondents reported discussing vasectomy with a healthcare provider.
- Interest in vasectomy was associated with lower income, being partnered, and exposure to vasectomy.

INTRODUCTION

Vasectomy is a safer, more effective and less expensive permanent contraception technique than tubal ligation.[1 2] However, reported rates of permanent contraception are up to three times higher in women than in men in the United States (US),[3–5] with rates varying by socioeconomic position, level of education and ethnicity. Most men undergoing vasectomy are college-educated, have higher income and identify as white. Women choosing tubal surgery are frequently less educated, publicly insured and identify as Hispanic or non-Hispanic Black.[4 6–8] The reasons behind these differences are multifactorial and incompletely explored but suggest patient access difficulties for these procedures. Indeed, a recent publication reported lower counselling rates for vasectomy compared with female contraceptive methods in publicly-funded family planning clinics in California, with only 5% offering vasectomy services.[9]

Much of our population-based knowledge on permanent contraception in the US is attained through administration of the National Survey of Family Growth (NSFG) survey.[3 4 8 10] The NSFG is comprehensive but relies on participant recall and incorporates small numbers of male respondents, presenting challenges to determining the nuances behind vasectomy utilisation. A handful of qualitative studies describe barriers against increased

vasectomy use including misconceptions about its effect on health and virility and a lack of accessible providers.[2 11 12] These associations reveal disparities in contraceptive knowledge driven by regional, cultural and socioeconomic differences.

Prenatal care provides an important opportunity for counselling on permanent contraception. While this counselling should occur throughout prenatal care, vasectomy discussions are infrequent across socioeconomic, racial and ethnic groups in the US,[13 14] and fewer than 3% of men who have completed families report ever receiving counselling.[14] In a survey of US fellowship-trained family planning subspecialists, counselling rates for tubal surgery were more than double that for vasectomies, despite the latter being preferred.[15] Moreover, men in general interact less often with the healthcare system,[16] making the prenatal period an opportune time to engage men of all backgrounds in reproductive healthcare.[17] Although male perinatal engagement is highly variable and dependent on sociodemographic factors,[18 19] fathers have repeatedly reported interest in being involved despite social and institutional barriers.[18 20]

To our knowledge, no studies on vasectomies have been performed during antepartum visits, when routine contraceptive counselling is performed. The goal of our study was to explore interest, awareness and barriers to obtaining vasectomies in patients and their partners who attend prenatal clinics in a major US city, and to evaluate sociodemographic factors that may be associated with vasectomy interest.

METHODS

Study setting

Paper surveys were distributed to a convenience sample of pregnant women and their male partners presenting for outpatient prenatal care in two academic tertiary care settings: the John H Stroger, Jr Hospital of Cook County, a public safety-net hospital serving mostly Medicaid and uninsured patients (PU), and the faculty practice at Northwestern Feinberg School of Medicine, a private hospital (PR). The surveys were distributed between 1 January and 31 July 2019. Inclusion criteria included age 18 years and older, English-speaking, and willingness to participate. No identifying information was collected, and responses were not linked to any patient data. All participants provided verbal confirmation of informed consent. The study was approved by the institutional review boards of both hospitals.

The recruitment process varied slightly between the two sites due to institutional requirements. At PU, a research assistant approached patients and their identified partners, if present, at the first prenatal or 6-week postpartum visit regarding study participation. If verbal informed consent was provided, the research assistant gave copies of the survey to the patient and partner to complete separately in a private examination room.

At PR, the survey was distributed by the medical assistant to all patients and their identified partners presenting for prenatal care at their first or 32-week prenatal visit. The patient and their partner, if present, were asked to complete the survey separately in a private examination room. The first page of the survey detailed the informed consent, and consent was implied by completion of the survey.

Survey development

The survey included two sections: general demographics and vasectomy-specific questions (30 questions in total; online supplemental material A). Sociodemographic questions included age, relationship, education, insurance statuses, self-identified race, income and current/desired number of children. The second portion included subsections on vasectomy awareness, interest and access, and reasons why a man would not want a vasectomy. Respondents were asked to consider permanent contraception procedures for themselves or their partner. Questions on contraceptive interest were scored using a five-item Likert scale ranging from not interested to very interested. Reasons for not obtaining a vasectomy were compiled from historical qualitative studies on vasectomy decisions.[11] Other questions were adapted from our literature review and expert opinion of the authors. The survey was piloted by three clinical personnel who did not participate in the survey creation.

Patient and public involvement

Patients and the public were not involved in the design, conduct, reporting or dissemination of this study.

Statistical methods

Descriptive statistics were used to summarise all demographic variables and survey responses using frequency and percentage for categorical variables and mean, standard deviation, median and range for continuous variables. Distributions of continuous variables were compared using two-tailed t-tests and categorical variables compared using Fisher's exact or Pearson chi-squared tests, as appropriate. Non-responses to sociodemographic survey questions were considered to be missing information. Non-responses to substantive vasectomy-specific questions were taken to mean "unsure". A sensitivity analysis was also performed after removing the "unsure" responses.

Mixed-effects logistic regression models were used to determine whether demographic characteristics were associated with interest in permanent contraception. The outcome was dichotomised as somewhat to very interested versus not interested or unsure (the comparison was dichotomised as somewhat to very interested versus not interested in the sensitivity analysis). The model used is an extension of a linear mixed

model but assumed to be a binomial distribution and logit link function to model the dichotomous outcome while including both fixed and random effects. For the random effect, we included a random intercept with unstructured covariance structure for couples to account for similarities in responses obtained from the dyad (pregnant person and the partner). Adjusted analyses controlled for variables reported in the literature that have been associated with vasectomy uptake[6 8 21] and interest,[22] including age, gender, education, income, relationship status, insurance and race. Lastly, Cohen's kappa was used to measure agreement between partners, if the father also responded to the survey. All analyses were conducted with R (version 3.5.3, 2019, The R Foundation) and SAS version 9.4 (SAS Institute Inc., Cary, NC, USA).

RESULTS

General demographics

A total of 494 individuals were approached for survey completion, with 436 surveys collected from the two sites (PR 330 surveys, 88.0% response rate; PU 103 surveys, 86.6% response rate). Respondents were a median 32 years old (range 18–53 years), and the majority were nulliparous (54.8%), partnered (84.1%), privately insured (69.7%), and had at least a college education (71.8%) and an annual income greater than US$60 000 (65.8%; table 1). More than half of the respondents desired additional children (56.9%) while a third were unsure about their future family plans. Of note, these demographics were driven heavily by the PR respondents and all characteristics were significantly different between the two sites ($p<0.01$): PU respondents were younger, nearly all female, less than college educated, identified as Hispanic and non-white, were self-insured or uninsured, and had a family income below US$60 000.

Permanent contraception interest, exposure and relationships

Both vasectomy and tubal ligation were familiar to respondents, and almost half of the respondents knew someone who had undergone one of the procedures; PR respondents had greater vasectomy exposure than those from PU (table 2). In general, more respondents were interested in vasectomy (71.8%) than tubal ligation (42.9%); this interest did not differ among respondents when stratified by hospital or gender. However, receiving counselling on permanent contraception methods was rare, although more frequent for PU than PR respondents. Half of the respondents selected their primary care/family practice (PCP/FP) or obstetrician's offices as preferred locations to obtain information on vasectomies (online supplemental figure 1). Male respondents preferred their PCP's office for information, followed equally by the urologist, obstetrician or family/friends.

Table 3 presents the associations between various demographic variables and vasectomy interest for respondents who have heard of a vasectomy. After adjusting for covariates, being partnered (adjusted odds ratio (aOR) 14.32, 95% CI 1.6 to 131.5, $p=0.019$), knowing someone who has had a vasectomy (aOR 5.21, 95% CI 2.36 to 11.48, $p<0.001$) and having a household income <$60 000 (aOR 3.16, 95% CI 1.07 to 9.73, $p=0.038$) were significantly associated with vasectomy interest. The former two factors remained significantly associated with vasectomy interest after conducting a sensitivity analysis removing "unsure" responses (online supplemental table 1). Participant responses regarding why a man would not want to undergo a vasectomy are shown in table 4. Fear was chosen most often, followed by regret and concerns regarding sexual function. The distribution of reasons remained consistent when comparing between hospitals or genders, although almost half of the PU respondents were unsure of reasons compared with one-quarter of the PR respondents.

Finally, most respondents (91.5%) believed that family planning is the responsibility of both partners, but only one-third correctly identified that tubal ligation is the comparatively riskier procedure (table 2). Female respondents and those from PR more frequently made this incorrect assumption. When comparing interest in permanent contraception between the partners of the same dyad in our study there was moderate agreement between couples for vasectomy interest (unweighted Cohen's kappa 0.56, 95% CI 0.36 to 0.76) but almost no agreement between partners for tubal ligation interest (unweighted Cohen's kappa 0.16, 95% CI −0.16 to 0.48).

DISCUSSION

In our convenience sample of pregnant women and their partners presenting for prenatal care at two sites serving diverse patient populations, more than 70% of respondents were interested in utilising vasectomy for contraception once childbearing goals were complete, while fewer than 5% had discussed vasectomies with a provider. Vasectomy interest surpassed tubal ligation interest by almost 30%, despite national data depicting higher rates of tubal ligation uptake.[3 4] Reasons behind vasectomy disinterest included modifiable factors like fear and regret. Through evaluating different respondent populations, we can better understand contraceptive viewpoints that will help guide efforts for increasing vasectomy uptake.

The comparatively high vasectomy interest rate in our study reveals a disconnect between the permanent contraceptive methods patients may desire and what they ultimately utilise. Interest was expectedly higher among partnered participants and those who knew someone who had had the procedure, but was also higher in those with lower incomes. More PU than

Table 1 Demographic characteristics of survey respondents from their respective hospital sites.

Demographic characteristic	Combined (n=436)	PU (n=103)	PR (n=333)
Age			
Median (minimum, maximum)	32.0 (18.0, 53.0)	27.0 (18.0, 46.0)	33.0 (19.0, 53.0)
Sex			
Male	106 (24.3)	1 (1.0)	105 (31.5)
Female	330 (75.7)	102 (99.0)	228 (68.5)
Relationship status			
Partnered	371 (85.1)	53 (51.4)	318 (95.5)
Single	62 (14.2)	49 (47.6)	13 (3.9)
Did not answer	3 (0.7)	1 (0.01)	2 (0.06)
Education			
Less than high school	14 (3.2)	13 (12.6)	1 (0.3)
High school	43 (9.9)	30 (29.1)	13 (3.9)
Some college	65 (14.9)	29 (28.2)	36 (10.8)
College	137 (31.4)	16 (15.5)	121 (36.3)
Graduate or beyond	176 (40.4)	14 (13.6)	162 (48.6)
Did not answer	1 (0.2)	1 (0.01)	–
Race			
White	223 (51.1)	14 (13.6)	209 (62.8)
Black	89 (20.4)	63 (61.2)	26 (7.8)
Asian American or Pacific Islander	66 (15.1)	4 (3.9)	66 (19.8)
Other	54 (12.3)	22 (21.4)	28 (8.4)
Did not answer	4 (0.9)	–	4 (0.9)
Ethnicity			
Hispanic/Latino	113 (25.9)	61 (59.2)	52 (15.6)
Non-Hispanic/Latino	287 (65.8)	25 (24.3)	262 (78.7)
Did not answer	36 (8.3)	17 (16.5)	19 (5.7)
Insurance			
Employer	304 (69.7)	10 (9.7)	294 (88.3)
Self-pay/uninsured	89 (20.4)	75 (72.8)	14 (4.2)
Medicaid/Medicare/Military	33 (7.6)	10 (9.7)	23 (6.9)
Did not answer	10 (2.3)	8 (7.8)	2 (0.6)
Family income			
<$30 000	56 (12.8)	39 (37.9)	17 (5.1)
$30 000–$60 000	38 (8.7)	15 (14.6)	23 (6.9)
>$60 000	287 (65.8)	1 (1.0)	286 (85.9)
Did not answer	55 (12.6)	48 (46.6)	7 (2.1)
Total children (n)			
0	205 (47.0)	23 (22.3)	182 (54.8)
1	148 (33.9)	34 (33.0)	114 (34.3)
2+	74 (17.0)	38 (36.8)	36 (10.8)
Did not answer	9 (2.1)	8 (7.8)	1 (0.3)
Desire more children			
No	50 (11.5)	16 (10.2)	34 (10.2)
Yes	248 (56.9)	29 (28.2)	219 (65.8)
Unsure or did not answer	97 (22.2)	21 (20.4)	76 (22.8)
Did not answer	41 (9.4)	37 (35.9)	4 (1.2)

Data represent n (%) unless otherwise specified.
All characteristics were statistically different between PU and PR ($p<0.01$).
PR, private hospital; PU, public hospital.

Table 2 Participant responses to permanent contraception questions (N=436), stratified by identified gender and hospital location.

Participant response	Combined (n=436)	Stratified by hospital			Stratified by gender		
	n (%)	PU (n=103)	PR (n=333)	P value	Female (n=330)	Male (n=106)	P value
Believe both partners are responsible for family planning	399 (91.5)	80 (77.7)	319 (95.8)	<0.001	299 (90.6)	100 (94.3)	0.230
Heard of vasectomy	382 (87.6)	73 (70.9)	309 (92.8)	<0.001	284 (86.1)	98 (92.5)	0.082
Heard of tubal ligation	340 (78.0)	63 (61.2)	277 (83.2)	<0.001	261 (79.1)	79 (74.9)	0.324
Somewhat to very interested in vasectomy after childbearing*	313 (71.8)	68 (66.0)	245 (73.6)	0.137	235 (71.2)	78 (73.6)	0.637
Know anyone who has had a vasectomy	193 (44.3)	17 (16.5)	176 (52.9)	<0.001	137 (41.5)	56 (52.8)	0.041
Know anyone who has had a tubal ligation	191 (43.8)	51 (49.5)	140 (42.0)	0.182	154 (46.7)	37 (34.9)	0.034
Somewhat to very interested in tubal ligation after childbearing*	187 (42.9)	16 (15.5)	171 (51.4)	<0.001	164 (49.7)	66 (62.3)	0.024
Tubal ligation is a riskier procedure than vasectomy	164 (37.6)	16 (15.5)	148 (44.4)	<0.001	116 (35.2)	11 (10.4)	<0.001
Provider talk about tubal	28 (6.5)	19 (18.5)	9 (2.7)	<0.001	27 (8.2)	1 (0.9)	<0.001
Provider talk about vasectomy	16 (3.7)	8 (7.8)	8 (2.4)	0.011	12 (3.6)	4 (3.7)	1.00

Non-response to any item was categorised as "no/don't know".
*This was phrased as "for you or your partner".
PR, private hospital; PU, public hospital.

PR respondents also reported being unsure about why men would not want a vasectomy. These novel findings are opposite to the trends described in the literature, where income positively predicts vasectomy prevalence.[4 7 8] Our data suggest that vasectomy uptake may be hindered by socioeconomic reasons. Respondents from both hospitals reported similar interest but those from PU were less likely to know someone who had had a vasectomy despite receiving more counselling by providers. This discrepancy suggests disparities in access as publicly-funded clinics are particularly lacking in male contraceptive services.[9] Healthcare organisations for low-income patients further describe poor reimbursement rates and insufficient availability of trained providers as barriers to vasectomy provision.[12]

While most individuals believed family planning to be the responsibility of both partners, more PR than PU respondents agreed with this viewpoint; this may partially explain the lower vasectomy rates in the PU demographic reported in the literature. In general, men wish for more counselling when there is a sense of shared contraceptive responsibility,[11 13 22 23] belying the importance of patient engagement and education.[13 21] Fewer men in our cohort than women thought that tubal ligation is the riskier procedure, potentially revealing sensitivity to the issue and proclivity towards vasectomies. A recent online survey showed that men who obtain vasectomies had greater positive attitudes towards, and more knowledge about, the procedure.[24] Indeed, an outreach initiative in India against common misconceptions more than quadrupled vasectomy uptake after 2 years.[25] Accordingly, prior exposure to vasectomy was one of the few variables significantly associated with interest. Closing gaps in the understanding of this permanent procedure will be crucial in avoiding regret, as almost 20% of men with vasectomies in the NSFG report desiring future children.[8] Ultimately, more patient-focused research is necessary to improve counselling techniques.

Our study is not the first to show a deficit in vasectomy counselling despite patient interest,[13 14] but is the first to evaluate interest during a time when patients are routinely counselled about contraception. As healthy, reproductive-aged men are minimally engaged in their own medical care but report interest in prenatal care involvement,[18 20] the prenatal care provider can help capture a population that is lacking in contraceptive counselling. Previous research has shown that obstetrician/gynaecologists are interested in learning more about and providing vasectomies,[15 26] and our data suggest that patients would readily seek out obstetricians for information. Family planning fellowships and residency rotations are avenues for developing vasectomy curricula so that future providers can offer fully informed options counselling.[2 15 23 26] The few attempts to create vasectomy training programmes in the US have highlighted the importance of strong

Table 3 Interest in obtaining a vasectomy in participants who have heard of a vasectomy.

Variable	Characteristic	Unadjusted	P value	Adjusted	P value
		OR (95% CI)		aOR (95% CI)	
Hospital	PR vs PU	2.59 (1.21 to 5.36)	0.014	1.83 (0.42 to 8.11)	0.443
Age	Continuous; years	1.06 (1.01 to 1.11)	0.025	1.04 (0.97 to 1.10)	0.246
Sex	Female vs Male	1.02 (0.58 to 1.77)	0.955	1.25 (0.68 to 2.32)	0.475
Relationship	Partnered vs Single	8.66 (1.98 to 37.8)	0.004	14.3 (1.56 to 131)	0.019
Education	College graduate vs Less than college	1.85 (0.98 to 3.49)	0.059	1.44 (0.57 to 3.64)	0.444
Race	White vs Non-white	1.76 (1.04 to 3.00)	0.037	1.39 (0.73 to 2.65)	0.319
Ethnicity	Non-Hispanic vs Hispanic	1.50 (0.80 to 2.80)	0.207	1.24 (0.29 to 2.34)	0.724
Insurance	Employer vs Non-employer	1.71 (0.91 to 3.20)	0.093	1.10 (0.41 to 3.00)	0.847
Income	≤$60 000 vs >$60 000	1.05 (0.56 to 1.97)	0.885	3.16 (1.07 to 9.37)	0.038
Counsel*	Yes vs No	0.63 (0.25 to 1.56)	0.318	0.47 (0.08 to 2.86)	0.413
Exposure*	Yes vs None	4.81 (2.55 to 9.08)	<0.001	5.21 (2.36 to 11.5)	<0.001

Outcomes dichotomised as somewhat to very interested versus unsure to not interested (N=382).
Adjusted analyses controlled for age, gender, education, income, relationship, insurance and race; participants' missing information on covariates were excluded.
*Counsel: whether a provider has talked to the participant about vasectomy. Exposure: whether a participant knows someone who has had a vasectomy.
aOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio; PR, private hospital; PU, public hospital .

interdisciplinary relationships and institutional support, in addition to trainee interest, trainer availability and patient volume.[15] We hope the results of this study suggesting an unmet need for vasectomy counselling will encourage future educational efforts.

The main strength of the study is our diverse respondent population which helps bolster the generalisability of the results. Conducting the survey at two hospitals serving different cultural and socioeconomic communities in the same city captures perspectives from patients who should theoretically have access to similar local resources. Conversely, the major limitation arises from our use of a convenience sample of prenatal care participants. Most respondents in our cohort were nulliparous and/or desired more children, so current responses could underestimate future contraceptive beliefs. Participant opinions on contraception may also be influenced by their stage of pregnancy; we unfortunately did not record gestational age, so could not provide this nuanced evaluation. Additionally, interest in a procedure may not translate to uptake, and longitudinal studies will be necessary to determine

Table 4 Participant responses as to why a man would not want to undergo a vasectomy, stratified by identified gender and hospital location.

Participant response	Combined (n=436)	Stratified by hospital		Stratified by gender	
	n (%)	PU (n=103)	PR (n=333)	Female (n=330)	Male (n=106)
Fear	201 (46.1)	29 (28.2)	172 (51.7)	150 (45.5)	56 (52.8)
Would regret in the future	166 (38.1)	24 (23.3)	142 (42.6)	121 (36.7)	56 (47.2)
Affects his sex life/ability to orgasm	113 (25.9)	27 (26.2)	86 (25.8)	85 (25.8)	33 (31.1)
Costs too much	85 (19.5)	14 (13.6)	71 (21.3)	57 (17.3)	33 (31.1)
Makes him less of a man	70 (16.1)	23 (22.3)	47 (14.1)	60 (18.2)	15 (14.2)
Against religion or culture	41 (9.4)	16 (15.5)	25 (7.5)	34 (10.3)	12 (11.3)
Cannot take time off	30 (6.9)	2 (1.9)	28 (8.4)	17 (5.2)	18 (17.0)
Would not know where to get it	28 (6.4)	6 (5.8)	22 (6.6)	21 (6.4)	12 (11.3)
Would not work	22 (5.0)	5 (4.9)	17 (5.1)	20 (6.1)	7 (6.6)
Increased risk of cancer	20 (4.6)	3 (2.9)	17 (5.1)	15 (4.5)	10 (9.4)
Other	17 (3.9)	3 (2.9)	14 (4.2)	17 (4.2)	25 (23.6)
Unsure	135 (31.0)	48 (46.6)	87 (26.1)	109 (33.0)	31 (29.2)

Participants were able to select more than one answer. Listed reasons for "other" reasons: "unnecessary" (3), "pain" (2), "concern for medical reasons or complications" (3), "lack of education" (1), "need to stay potent" (1), "it's weird" (1) and "want more children" (1).
PR, private hospital; PU, public hospital.

what proportion of participants who express interest do pursue the procedure. Finally, there were relatively few male respondents, particularly at the PU site, which skews our male-only subset analyses. However, women are often the initiators of permanent contraception discussions,[27] and we and others have shown that men tend to agree with their partners regarding vasectomy interest.[22] Interestingly, our couples did not share tubal ligation interest, possibly due to lower interest in women compared with their partners.

Although vasectomy remains one of the most effective contraceptive methods, it is disproportionally underutilised as a permanent contraception option despite patients desiring the procedure as much as tubal ligation. As patients are willing to seek more information from their obstetrician, the prenatal visit represents an opportune time for vasectomy counselling. Future research should more broadly evaluate reproductive-aged males in a community-based setting, explore barriers to access and uptake of vasectomies for underserved patients, and determine methods to involve prenatal care providers in vasectomy counselling and delivery.

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Contributors XMG, ML, JM, JK and AP planned the study. MB conducted the survey and undertook data collection. XMG, JM and KZ analysed the data. ML, JK and AP supervised the study and are the guarantors.

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Patient and public involvement Patients and/or the public were not involved in the design, or conduct, or reporting, or dissemination plans of this research.

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Data availability statement Data are available upon reasonable request. Deidentified participant data are stored in a Redcap database and password protected Excel sheet. Data can be requested from the corresponding author.

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