Factors associated with contraceptive nonuse among obese women

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Abstract

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Objectives: To identify risk factors associated with contraceptive nonuse among obese women.

Methods: We performed a case control study of 20-44 year old, sexually active, obese women (body mass index ≥ 30) at risk of unintended pregnancy using the 2006-2010 National Survey of Family Growth. We defined cases as contraceptive nonusers and controls as users of any contraceptive method. We assessed demographic, reproductive, behavioral, and health services factors associated with nonuse using generalized linear models with a log-link function to estimate relative risks and 95% confidence intervals (CI).

Results: Of 1,359 obese respondents at risk of unintended pregnancy, 21.4% were nonusers (n=292). In our multivariable model, nonusers users compared to users were more likely to be age 35-39 (aRR 1.65, 95%CI 1.05-2.59), non-Hispanic black (aRR 1.43, 95%CI 1.03-2.00), single (1.44, 95%CI 1.04-2.00), parous with 1 prior birth (aRR 1.52, 95%CI 1.07-2.15) or ≥2 births (aRR 1.57, 95%CI 1.10-2.23); to have infrequent sex (aRR 1.67, 95%CI 1.27-2.22); and to perceive difficulty becoming pregnant (aRR 1.89, 95%CI 1.42-2.53). Obese nonusers did not differ significantly from users in socioeconomic indicators. Compared to users, nonusers were less likely to have discussed contraception with a health care provider (OR 0.45, 95%CI 0.31-0.65).

Conclusions: Efforts to decrease contraceptive nonuse among obese women should focus on older, non-Hispanic black, single, parous women across all socioeconomic strata. Increasing contraceptive counseling by providers may improve contraceptive uptake, especially among obese women who have infrequent sex and who perceive difficulty becoming pregnant.

Introduction

The prevalence of obesity among adult women of childbearing age in the United States (US) has risen dramatically since the 1970s, and is currently estimated at 31.9% [1]. Studies indicate that obese women experience unintended pregnancy at similar to slightly higher rates compared with non-obese women in the US [2-4], with approximately 50% of all births unintended [5]. Obese women, however, are at significantly higher risk of maternal and fetal morbidity compared to non-obese women [6, 7]. As unintended pregnancy itself is also a risk factor for poor maternal and fetal outcomes [8, 9], the overlap of the obesity and unintended pregnancy epidemics represents an increasingly pressing and challenging public health issue [4, 10].

Although much recent attention has focused on use of less effective contraceptive methods as a cause of unintended pregnancy, the majority of unplanned pregnancies (52%) occur among women who are not using any contraception at the time of conception [11]. Approximately 4.5 million reproductive-aged women in the US are sexually active and do not desire pregnancy but do not use contraception [12]. Previously identified risk factors for contraceptive nonuse in the general population include older age, non-Hispanic black race, lower socioeconomic status, lack of insurance, prior dissatisfaction with contraceptive methods, less frequent intercourse, perceived low risk of getting pregnant, and pregnancy ambivalence [13-15]. Obese women have similar to higher rates of contraceptive nonuse compared to non-obese women [16, 17], however little is known about risk factors for nonuse among obese women considered separately. Studies document that as many as 14-23% of sexually active obese women who do not desire pregnancy are not using contraception and therefore at risk of unintended pregnancy [16, 17]. While sexual behaviors such as frequency of intercourse and

number of partners appear to be similar among obese and non-obese women [4, 18], factors associated with contraceptive nonuse may differ among obese women from the general population.

Discussing contraception with a provider appears to be an important factor in women's contraceptive choices and knowledge [14, 19-25], although no studies have examined the role of counseling among obese women specifically. In general, obese women receive less preventive counseling and education from health providers such as smoking cessation and injury prevention [26], and are less likely to receive preventive services such as pap smears and mammograms [26-29]. It is unknown if discussing birth control with a provider decreases the risk of contraceptive nonuse in obese women. The increased complexity of contraceptive decision-making in obese women related to concerns about contraceptive efficacy and medical comorbidities may reduce the quality of contraceptive counseling provided to obese women [10].

This study seeks to describe contraceptive nonuse and contraceptive method types used among obese women in a nationally representative sample, and to identify demographic, reproductive, behavioral and health services factors associated with contraceptive nonuse among obese women.

Materials and methods

Data collection and study population

We conducted a population-based case control study using data from the 2006-2010 cycle of the National Survey of Family Growth (NSFG). A complete description of the NSFG sampling methods and survey design has been previously published [30]. Briefly, the 2006-2012 cycle includes 12,270 women aged 15-44 years who were interviewed between June 2006 and June 2010. Study participants were queried about multiple reproductive health outcomes and

behaviors related to contraceptive use and pregnancy. An Audio Computer-Assisted Self-Interviewing system (ACASI) was used for sensitive subjects such as unintended pregnancy, without the interviewer knowing the answer. The NSFG is weighted and designed to be nationally representative, with all subjects assigned a weight based on national averages of race, ethnicity, and age from the US Census Bureau. The survey response rate was 76% among females, and data were adjusted for nonresponse based on information about non-responders [30].

Our study population included women respondents ages 20-44 years with available BMI data who were obese, defined as BMI $\geq$30 by the World Health Organization (WHO) [31]. BMI information is available in NSFG as self reported weight in kilograms divided by self-reported height in meters squared. Women under age 20 were not included because BMI data was not collected for adolescents in the 2006-2010 NSFG. To arrive at our final sample, we excluded obese respondents who were not at risk of unintended pregnancy using criteria based on published reports by the National Center for Health Statistics (NCHS) [32]. This included women who reported no prior sexual intercourse with a man, women with prior sterilization or hysterectomy, women with a sterilized or infertile male partner, women who reported that either they or their partner were unable to get pregnant, women who were actively trying to conceive, and women who reported no sex in the past 3 months.

Cases were defined as women who reported no contraceptive method during the month of the interview and controls as women who reported contraceptive use during the month of the interview. Contraceptive use was defined as use of any method, including withdrawal, natural family planning, barrier methods, birth control pills, patch, ring, injection, implant or intrauterine device. The study was exempted from review by the Human Subjects Division at the University

of Washington.

Risk Factors

Risk factors for contraceptive nonuse included demographic, reproductive, behavioral, and health services factors. We categorized age by five-year intervals between 20 and 44, and used the age group 25-29 as a referent category. Race/ethnicity was categorized as non-Hispanic white, non-Hispanic black, Hispanic, and other race, and foreign-born status was categorized as yes/no. Socioeconomic indicators included education (less than high school, high school graduate, some college, and completed college or more), income (percent of federal poverty level including <100%, 100-249%, ≥250%) and insurance status (uninsured or not). Reproductive characteristics included marital status (married, cohabitating, or single, with single composed of women who were divorced, separated, widowed or never married), and gravidity and parity (none, 1, ≥2).

Behavioral characteristics included frequency of intercourse in past 4 weeks (<4 times or ≥4 times) and number of male partners in the past 3 months (1 or >1). Other behavioral factors included perception of fertility ("As far as you know, would you, yourself, have any difficulty getting pregnant or carrying another baby?"), future pregnancy intention ("Looking to the future, do you, yourself, want to have a baby at some time in the future?") and having discontinued a method in the past due to dissatisfaction ("What method or methods did you stop because you were not satisfied?"). Health services indicators included having discussed contraception with a provider and having had a pap smear in the past year. We created a variable for having discussed contraception with a provider, defined as having received contraceptive counseling or having had a visit related to contraception in the past year. Although guidelines have changed regarding pap screening frequency [33], the 2006-2010 NSFG data was collected during a time

when the majority of providers were still recommending annual pap smears [34]. Receipt of Papanicolaou smear in the past year was therefore used as a surrogate measure of reproductive health care access and utilization.

Data analysis

We described the percentages of contraceptive nonusers and users in our sample, and the percentages of specific method type among obese contraceptive users. We performed univariable and multivariable analyses to investigate the association between potential risk factors and case status. Because our outcome of contraceptive nonuse was not rare, we used generalized linear models with a log-link function to directly calculate the relative risks (RRs) and 95% confidence intervals. We performed a sequential backwards stepwise regression to arrive at our final parsimonious model. First, we included all of the risk factors considered in the univariable analyses in our initial multivariable model, given that all were potential factors associated with nonuse defined *a priori* based on our literature review [13-17, 35-37]. Given colinearity between gravidity and parity, we included only parity based on previous literature [13, 15]. We performed Wald tests for each individual variable included in the model and excluded variables sequentially starting with the variable with the highest p value. In our final model, we retained only variables significant at the $p<0.10$ level based on the Wald test. All analyses were conducted using Stata 12.0 (StataCorp. College Station, TX). The "svy" and "subpop" commands in Stata were used to ensure correct estimates of variance given the NSFG's sampling design and weighting.

Results

A total of 9,340 respondents ages 20-44 years had BMI data available. Of these, 3,176 (34.0%) were obese (BMI$\geq$30). Obese women who were virginal (n=132), reported sterilization

or hysterectomy (n=885), or had a sterile or infertile partner (n=147) were excluded from the analysis. In addition, women who were actively trying to get pregnant (n=163) or had not had sex in the past 3 months (n=490) were excluded. Our final study sample included 1,359 sexually active obese women at risk of unintended pregnancy (Figure 1).

Just over one-fifth (21.4%, n=292) of our sample was nonusers, or women who reported no contraceptive method in the month of the interview. The remaining 88.6% (n=1,067) reported use of a contraceptive method in the month of the interview (Table 1). Among obese women who used contraception, almost half (45.5%) were using less effective methods, including barrier, withdrawal or natural family planning methods. One third (30.4%) were using the pill, 7.3% injectable methods. and 13.3% were using a long-acting reversible contraceptive method (12.2% using an intrauterine device and 1.1% using a contraceptive implant).

Compared to users, contraceptive nonusers were more likely to be age 35-39 or 40-44, and less likely to be 20-24 (Table 2). Nonusers were more likely to be non-Hispanic black and to have high school or less education, and were less likely to be Hispanic or foreign born. Nonusers and users were similar in terms of household income level, although a slightly higher proportion of nonusers were uninsured. Nonusers were more likely to be single and to have had one or more pregnancies and births, and more likely to report infrequent intercourse compared to users (Table 3). While nonusers and users did not differ in percent having previously discontinued a method due to dissatisfaction, nonusers were slightly less likely to report future intention to have more children and more likely to report that getting pregnant in the future would be difficult. Lastly, nonusers were less likely to have discussed contraception with a provider or to have had a Pap smear in the past year.

In the univariable analyses, nonusers were more likely to be over age 35, non-Hispanic black, single and less likely to be born outside of the US, compared to users (Table 4). Compared to users, nonusers were more likely to report infrequent sex and no intention to have more pregnancies, and more likely to report perceived difficulty in getting pregnant. Nonusers and users did not differ significantly by education, insurance status, income, or history of having discontinued a contraceptive method due to dissatisfaction. In terms of health services factors, nonusers were less likely to have discussed contraception with a physician and less likely to have had a pap smear.

In our final multivariable model, age, race and place of birth remained significant independent risk factors for nonuse among obese women, with nonusers 65% more likely to be aged 35-39, 43% more likely to be non-Hispanic black and 58% less likely to be foreign born (Table 3). Compared to users, nonusers were 44% more likely to be single, 52% more likely to have had one prior birth and 57% more likely to have two or more prior births. Infrequent sex and perceived subfertility also remained significant risk factors for nonuse in the adjusted analyses, with nonusers 37% more likely to have infrequent sex and almost 2-fold more likely to perceive difficulty getting pregnant. Not having discussed contraception in the past year with a provider remained a significant risk factor, with nonusers 55% less likely to have discussed contraception with a provider compared to users. Nonusers were less likely to have had an abortion in the past or to have had a pap smear in the past year, but neither of these associations reached statistical significance.

Discussion

In our sample of sexually active obese women at risk for unintended pregnancy, over one-fifth (21.4%) were not using contraception. Key risk factors associated with contraceptive

nonuse among obese women included age 35-39, non-Hispanic black race, single status, higher parity, less frequent intercourse, and perceived difficulty becoming pregnant. Nonuse among obese women, however, did not vary significantly by socioeconomic status. Obese women who had discussed contraception with a provider in the past year had a significantly decreased risk of nonuse.

The prevalence of contraceptive nonuse among obese women in NSFG is similar to percentages reported from other nationally representative data [16, 17], although variation exists based on the denominator used. Our study population excluded women using male or female sterilization; if women using sterilization methods (male or female) were added into the denominator, the prevalence of nonuse among sexually active obese women is 14.7%. Compared to data reported by the National Center for Health Statistics (NCHS) on women in all BMI categories [32], obese women in our sample were more likely to use both the least effective and the most effective contraceptive methods. Just under half (45.5%) of the women in our sample using contraception relied on less effective methods, including barrier, withdrawal and natural family planning methods, in contrast to only 36.7% of women in the general population [32]. A lower proportion of obese women in our sample used the birth control pill than the general population (30.4% vs 43.8%), however a higher proportion of obese women used an intrauterine device (12.2% vs 8.8%) [32]. Further studies are needed to examine factors associated with choice of specific method types among obese women using contraception.

While several risk factors for nonuse among obese women were similar to what has been reported in the general population, we observed important differences as well. In our multivariable model, nonusers were most likely be age 35-39. Prior studies have found the highest risk in women over 40 [13-15, 36], the effect of which is somewhat mitigated by

decreased fertility in this age group. Our finding of high risk of nonuse among obese women aged 35-39 is particularly concerning, as many of these women are both still fertile and at elevated risk of chronic conditions such as type 2 diabetes and hypertension which are associated with pregnancy-related complications [7, 17]. Proposed explanations for nonuse among older women include perceived subfecundity and patient and provider concerns about safety of contraception with medical comorbidities [13, 14]. Despite controlling for perceived subfecundity, older age remained an independent risk factor. Because NSFG collects only limited data on medical comorbidities, however, we were unable to adequately control for chronic medical conditions. Future research is needed to investigate reasons for nonuse among older obese women, including the role of chronic medical conditions.

Obese nonusers in our sample were 43% more likely to be non-Hispanic black women than non-Hispanic white after adjusting for other socio-demographic characteristics, similar to findings from the general population [15, 32, 38]. Several studies have proposed explanations for this association that may also be present among obese women, including increased concerns about the safety and side effects of contraceptives, mistrust of the medical community, and increase rates of ambivalence about pregnancy among non-Hispanic black women [39]. In direct contrast to published studies from the general population [13, 15, 36], however, we found that nonusers did not differ from users by education, income or insurance status in our adjusted analyses. Our results suggest that obese women's risk of nonuse is not dependent on socioeconomic status, and therefore preventive efforts need to target obese women of all socioeconomic backgrounds.

We identified several key reproductive and behavioral risk factors for nonuse among obese women. Compared to users, obese nonusers were 44% more likely to be single than

married, consistent with other studies reporting associations between nonuse and having never been married [32] and nonuse and lack of a current relationship [15]. Also similar to prior reports, infrequent intercourse was a significant independent risk factor for nonuse in our sample of obese women [13, 15]. In contrast to data in women of all BMI categories, however, obese contraceptive nonusers were 50% more likely to have one prior birth or two or more prior births compared to users. Published statistics from the NCHS found an opposite association among women of all BMI categories: women with 2 or more births were significantly less likely to be nonusers compared to nulliparous women [32]. This elevated risk of nonuse among obese parous women, which persisted after adjusting for other socio-demographic and relationship factors, is concerning given that these women have proven fertility and may be at substantial risk of unplanned pregnancy.

Nonusers in our sample of obese women were significantly more likely to perceive difficulty in becoming pregnant than users. Previous studies have also found that women who perceive decreased fertility are at elevated risk of contraceptive nonuse and unintended pregnancy [40], and one study focused on women with obesity and diabetes found that receipt of infertility treatment in the past increased risk of nonuse [37]. Although obese women may have decreased fertility compared to normal weight women [41], many remain at risk of unintended pregnancy throughout their reproductive years. Improved counseling is therefore needed to educate obese women about actual pregnancy risks.

Finally, we examined the association of health services factors with contraceptive nonuse among obese women. Despite the increased complexity of contraceptive care for obese women resulting from concerns about contraceptive failure and safety, we identified a negative association between nonuse and having discussed contraception a provider. Although the

evidence base on effectiveness of contraceptive counseling has been mixed, recent studies have identified an association between provider counseling and contraceptive knowledge, attitudes and behavior [14, 15, 19, 20, 42]. Several studies specifically found that having discussed birth control with a provider is associated with reduced contraceptive nonuse in the general population [14, 15], similar to our findings among obese women. As our data are observational, it is not possible to determine if women who were more motivated to start contraception were also more likely to recall having been counseled or to have sought out counseling or visits related to contraception. This association, however, suggests that expanding provider counseling among obese women may be one important strategy for decreasing nonuse.

Our findings should be considered in light of several limitations. First, weight are self-reported in NSFG, which could result in under-ascertainment of obesity [43]. The percentage of obesity in the NSFG is similar to validated national estimates [1], however, suggesting that underreporting of weight is not a significant concern. Second, recall bias may influence our results, as with any survey-based study. Contraceptive users, for example, may be more likely to recall having discussed birth control with a physician over the past year compared to nonusers, which could overestimate associations we identified. Lastly, as we could only adjust for factors that were identified in the NSFG data, residual confounding may be present. We are unable to determine how inclusion of factors such as the presence or absence of chronic medical conditions, not adequately captured in NSFG, would have affected our findings.

In conclusion, our findings suggest that efforts to decrease contraceptive nonuse among obese women should focus on older (35-39 year old), non-Hispanic black, single, parous women across all socioeconomic strata. Increased discussion about the importance of contraception and contraceptive options by providers, especially among obese women who have infrequent sex and

who perceive difficulty becoming pregnant, may lead to increased contraceptive uptake and decreased rates of unintended pregnancy and pregnancy-related morbidity among obese women.

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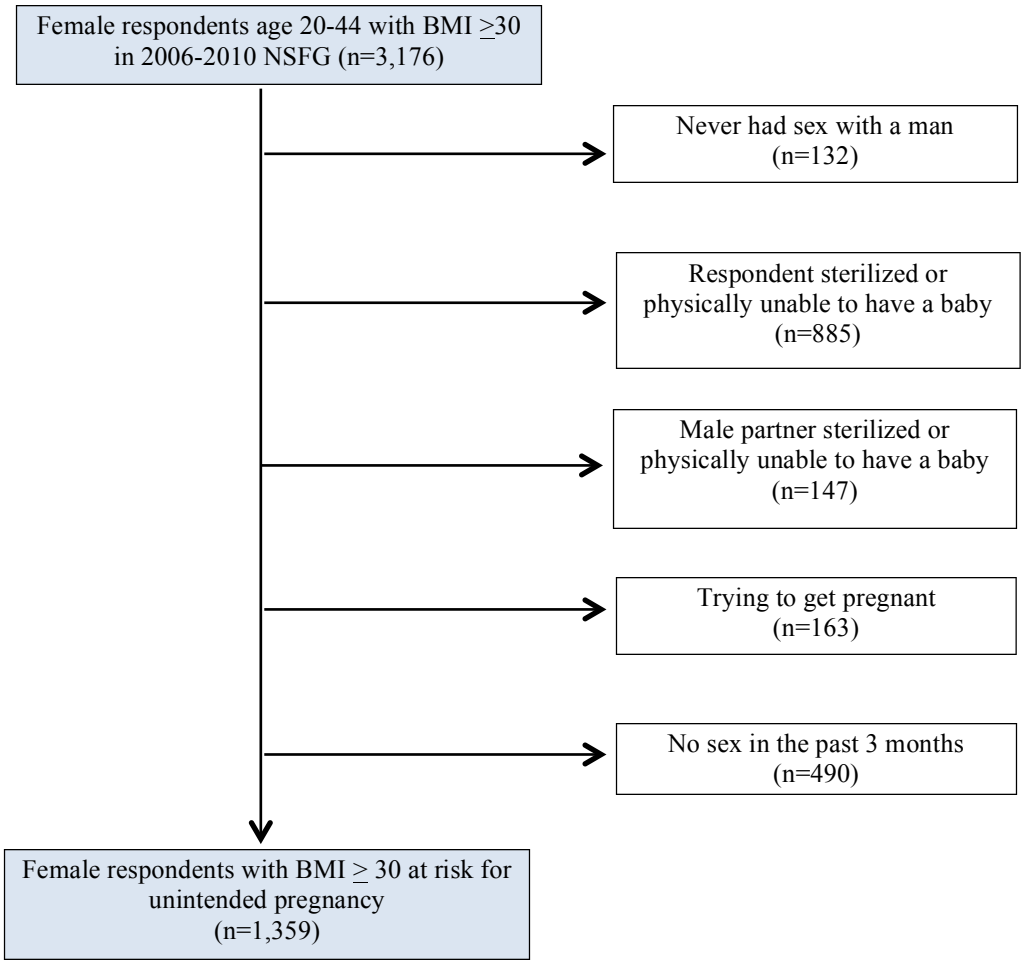

Figure 1. Flowchart of study selection methods.
NSFG=National Survey of Family Growth; BMI=body mass index

Table 1. Contraceptive use and method type among obese respondents, National Survey of Family Growth (NSFG) 2006-2010.

Nonusers	**N=292**	
Contraceptive Users	**N=1,067***	**(100%)**
Less effective methods		
Condoms	328	(30.9)
Withdrawal	128	(12.1)
Natural family planning	18	(1.7)
Foam/sponge/other	8	(0.8)
Effective methods		
Pill	323	(30.4)
Patch	9	(0.9)
Ring	29	(2.7)
Injectable contraception	77	(7.3)
Intrauterine Device	130	(12.2)
Contraceptive Implant	12	(1.1)

*Numbers may not add to total because of missing data.

Table 2. Demographic factors by contraceptive use among obese respondents, National Survey of Family Growth (NSFG) 2006-2010.

	Nonusers N=292 (%)*	**Any contraceptive method** N=1,067 (%)*
Age		
20-24	58 (15.3)	331 (29.6)
25-29	76 (23.7)	228 (19.8)
30-34	54 (12.7)	237 (22.0)
35-39	62 (30.2)	157 (17.3)
40-44	42 (18.1)	114 (11.3)
Race		
Non-Hispanic white	122 (53.4)	472 (55.9)
Non-Hispanic black	102 (27.3)	267 (14.7)
Hispanic	48 (11.4)	264 (20.8)
Other	20 (8.0)	64 (8.7)
Education		
High school or less	164 (52.5)	478 (42.7)
Some college	60 (21.1)	285 (25.6)
Bachelors/higher	68 (26.4)	304 (31.7)
Uninsured	46 (15.6)	170 (13.6)
Income (% of FPL)		
0-99%	89 (23.6)	280 (23.1)
100-499%	164 (61.7)	649 (62.1)
≥500%	39 (14.7)	138 (14.8)
Foreign born	26 (6.3)	162 (15.2)

*Numbers may not add to total because of missing data.

Table 3. Reproductive, relationship and health services factors by contraceptive use among obese respondents, National Survey of Family Growth (NSFG) 2006-2010.

	Nonusers N=292 (%)*	**Any contraceptive method** N= 1,067 (%)*
Marital status		
Single	160 (48.3)	427 (28.8)
Cohabitating	27 (6.3)	188 (17.7)
Married	105 (45.4)	452 (53.6)
Gravidity		
0	55 (18.7)	257 (27.8)
1	71 (21.2)	231 (20.2)
2+	166 (60.1)	579 (52.0)
Parity		
0	79 (24.4)	327 (33.9)
1	81 (29.3)	289 (24.1)
2+	132 (46.3)	451 (42.0)
Number of male sexual partners in past year		
1	232 (86.5)	896 (89.2)
2+	53 (13.5)	164 (10.8)
Frequency of sex over the past month		
<4	194 (63.2)	429 (39.9)
4+	95 (36.8)	630 (60.2)
Discontinuation of a contraceptive method in past due to dissatisfaction	140 (45.6)	546 (49.4)
Intention to have more pregnancies in future		
Yes	138 (42.2)	565 (53.8)
No	145 (56.4)	479 (44.5)
Don't know	9 (1.5)	23 (1.8)
Perceived difficulty having pregnancies in the future	73 (27.3)	120 (12.6)
Prior history of abortion	53 (16.8)	189 (16.2)
Discussion of contraception with provider in past year	70 (22.2)	531 (47.9)
Pap smear in past year	191 (64.0)	816 (76.9)

*Numbers may not add to total because of missing data.

Table 4. Factors associated with contraceptive nonuse versus any contraceptive use among obese women, National Survey of Family Growth (NSFG) 2006-2010..

	Unadjusted RR N= 1,359	Adjusted RR[1] N=1,336
Age		
20-24	0.97 (0.62-1.52)	1.24 (0.80-1.92)
25-29	Ref	Ref
30-34	0.76 (0.45-1.28)	0.89 (0.54-1.34)
35-39	1.80 (1.20-2.71)	1.65 (1.05-2.59)
40-44	1.70 (1.10-2.62)	1.44 (0.93-2.21)
Race		
Non-Hispanic white	Ref	Ref
Non-Hispanic black	1.63 (1.18-2.23)	1.43 (1.03-2.00)
Hispanic	0.63 (0.41-0.96)	0.88 (0.59-1.32)
Other	0.97 (0.49-1.91)	1.12 (0.62-2.01)
Education		
High school or less	1.35 (0.94-1.95)	
Some college	0.99 (0.66-1.50)	
Bachelors/higher	Ref	
Uninsured		
No	Ref	
Yes	1.17 (0.68-2.01)	
Income (% of FPL)		
0-99%	1.02 (0.59-1.77)	
100-499%	1.00 (0.59-1.69)	
≥500%	Ref	
Foreign born		
No	Ref	Ref
Yes	0.44 (0.24-0.80)	0.42 (0.21-0.81)
Marital status		
Single	1.67 (1.22-2.30)	1.44 (1.04-2.00)
Cohabitating	0.47 (0.28-0.80)	0.55 (0.30-1.02)
Married	Ref	Ref
Parity		
0	Ref	Ref
1	1.51 (0.96-2.40)	1.52 (1.07-2.15)
2+	1.40 (0.97-2.04)	1.57 (1.10-2.23)
Number of male sexual partners in past year		
1	Ref	
2+	1.21 (0.87-1.70)	
Frequency of sex over past month		
<4 times	2.12 (1.56-2.87)	1.67 (1.27-2.22)
≥4 times	Ref	Ref
Discontinuation of a contraceptive method in the past due to dissatisfaction		
No	Ref	
Yes	0.89 (0.67-1.17)	
Intention to have more pregnancies		
Yes	Ref	
No	1.62 (1.12-2.34)	
Doesn't know	1.07 (0.35-3.25)	

Perceived difficulty getting pregnant		
No	Ref	Ref
Yes	2.01 (1.49-2.70)	1.89 (1.42-2.53)
Prior abortion		
No	Ref	Ref
Yes	1.04 (0.68-1.58)	0.71 (0.50-1.02)
Discussion of contraception with a provider in past year		
No	Ref	Ref
Yes	0.39 (0.27-0.57)	0.45 (0.31-0.65)
Pap smear in past year		
No	Ref	Ref
Yes	0.62 (0.46-0.83)	0.77 (0.58-1.02)

Ref = Reference group

[1] Final multivariable model includes age, race, marital status, foreign born status, parity, frequency of sex, difficulty getting pregnant, discussed contraception, and pap smear