Racial and Ethnic Disparities in Contraceptive Method Choice in California

CONTEXT: *Unintended pregnancy, an important public health issue, disproportionately affects minority populations. Yet, the independent associations of race, ethnicity and other characteristics with contraceptive choice have not been well studied.*

METHODS: *Racial and ethnic disparities in contraceptive use among 3,277 women aged 18–44 and at risk for unintended pregnancy were assessed using 2006–2008 data from of the California Women's Health Survey. Sequential logistic regression analyses were used to examine the independent and cumulative associations of racial, ethnic, demographic and socioeconomic characteristics with method choice.*

RESULTS: *Differences in contraceptive use persisted in analyses controlling for demographic and socioeconomic characteristics. Blacks and foreign-born Asians were less likely than whites to use high-efficacy reversible methods—that is, hormonals or IUDs (odds ratio, 0.5 for each). No differences by race or ethnicity were found specifically for IUD use in the full model. Blacks and U.S.-born Hispanics were more likely than whites to choose female sterilization (1.9 and 1.7, respectively), while foreign-born Asians had reduced odds of such use (0.4). Finally, blacks and foreign-born Asians were less likely than whites to rely on male sterilization (0.3 and 0.1, respectively).*

CONCLUSIONS: *Socioeconomic factors did not explain the disparities in method choice among racial and ethnic groups. Intervention programs that focus on improving contraceptive choice among black and, particularly, Asian populations need to be developed, as such programs have the potential to reduce the number of unintended pregnancies that occur among these high-risk groups.*

Perspectives on Sexual and Reproductive Health, 2011, 43(3):173–180, doi: 10.1363/4317311

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Approximately half of all pregnancies in the United States are unintended,[1] and outcomes of these pregnancies—including abortion and unplanned childbirth—place a burden on women, families and the health care system.[2,3] Furthermore, unintended pregnancy disproportionately affects minority women.[1] Data from the National Survey of Family Growth (NSFG) show that black and Hispanic women have higher rates of unintended pregnancy than white women and, as a result, higher rates of unintended birth and abortion.[4] In 2001, 69% of pregnancies among black women and 54% among Hispanics were unintended, compared with 40% among white women; the abortion rate was 50 per 1,000 women aged 15–44 among blacks, 28 among Hispanics and 11 among whites.[5] Other studies have shown similar disparities in unintended pregnancy, which persist even after various socioeconomic and demographic characteristics are controlled for.[1,4,6]

Multiple factors explain these disparities in unintended pregnancy. One important factor is the use of contraceptives. Some studies have found that black, Asian and Hispanic women have lower rates of contraceptive use than whites.[7–11] According to the 2006–2008 NSFG, 16% of black women at risk for unintended pregnancy are not using any form of contraception, compared with 9% of Hispanics, Asians and whites.[12]

While studies examining contraceptive use and nonuse can make important contributions to efforts to prevent unintended pregnancy, they are not sufficient to explain disparities in rates of unintended pregnancy. Since half of unintended pregnancies occur among contraceptive users, it is equally important to examine differences in method selection, especially because methods have a wide range of efficacy.[4] Permanent methods (female and male sterilization) have one-year failure rates of less than 1%. Some reversible methods (the IUD and implant) have similarly low failure rates, while others (the injectable, ring, patch and pill) have typical failure rates of 5–9%. Nonhormonal methods (e.g., the condom) have typical failure rates of 17–18%.[13]

Studies of racial and ethnic differences in contraceptive selection have found that black, Hispanic and Asian women use different methods than whites.[14,15] Whites are more likely to use the pill and less likely to use condoms than are blacks and Asians.[12,14] Hispanics are the most likely, and Asians the least likely, to use the IUD.[12] Black and Hispanic women are more likely than whites to use female sterilization, whereas white women are more likely than others to rely on male sterilization.[12]

These studies have provided descriptive data about racial, ethnic and socioeconomic differences in contraceptive use,

but have not examined independent and cumulative associations between these characteristics and use. The few studies that have explored racial and ethnic differences in method use by controlling for socioeconomic characteristics have focused on nonuse or on specific methods.[10,11,14,16,17] Only one study conducted multivariate analysis of racial and ethnic differences in the selection of reversible contraceptive methods.[14] In analyses controlling for demographic characteristics and contraceptive attitudes, no differences in consistency of pill and condom use by race or ethnicity were found.

To our knowledge, no studies have examined contraceptive selection in sequential models, with the goal of evaluating independent and combined associations of demographic characteristics and race or ethnicity. We used data from the California Women's Health Survey (CWHS) to examine the association of method choice and race and ethnicity independently, as well as in the context of demographic characteristics.

METHODS

Data and Measures

The CWHS is an ongoing monthly telephone survey that collects information on a wide variety of health-related behaviors and attitudes from a randomly selected sample of California women aged 18 or older.* We combined data for 2006–2008 to provide a sufficient sample to make estimates of contraceptive use among demographic subgroups. In each of these years, 72–88% of eligible households that were contacted yielded a completed interview; more than 14,000 women were surveyed during this period. Interviews were conducted in both English and Spanish.

Our analysis focuses on contraceptive use among women aged 18–44 who were at risk for unintended pregnancy. We aligned our definition of "at risk" with the NSFG criteria to the extent possible. The NSFG considers women to be at risk of unintended pregnancy if they are sexually active (i.e., have had sex with at least one male partner in the last three months) and not pregnant, trying to become pregnant or infecund; it includes women using any contraceptive method, including sterilization, because of the risk of contraceptive failure.[12] By contrast, we considered sexual activity within the last 12 months, because information specifically for the last three months was not available in the CWHS. Furthermore, because CWHS questions regarding fecundity were subjective and inconsistent across years, we defined a woman as being fecund if she had not had a hysterectomy. In all, 3,277 CWHS respondents met the inclusion criteria for our sample.

*The survey is coordinated by the California Department of Public Health in collaboration with the state's Office of Women's Health and departments of Mental Health, Social Services, and Alcohol and Drug Programs; the California Medical Review; and the Survey Research Group of the Public Health Institute.

In the CWHS, women are asked to report all contraceptive methods that they are currently using. For our analysis, we designated each respondent's most effective method as her primary one; previous analysis of the CWHS used a similar technique.[10] The methods in descending order of effectiveness are male sterilization, female sterilization, IUDs, implants, injectables, vaginal ring, patch, pill, male condoms, other regular methods (i.e., other barrier methods, spermicides, natural family planning and lactational amenorrhea), emergency contraception only and none.

First, we examined the use of reversible methods by relative efficacy. We considered IUDs and hormonal methods high-efficacy and all others (including no method) low-efficacy. Next, we compared women who used the IUD with those who did not, because the efficacy of IUDs is similar to that of permanent methods. Finally, we examined the use of male and female sterilization.

We considered the following demographic characteristics: race and ethnicity; income; education; age; parity; and, for Hispanics and Asians, nativity (U.S.- vs. foreign-born). Women who indicated more than one race or ethnicity were asked to choose one. Responses were collapsed into five mutually exclusive groups: white, black, Hispanic, Asian and other. Because only 27 women categorized themselves as "other," we excluded them from our analysis. Income level was categorized by annual household income as a percentage of the federal poverty level (100% or less, 101–200% or more than 200%). Education level was dichotomized into whether women had completed high school.

The survey collects information on whether women have private, public or no insurance. However, it has not consistently gathered data on participation in Family PACT, a state-funded program that provides no-cost family planning services to men and women with incomes at or below 200% of poverty, regardless of their insurance status. Because Family PACT is widely used (the program serves more than one million people each year)[18] and because some participants may consider it a separate type of insurance, we excluded insurance status from the general analysis. We did, however, include it in sensitivity analyses.

We also excluded union status from our models, because we considered it to be a potential explanatory factor, rather than a confounder, since it may reflect racial or ethnic differences in relationship stability. However, when union status was included in supplementary analyses, it did not change the relationship between race and ethnicity and contraceptive selection in any of our models.

Analysis

We used the CWHS inverse probability of sampling weights so that our results were representative of California women of reproductive age in 2006–2008. We tabulated the weighted prevalence of women's use of contraceptive methods, and used chi-square tests to examine

differences in the distribution of method use by demographic and socioeconomic characteristics. On the basis of previous research, Hispanics and Asians were stratified by nativity for all models.[19–21] We then determined, on an a priori basis, whether race and ethnicity interacted with income, education and nativity for all subgroups for which sufficient numbers were available. In all models that identified an interaction between race and ethnicity and other characteristics, we also examined stratified results.

A series of logistic regression analyses assessed the independent associations of race and ethnicity with contraceptive use. The initial model was unadjusted, the next model adjusted for age and parity, and the final model also adjusted for income and education. The sequence of models was designed to estimate the degree to which income and education—relatively modifiable factors—may confound the relationship between contraceptive use and race and ethnicity.

We conducted four regression analyses. The first compared the use of high-efficacy reversible methods with use of barrier or no methods, and the second compared IUD use with use of all other reversible methods or no method. Finally, we compared female sterilization with all other methods (including nonuse), and male sterilization with other methods (including nonuse). The sample size for the first two method comparisons was 2,493, while that for the sterilization comparisons was 3,277. To include all women aged 18–44 who were at risk for unintended pregnancy, all models included respondents who were not using any method. We also performed a sensitivity analysis to examine the potential impact of insurance status among women who did not qualify for Family PACT. All analyses were performed using the commands for complex surveys in Stata 10.1.

RESULTS

Bivariate Analysis

Overall, 21% of women were not using any contraceptive method (Table 1). Women were most likely to use the pill (23%) or condoms (20%), followed by male or female sterilization (10% each) and IUDs (8%). Three percent used injectables, and 2% and 1%, respectively, used the ring and the patch—both of which were introduced in the United States in 2002.

Whites were the least likely of all racial and ethnic groups to report using no method (19%), while blacks were the most likely to do so (28%). Whites were more

TABLE 1. Percentage distribution of women aged 18–44 at risk of unintended pregnancy, by current contraceptive method, according to selected characteristics, California Women's Health Survey, 2006–2008

Characteristic	N	Male sterilization	Female sterilization	IUD	Injectable	Ring	Patch	Pill	Condom	Other	None	Total
Total	**3,277**	**10**	**10**	**8**	**3**	**2**	**1**	**23**	**20**	**2**	**21**	**100**
Race/ethnicity												
White	1,471	16	8	9	2	3	0	26	16	2	19	100
Black	148	4	14	4	6	1	1	17	22	4	28	100
Hispanic												
U.S.-born	443	8	10	8	5	1	1	25	18	0	24	100
Foreign-born	983	4	17	8	5	1	3	16	22	2	22	100
Asian												
U.S.-born	68	9	2	4	4	1	0	28	25	2	25	100
Foreign-born	164	1	4	10	1	0	0	21	36	1	26	100
% of poverty level												
>200	1,936	15	7	8	2	2	1	26	19	2	19	100
101–200	588	6	15	8	4	2	1	17	20	3	23	100
≤100	753	2	14	7	6	2	2	18	21	1	26	100
Education												
High school	2,638	11	8	8	3	2	1	24	21	2	21	100
<high school	639	3	20	6	5	1	2	16	19	1	25	100
Age												
18–19	57	0	0	5	12	11	3	24	26	0	19	100
20–24	283	1	0	9	6	2	1	33	20	2	23	100
25–29	582	3	5	7	3	4	2	33	21	2	21	100
30–34	729	8	13	11	3	0	1	19	22	2	20	100
35–39	801	13	14	8	1	0	0	18	21	2	22	100
40–44	825	24	15	6	1	0	0	15	14	2	21	100
Parity												
0	653	3	1	2	3	4	1	36	24	2	24	100
1	563	6	3	12	4	2	2	23	21	2	27	100
≥2	2,061	15	17	10	3	1	1	15	18	2	18	100

Notes: In chi-square tests, differences in distributions by all demographic characteristics were significant at p<.01. "Other" methods are female barrier methods, spermicides, natural family planning and lactational amenorrhea; no respondents reported current use of implants or emergency contraception. Sample Ns are unweighted. Percentages may not add to 100 because of rounding.

TABLE 2. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that women used any high-efficacy reversible contraceptive or the IUD, by selected characteristics

Characteristic	High-efficacy reversible			IUD		
	Unadjusted	Model 1	Model 2	Unadjusted	Model 1	Model 2
Race/ethnicity						
White (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Black	0.5 (0.3–0.8)*	0.5 (0.3–0.8)*	0.5 (0.3–0.8)*	0.5 (0.2–1.1)	0.4 (0.2–1.0)	0.5 (0.2–1.1)
Hispanic						
U.S.-born	0.8 (0.6–1.1)	0.7 (0.5–0.9)*	0.8 (0.6–1.1)	0.9 (0.5–1.4)	0.7 (0.5–1.2)	0.8 (0.5–1.3)
Foreign-born	0.7 (0.6–0.9)*	0.6 (0.5–0.8)*	0.8 (0.6–1.1)	0.9 (0.6–1.2)	0.5 (0.3–0.7)*	0.7 (0.5–1.2)
Asian						
U.S.-born	0.7 (0.4–1.3)	0.7 (0.3–1.2)	0.7 (0.4–1.3)	0.3 (0.1–1.1)	0.3 (0.1–1.1)	0.3 (0.1–1.0)
Foreign-born	0.5 (0.3–0.7)*	0.5 (0.3–0.7)*	0.5 (0.3–0.7)*	0.9 (0.5–1.6)	0.8 (0.4–1.4)	0.8 (0.4–1.4)
% of poverty level						
>200 (ref)	1.0	na	1.0	1.0	na	1.0
101–200	0.8 (0.6–1.0)	na	0.7 (0.5–0.9)*	1.1 (0.8–1.6)	na	0.9 (0.6–1.4)
≤100	0.8 (0.6–1.0)	na	0.6 (0.5–0.9)*	0.8 (0.5–1.2)	na	0.7 (0.4–1.1)
Education						
High school (ref)	1.0	na	1.0	1.0	na	1.0
<high school	0.8 (0.6–1.0)	na	0.9 (0.7–1.2)	0.8 (0.6–1.1)	na	0.6 (0.4–1.0)
Age						
18–19 (ref)	1.0	1.0	1.0	1.0	1.0	1.0
20–24	0.9 (0.5–1.8)	0.9 (0.5–1.7)	0.9 (0.5–1.6)	2.4 (0.6–9.0)	1.3 (0.4–5.1)	1.2 (0.3–4.3)
25–29	0.9 (0.5–1.6)	0.8 (0.4–1.5)	0.7 (0.4–1.4)	1.7 (0.5–6.1)	0.7 (0.2–2.5)	0.5 (0.1–1.9)
30–34	0.7 (0.4–1.2)	0.6 (0.3–1.1)	0.5 (0.3–0.9)*	3.5 (1.0–12.6)	1.0 (0.3–3.8)	0.8 (0.2–2.9)
35–39	0.5 (0.3–0.9)*	0.4 (0.2–0.8)*	0.4 (0.2–0.7)*	2.5 (0.7–9.1)	0.7 (0.2–2.4)	0.5 (0.1–1.9)
40–44	0.5 (0.3–0.9)*	0.4 (0.2–0.7)*	0.3 (0.2–0.6)*	2.4 (0.7–8.7)	0.6 (0.2–2.3)	0.5 (0.1–1.7)
Parity						
0 (ref)	1.0	1.0	1.0	1.0	1.0	1.0
1	0.9 (0.7–1.2)	1.1 (0.9–1.5)	1.2 (0.9–1.5)	7.8 (4.2–14.6)*	9.4 (4.8–18.6)*	10.1 (5.0–20.4)*
≥2	0.9 (0.7–1.1)	1.2 (1.0–1.7)	1.4 (1.1–1.9)*	9.0 (5.2–15.8)*	12.6 (6.6–24.3)*	14.0 (7.1–27.8)

*p<.05. *Notes:* High-efficacy reversible methods are the IUD and hormonal methods. ref=reference group. na=not applicable, because characteristic was not included in the model.

likely to rely on male sterilization than were other subgroups, especially foreign-born Asians (16% vs. 1–9%). U.S.-born and foreign-born Asians were less likely to use female sterilization (2% and 4%, respectively) than were others (8–17%).

Blacks and U.S.-born Asians were the least likely to use IUDs (4% for each), whereas foreign-born Asians were the most likely to do so (10%). Use of the pill was most prevalent among U.S.-born Asians (28%) and least common among blacks and foreign-born Hispanics (16–17%). The prevalence of condom use was lowest among whites (16%) and highest among U.S.-born and foreign-born Asians (25% and 36%, respectively).

Compared with the other income groups, those in the highest income category were more likely to rely on male sterilization (15% vs. 2–6%) or the pill (26% vs. 17–18%), and less likely to report nonuse of any method (19% vs. 23–26%). They also were the least likely to use female sterilization (7% vs. 14–15%). High school graduates were more likely than others to rely on male sterilization (11% vs. 3%) or the pill (24% vs. 16%), and they were less likely to report female sterilization (8% vs. 20%) or use of no method (21% vs. 25%). IUD and condom use differed little by income or educational level. Women aged 18–19 were more likely than other age-groups to choose the injectable (12% vs. 1–6%) or ring (11% vs. 0–4%). Method choice also differed by parity: Women who had had two or more births reported the highest levels of reliance on male or female sterilization (15–17% vs. 1–6%).

Multivariate Analysis

•***High-efficacy reversible methods.*** In unadjusted regression analysis, blacks, foreign-born Hispanics and foreign-born Asians had lower odds than whites of using high-efficacy reversible methods (odds ratios, 0.5–0.7; Table 2).* Controlling for confounders had no effect for black women or foreign-born Asians; by contrast, adjusting for age and parity attenuated the association for foreign-born Hispanics (0.6), and the inclusion of income and education eliminated it.

Compared with women whose income was more than twice the federal poverty level, those with less income had reduced odds of using high-efficacy reversible methods when all factors were controlled for (odds ratios, 0.6–0.7). Education level was not significant in unadjusted or adjusted models. In all models, women aged 35–39 and 40–44 had lower odds of using high-efficacy reversible methods than women aged 18–19 (0.3–0.5);

*This model revealed a significant interaction between black race and education level. However, in stratified analysis, the magnitude and direction of odds ratios were similar for black high school graduates and nongraduates, so nonstratified results are presented here.

those aged 30–34 had reduced odds only in the fully adjusted model (0.5). Finally, in the full model, women who had had two or more births had 1.4 times as high odds of using high-efficacy reversible contraceptives as nulliparous women.

•***IUDs.*** The use of IUDs did not vary by race or ethnicity in the unadjusted model. After adjustment for age and parity, however, foreign-born Hispanics were less likely than whites to use an IUD (odds ratio, 0.5). The strongest predictor of IUD use was parity: In the fully adjusted model, women who had had one birth and those at higher parities had elevated odds of using an IUD (10.1 and 14.0, respectively). Income, education and age were not associated with IUD use in any models.

•***Female sterilization.*** All models assessing male and female sterilization were adjusted for age because of the strong association between this characteristic and either method. Compared with women aged 18–19, those who were older were more likely to rely on any type of sterilization in unadjusted and adjusted models (odds ratios, 10^6–10^8).

In unadjusted models, blacks and Hispanics were more likely than whites to use female sterilization (odds ratios, 2.3–2.8; Table 3). These associations persisted for blacks and U.S.-born Hispanics in the fully adjusted model (1.9 and 1.7, respectively); the association for foreign-born Hispanics was reduced by adjustment for age and parity, and was rendered nonsignificant in the full model. Use of female sterilization among Asian women was not significant in the unadjusted models; however, in the full model, foreign-born Asians had reduced odds of relying on this method (0.4).

Compared with women in the highest income category, those in the lower categories had elevated odds of choosing female sterilization in both unadjusted and adjusted models (odds ratios, 3.3–3.9 and 2.2–2.4, respectively). Women who did not have a high school diploma had 3.0 times as high odds of using female sterilization as those who had graduated; however, this association was not significant in the adjusted model. Parity was the strongest predictor of female sterilization: In the full model, women who had had two or more births were more likely than those who had had none to use this method (11.5).

•***Male sterilization.*** In unadjusted analyses, blacks and foreign-born Hispanics and Asians had a lower likelihood than whites of relying on male sterilization (odds ratios, 0.1–0.3). For blacks and foreign-born Asians, these associations were unchanged when demographic and socioeconomic factors were controlled for; however, the association lost significance in the full model for foreign-born Hispanics.

Income predicted reliance on male sterilization: Women in the two lowest income categories had reduced odds of relying on this method in the fully adjusted model (odds ratios, 0.3–0.5). While women without a high school diploma were less likely than others to rely on male sterilization in the unadjusted model, this association was not significant in the full model. Finally, as was the case for female sterilization, parity was the strongest predictor of women's reliance on male sterilization: In the adjusted models, women who had had at least two births were more likely than those who had had none to have a sterilized partner (3.8–4.2).

Sensitivity Analysis

When all demographic factors were controlled for in sensitivity analyses, the addition of insurance coverage among the 1,936 women who did not qualify for Family PACT did

TABLE 3. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing the likelihood that women used female or male sterilization, by selected characteristics

Characteristic	Female sterilization			Male sterilization		
	Age-adjusted	Model 1	Model 2	Age-adjusted	Model 1	Model 2
Race/ethnicity						
White (ref)	1.0	1.0	1.0	1.0	1.0	1.0
Black	2.3 (1.4–3.7)*	2.6 (1.5–4.4)*	1.9 (1.1–3.4)*	0.3 (0.1–0.6)*	0.3 (0.1–0.6)*	0.3 (0.2–0.7)*
Hispanic						
U.S.-born	2.4 (1.6–3.5)*	2.0 (1.4–3.0)*	1.7 (1.1–2.5)*	0.8 (0.6–1.3)	0.7 (0.5–1.1)	0.9 (0.6–1.3)
Foreign-born	2.8 (2.2–3.7)*	2.0 (1.5–2.7)*	1.0 (0.7–1.5)	0.2 (0.1–0.3)*	0.2 (0.1–0.4)*	0.5 (0.2–1.1)
Asian						
U.S.-born	0.4 (0.1–1.6)	0.4 (0.1–1.6)	0.5 (0.1–1.9)	0.6 (0.3–1.3)	0.5 (0.2–1.3)	0.5 (0.2–1.1)
Foreign-born	0.4 (0.2–1.0)	0.5 (0.2–1.0)	0.4 (0.2–0.9)*	0.1 (0.0–0.2)*	0.1 (0.0–0.3)*	0.1 (0.0–0.3)*
% of poverty level						
>200 (ref)	1.0	na	1.0	1.0	na	1.0
101–200	3.3 (2.4–4.4)*	na	2.2 (1.5–3.2)*	0.4 (0.3–0.6)*	na	0.5 (0.3–0.8)*
≤100	3.9 (3.0–5.2)*	na	2.4 (1.6–3.6)*	0.2 (0.1–0.3)*	na	0.3 (0.1–0.5)*
Education						
High school (ref)	1.0	na	1.0	1.0	na	1.0
<high school	3.0 (2.3–3.8)*	na	1.3 (0.9–1.9)	0.2 (0.1–0.4)*	na	0.7 (0.4–1.2)
Parity						
0 (ref)	1.0	1.0	1.0	1.0	1.0	1.0
1	2.8 (1.1–7.1)*	2.5 (1.0–6.3)	2.4 (1.0–6.1)	1.3 (0.8–2.2)	1.4 (0.8–2.4)	1.5 (0.9–2.5)
≥2	16.0 (7.3–35.3)*	13.1 (5.9–28.8)*	11.5 (5.2–25.4)*	2.8 (1.8–4.2)	3.8 (2.5–5.8)*	4.2 (2.7–6.5)*

*p<.05. *Notes:* ref=reference group. na=not applicable, because characteristic was not included in the model.

not alter the relative odds of method use among Hispanics and U.S.-born Asians in any models. Analyses of use of a high-efficacy reversible method showed that for blacks and foreign-born Asians, odds ratios increased from 0.5 to 0.6, and from 0.5 to 0.7, respectively; however, neither of these increased odds ratios was significant. A similar adjustment in the female sterilization model increased the odds ratio from 0.4 to 0.7 among foreign-born Asians, and from 1.9 to 2.8 among blacks; only the latter was significant.

Insurance coverage was significant in the unadjusted and adjusted high-efficacy reversible contraceptive models. Women who had public insurance or no insurance were less likely than those with private insurance to use high-efficacy reversible methods in the fully adjusted model (odds ratios, 0.2 and 0.5, respectively). Insurance was not significant in any other fully adjusted models.

DISCUSSION

Among California women at risk of unintended pregnancy, racial and ethnic disparities were found in the use of high-efficacy reversible methods and sterilization, but not of IUDs. Furthermore, differences in method choice were also found by income level, but not by education.

Our study underscores the need for improved understanding of contraceptive behavior among minority women. The sequential modeling suggested that reasons for racial and ethnic disparities in method selection may vary by minority group. For example, in the high-efficacy reversible method model, adjustment for income and education eliminated significant associations for all Hispanic women. By contrast, this adjustment did not affect associations for blacks or foreign-born Asians; thus, other explanatory factors may play an important role in method choice among these groups.

Asian women are of particular interest because of the relative lack of reproductive health information on this population and their relatively low rates of use of high-efficacy methods. Asians reported some of the lowest rates of use of the two most effective forms of contraception—male and female sterilization. In addition, Asian women reported relatively high levels of condom use, as well as of no use. National analyses of unintended pregnancy and contraceptive use have often excluded Asians because of limited sample size,[4,9,22] yet a growing body of research has found that Asians have a high rate of nonuse and a low rate of effective method use.[6,10] Hence, Asians are at high risk for unintended pregnancies, and intervention programs that target this subgroup need to be developed.

Because of the high efficacy of IUDs, there has been a concerted effort to increase their acceptability and accessibility.[23–26] Our finding of no racial or ethnic differences in IUD use is consistent with findings from the most recent NSFG, which showed that similar proportions of white, black and Hispanic women were currently using an IUD (3–5%).[12] However, an earlier California study detected differences.[10] Furthermore, the Contraceptive CHOICE study—which, like Family PACT, provided no-cost contraceptives to all participants—found that black women were as likely to choose a long-acting reversible method (IUD or implant) as were white women, although their relative risk was slightly reduced in adjusted analysis (0.9).[23] Both our study and the CHOICE study suggest that when family planning is available without cost, IUDs are equally acceptable among different racial and ethnic groups. The lack of significant differences in IUD use among groups in California, and the relatively higher overall use of the method among California women, may reflect the successful promotion and improved acceptability and accessibility of this highly effective method.

Our findings on sterilization are consistent with those of other studies in showing relatively low use of male sterilization and relatively high use of female sterilization among blacks and Hispanics.[12,19,27,28] They also are generally consistent with research showing associations between reliance on sterilization and socioeconomic characteristics. Compared with the overall U.S. male population aged 20–74, men who have had vasectomies have higher economic status and have completed more schooling.[27–30] In our adjusted models, income (as well as parity) was significant for both sterilization methods, but education was not. Other studies' findings of differences in sterilization recipients by education level may have been attributable to other demographic characteristics or may reflect differences in the study populations. Because limited data are available on reliance on sterilization among Asians, better understanding of the barriers to adopting this method may improve overall contraceptive use in this population.

Our sensitivity analysis suggests that insurance status may play an important role in method choice, particularly for black women and foreign-born Asians. Adjusting for insurance coverage for these two groups increased their odds of using a high-efficacy reversible method, though the resulting odds were not significant. However, because this analysis included only women who did not qualify for Family PACT, these changes may be due to widened confidence intervals from the smaller sample size, rather than a role of insurance in method choice. In the female sterilization model, inclusion of insurance also altered the results for blacks and foreign-born Asians, although the increased odds among the latter group were not significant. Finally, the inclusion of insurance coverage did not affect odds ratios for Hispanics or U.S.-born Asians. This finding reassures us that our conclusions regarding contraceptive choice in these groups would not have changed if women's insurance status (and Family PACT status) had been consistently available in the CWHS.

Other potential influences on differences in contraceptive use by racial, ethnic and income characteristics include client knowledge of contraceptives and values regarding method choice. Several studies have found that nonwhite populations had lower overall contraceptive knowledge and lower knowledge of high-efficacy methods than whites.[8,31–34] These differences may contribute to

some groups' increased likelihood of using no method or low-efficacy methods. Pregnancy ambivalence and other attitudes may also vary by race and ethnicity. In one study, nonwhite women's odds of reporting pregnancy ambivalence were 2.9 times those of whites.[35] In another, 43% of black women reported pregnancy ambivalence, compared with 32% of white women.[36]

Provider-level factors, such as contraceptive knowledge and counseling, may also contribute to racial and ethnic differences in women's use. Provider knowledge is known to influence counseling practices in family planning; in one study, clinicians who considered the IUD a safe method were more likely than others to counsel patients about it.[37] Another study found that Hispanics and blacks with low socioeconomic status were more likely than low-status whites to have a provider recommend an IUD (odds ratios, 3.4 and 3.1, respectively).[38]

Finally, previous studies have shown that minority men have less knowledge of and less positive attitudes toward male sterilization than do nonminority men.[39,40] In addition, racial and ethnic differences in beliefs regarding contraceptive responsibility[41] and familiarity with sterilization[42] may contribute to differences in vasectomy rates among groups.

Limitations

We included only two dimensions of socioeconomic status: income and education. These data were collected once at the individual or household level. We did not assess income sources, accumulated wealth, quality of education or occupation. Given the sample's age restriction of 18–44 years, we dichotomized the education measure by whether respondents were high school graduates, since younger women may not have completed schooling. However, this categorization may not fully capture the links between education and contraceptive use.[43] In addition, our categorization of economic status, provided by the CWHS, may not sufficiently represent the economic variation in the sample, particularly at higher income levels.

In describing women who are at risk for unintended pregnancy, the NSFG defines women as being sexually active if they have had intercourse in the past three months; given the available CWHS data, our corresponding time period was the last 12 months.[9] Our analysis therefore potentially includes women who had not had sex in the recent past, and their inclusion may explain why our estimate of contraceptive nonuse was higher than those from other sources: 21%, compared with 11% from the 2006–2008 NSFG[9,12] and 18% from the 1998–2001 CWHS.[10] However, because the proportion of women having intercourse between three months and a year prior to data collection is unlikely to differ across racial and ethnic groups, our definition of sexual activity should not affect our analysis of contraceptive choice.

Finally, our data set had limited numbers of black (148) and Asian (232) respondents. These sample sizes, particularly when stratified by education and nativity, may have limited our ability to detect potentially significant associations.

Conclusion

Further research is needed to improve our understanding of the factors involved in method use disparities, including patient- and provider-level characteristics. Efforts that focus on improving contraceptive choice among black, Asian and low-income populations have the potential to reduce the number of unintended pregnancies that occur among these high-risk groups.

REFERENCES

1. Henshaw SK, Unintended pregnancy in the United States, *Family Planning Perspectives*, 1998, 30(1):24–29 & 46.

2. Gipson JD, Koenig MA and Hindin MJ, The effects of unintended pregnancy on infant, child, and parental health: a review of the literature, *Studies in Family Planning*, 2008, 39(1):18–38.

3. Trussell J, The cost of unintended pregnancy in the United States, *Contraception*, 2007, 75(3):168–170.

4. Finer LB and Henshaw SK, Disparities in rates of unintended pregnancy in the United States, 1994 and 2001, *Perspectives on Sexual and Reproductive Health*, 2006, 38(2):90–96.

5. Jones RK et al., Trends in abortion in the United States, *Clinical Obstetrics and Gynecology*, 2009, 52(2):119–129.

6. Cubbin C et al., Socioeconomic and racial and ethnic disparities in unintended pregnancy among postpartum women in California, *Maternal and Child Health Journal*, 2002, 6(4):237–246.

7. Raine T, Minnis AM and Padian NS, Determinants of contraceptive method among young women at risk for unintended pregnancy and sexually transmitted infections, *Contraception*, 2003, 68(1):19–25.

8. Sangi-Haghpeykar H et al., Disparities in contraceptive knowledge, attitude and use between Hispanic and non-Hispanic whites, *Contraception*, 2006, 74(2):125–132.

9. Mosher WD et al., Use of contraception and use of family planning services in the United States: 1982–2002, *Advance Data from Vital and Health Statistics*, 2004, No. 350.

10. Foster DG et al., Contraceptive use and risk of unintended pregnancy in California, *Contraception*, 2004, 70(1):31–39.

11. Frost JJ, Singh S and Finer LB, Factors associated with contraceptive use and nonuse, United States, 2004, *Perspectives on Sexual and Reproductive Health*, 2007, 39(2):90–99.

12. Mosher WD and Jones J, Use of contraception in the United States: 1982–2008, *Vital and Health Statistics*, 2010, Series 23, No. 29.

13. Kost K et al., Estimates of contraceptive failure from the 2002 National Survey of Family Growth, *Contraception*, 2008, 77(1):10–21.

14. Frost JJ and Darroch JE, Factors associated with contraceptive choice and inconsistent method use, United States, 2004, *Perspectives on Sexual and Reproductive Health*, 2008, 40(2):94–104.

15. Ranjit N et al., Contraceptive failure in the first two years of use: differences across socioeconomic subgroups, *Family Planning Perspectives*, 2001, 33(1):19–27.

16. Eisenberg ML et al., Racial differences in vasectomy utilization in the United States: data from the National Survey of Family Growth, *Urology*, 2009, 74(5):1020–1024.

17. Upson K et al., Factors associated with contraceptive nonuse among U.S. women ages 35–44 years at risk of unwanted pregnancy, *Contraception*, 2010, 81(5):427–434.

18. Bixby Center for Global Reproductive Health, University of California, San Francisco, Fact sheet on Family PACT: an overview,

2008, <http://www.familypact.org/Files/Provider/Fact%20Sheets/FS_FamPACToverview11-08.pdf>, accessed June 13, 2011.

19. Borrero S et al., Race, insurance status, and tubal sterilization, *Obstetrics & Gynecology*, 2007, 109(1):94–100.

20. Dehlendorf C et al., Sociocultural determinants of teenage childbearing among Latinas in California, *Maternal and Child Health Journal*, 2010, 14(2):194–201.

21. Braveman P et al., Measuring socioeconomic status/position in studies of racial and ethnic disparities: maternal and infant health, *Public Health Reports*, 2001, 116(5):449–463.

22. Piccinino LJ and Mosher WD, Trends in contraceptive use in the United States: 1982–1995, *Family Planning Perspectives*, 1998, 30(1):4–10 & 46.

23. Secura GM et al., The Contraceptive CHOICE Project: reducing barriers to long-acting reversible contraception, *American Journal of Obstetrics & Gynecology*, 2010, 203(2):115.e1–115.e7, <http://www.ajog.org/article/S0002-9378(10)00430-8/abstract>, accessed June 10, 2011.

24. Drey EA et al., Insertion of intrauterine contraceptives immediately following first- and second-trimester abortions, *Contraception*, 2009, 79(5):397–402.

25. Goodman S et al., Increasing intrauterine contraception use by reducing barriers to post-abortal and interval insertion, *Contraception*, 2008, 78(2):136–142.

26. Madden T et al., Intrauterine contraception in Saint Louis: a survey of obstetrician and gynecologists' knowledge and attitudes, *Contraception*, 2010, 81(2):112–116.

27. Ager JW et al., Vasectomy—who gets one and why, *American Journal of Public Health*, 1974, 64(7):680–686.

28. Barone MA et al., Characteristics of men receiving vasectomies in the United States, 1998–1999, *Perspectives on Sexual and Reproductive Health*, 2004, 36(1):27–33.

29. Forste R, Tanfer K and Tedrow L, Sterilization among currently married men in the United States, 1991, *Family Planning Perspectives*, 1995, 27(3):100–107 & 122.

30. Lear H, Psychosocial characteristics of patients requesting vasectomy, *Journal of Urology*, 1972, 108(5):767–769.

31. Foster DG et al., Knowledge of emergency contraception among women aged 18 to 44 in California, *American Journal of Obstetrics & Gynecology*, 2004, 191(1):150–156.

32. Borrero S et al., Differences in knowledge may contribute to racial variation in tubal sterilization rates, *Contraception*, 2009, 80(2):206.

33. Guendelman S et al., Perceptions of hormonal contraceptive safety and side effects among low-income Latina and non-Latina women, *Maternal and Child Health Journal*, 2000, 4(4):233–239.

34. Scott CS et al., Hispanic and black American adolescents' beliefs relating to sexuality and contraception, *Adolescence*, 1988, 23(91):667–688.

35. Schwarz EB et al., Prevalence and correlates of ambivalence towards pregnancy among nonpregnant women, *Contraception*, 2007, 75(4):305–310.

36. Kavanaugh ML and Schwarz EB, Prospective assessment of pregnancy intentions using a single- versus a multi-item measure, *Perspectives on Sexual and Reproductive Health*, 2009, 41(4):238–243.

37. Harper CC et al., Challenges in translating evidence to practice: the provision of intrauterine contraception, *Obstetrics & Gynecology*, 2008, 111(6):1359–1369.

38. Dehlendorf C et al., Recommendations for intrauterine contraception: a randomized trial of the effects of patients' race/ethnicity and socioeconomic status, *American Journal of Obstetrics & Gynecology*, 2010, 203(4):319.e1–319.e8, <http://www.ajog.org/article/S0002-9378(10)00578-8/abstract>, accessed June 10, 2011.

39. Arevalo JA, Wollitzer AO and Arana S, Vasectomy—views of Latinos and white men, *Journal of Family Practice*, 1987, 24(5):493–496.

40. Thorburn S and Bogart LM, Conspiracy beliefs about birth control: barriers to pregnancy prevention among African Americans of reproductive age, *Health Education & Behavior*, 2005, 32(4):474–487.

41. Grady WR et al., Men's perceptions of their roles and responsibilities regarding sex, contraception and childrearing, *Family Planning Perspectives*, 1996, 28(5):221–226.

42. Borrero S et al., "Everything I know I learned from my mother...or not": perspectives of African-American and white women on decisions about tubal sterilization, *Journal of General Internal Medicine*, 2009, 24(3):312–319.

43. Braveman PA et al., Socioeconomic status in health research: one size does not fit all, *Journal of the American Medical Association*, 2005, 294(22):2879–2888.

Acknowledgment

Christine Dehlendorf is supported by NIH/NCRR/OD grant KL2 RR024130.

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