

Young Adults' Contraceptive Knowledge, Norms and Attitudes: Associations with Risk Of Unintended Pregnancy

CONTEXT: Women aged 18–29 have higher rates of unintended pregnancy than any other age-group. Information is needed to understand what characteristics are associated with risky contraceptive use practices among this population and to develop new strategies for reducing these women's risk of unintended pregnancy.

METHODS: Data related to unintended pregnancy risk were collected from a nationally representative sample of 1,800 unmarried women and men aged 18–29 surveyed by telephone in 2009. Among those at risk of unintended pregnancy, multiple logistic regression was used to assess associations between contraceptive knowledge, norms and attitudes and selected risky contraceptive behaviors.

RESULTS: More than half of young men and a quarter of young women received low scores on contraceptive knowledge, and six in 10 underestimated the effectiveness of oral contraceptives. Among women, for each correct response on a contraceptive knowledge scale, the odds of expecting to have unprotected sex in the next three months decreased by 9%, of currently using a hormonal or long-acting reversible method increased by 17%, and of using no method decreased by 17%. Fear of side effects, norms and attitudes that favor non-marital pregnancy or undervalue the importance of contraception, pregnancy ambivalence and mistrust of government's role in promoting contraception were also associated with one or more risky contraceptive use behaviors.

CONCLUSIONS: Programs to increase young adults' knowledge about contraceptive methods and use are urgently needed. Given the demonstrated link between method knowledge and contraceptive behaviors, such programs may be useful in addressing risky behavior in this population.

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American women in their late teens and 20s have higher rates of unintended pregnancy than do women in any other age-group. For example, in 2006, rates of unintended pregnancy varied between 71 and 106 per 1,000 women aged 19–29, but only between 22 and 46 per 1,000 women aged 15–17 or 30–39.¹

To improve understanding of the characteristics associated with the high unintended pregnancy rates among young people, and to explore strategies for assisting them in reducing their risk of unintended pregnancy, we analyzed new data collected from a nationally representative sample of unmarried adults aged 18–29. The survey was based on a theoretical framework of variables expected to affect pregnancy prevention intentions and behaviors using a model² that integrated key components from four major health behavioral theories.^{3–6} In our analysis, we refined this model further, defining six proximal domains that we hypothesized are linked with young adults' contraceptive behaviors—background characteristics, objective and subjective knowledge about contraceptive methods, evaluation of the consequences of using methods, and perceived social norms and personal attitudes regarding pregnancy and contraceptive use.

BACKGROUND

A great deal of research has examined associations between contraceptive behaviors and different combinations of variables; Jaccard has summarized the plethora of studies examining characteristics associated with contraceptive use.⁷ However, much of this research has focused exclusively on adolescents; some has included women of all ages or adults aged 18–44. Moreover, nationally representative data typically include only measures for background characteristics and a few attitudinal or normative measures. Therefore, most studies looking at contraceptive or reproductive health knowledge have been based on small, localized samples, with the exception of analyses of the National Longitudinal Study of Adolescent Health.⁸ To our knowledge, the present study is the first nationally representative one to examine associations between contraceptive behaviors and a wide range of domains (including contraceptive knowledge) among a sample of young adults.

Previous research has yielded mixed results regarding the association between individuals' knowledge about reproductive health and contraceptive methods and their contraceptive behaviors. In part, this may reflect variation in how knowledge has been measured: Some studies have

based it on receipt of sex education,^{9–11} and some have assessed actual knowledge, typically through a series of true-or-false items.⁸ Some studies have found no association between condom use and reproductive health knowledge or sex education,^{9,10} while others have found a positive association between knowledge and contraceptive use at first sex or ever-use of a method.¹¹

Another type of knowledge—perceived, or subjective, knowledge—has occasionally been examined in relation to contraceptive use. This construct gauges the extent to which respondents think they know something—for example, whether they think they know “much” or “a lot” about sex or about specific contraceptive methods. One study found that, compared with teenagers with high perceived knowledge about sex, those with low perceived knowledge were less likely to be sexually experienced, and among teenagers who were sexually experienced, those with low perceived knowledge were more likely to engage in risky contraceptive practices.¹²

Prior research has also examined associations between contraceptive behaviors and a range of attitudinal measures (including motivations and ambivalence regarding avoiding pregnancy, as well as beliefs and perceptions about methods and method use).^{13,14} Studies have found that both teenagers and adult women who reported ambivalent attitudes toward pregnancy or low motivation to avoid pregnancy had an elevated likelihood of engaging in risky contraceptive practices (such as no or inconsistent method use).^{15–17}

The current analysis was designed to build on these earlier studies using national data, a more comprehensive knowledge measure than has been employed in prior work and a theoretically derived model to test the relative strength of different domains.

METHODS

Data

This study analyzed data from the 2009 National Survey of Reproductive and Contraceptive Knowledge, which collected information from unmarried 18–29-year-old women and men in the United States. The survey was designed by the authors and other Guttmacher Institute researchers under contract with the National Campaign to Prevent Teen and Unplanned Pregnancy, and fieldwork was conducted by the Field Research Corporation. Initial survey findings have been reported elsewhere.¹⁸

In this survey, a nationally representative stratified random sample of both cell phone and landline telephone numbers was used to identify eligible respondents. For the landline sample, two mutually exclusive strata were

created: The targeted stratum comprised households with listed telephone numbers and a higher than average probability of having an eligible unmarried 18–29-year-old (as determined on the basis of known and inferred demographic data from commercial databases), and a complementary stratum consisted of the remaining households that could be reached via random-digit dialing. The landline sample also included substrata in which black and Hispanic households were oversampled. Because the cell phone sample could not be targeted by age or other social and demographic characteristics, it consisted of a single stratum; this sample was purchased from and designed with the Marketing Systems Group.

More than 115,000 telephone numbers were sampled and dialed; of these, nearly 50,000 were found to be non-household numbers. We screened 66,000 households, identified about 4,800 with a likely eligible resident and confirmed eligibility for 3,400. In total, 1,800 respondents completed interviews—897 females and 903 males. Sixty percent of the completed interviews were from the landline samples, and 40% were from the cell phone sample. At the beginning of each call, respondents were informed that their answers would be confidential, that the survey covered sensitive topics, and that they could skip questions or end the interview at any point. Interviews averaged 29 minutes for females and 23 minutes for males, and were conducted in either English or Spanish; respondents received a small monetary incentive for participating. The questionnaire and survey protocols were approved by the institutional review board of the Guttmacher Institute.

The level of response or cooperation obtained from respondents of a telephone survey can be expressed in different ways. We calculated a response rate of 21% using the American Association for Public Opinion Research's Response Rate 3 method, in which the denominator includes an estimate of the proportion of cases of unknown eligibility that are likely to be eligible.*¹⁹ Although this figure may appear low, a number of studies suggest that as long as a representative sample is scientifically drawn from the population, and thorough, professional efforts are made to collect data from all selected potential respondents, response rates of about 20–65% are associated with equally accurate survey results.^{20–23}

The cooperation rate is a better reflection of potential respondents' willingness to participate in the survey. Cooperation rates can be calculated at the household or the respondent level, and include only households or respondents who are contacted and fully screened. The overall household cooperation rate for this survey was about 40%; the respondent-level cooperation rate (for the landline sample) was about 75%. (The difference between these rates arises because many households reported that someone eligible resided there, but interviewers could not contact these individuals to confirm eligibility and request participation.) We validated the representativeness of the data by comparing key characteristics with similar measures for a comparable subpopulation of respondents to

*For about 30,000 households with undetermined eligibility, we used the effective incidence (the number of confirmed or likely eligible respondents divided by the number of fully screened households, or 13%) to estimate the proportion that would be expected to have an eligible respondent. Using this method, the response rate equals the number of completed interviews divided by the number of confirmed, likely or estimated eligible respondents, that is, 1,800 divided by [4800+(30,000×13%)], or 21%.

the 2002 National Survey of Family Growth. Additional detail about the survey methodology has been published previously.¹⁸

For the current analysis, we restricted the sample to respondents who were at risk of unintended pregnancy because they reported having had sex in the past 12 months and were not currently pregnant or trying to get pregnant (623 females and 618 males). In a model that assessed contraceptive nonuse, the sample was further restricted to respondents who were in a sexual relationship (454 females and 386 males). A final model looking at inconsistent contraceptive use included 441 female respondents who reported current use of a method.

Measures

•**Dependent variables.** Four dichotomous dependent variables were included. One assessed whether respondents reported that it was likely (either very or somewhat) that they would have unprotected sex in the next three months. Another measured whether respondents reported that they (or their partner) were currently using a hormonal or long-acting reversible contraceptive method (the pill, injectable, patch, vaginal ring, IUD or implant). The third variable measured whether respondents in a relationship reported that they were not using any medical method to prevent pregnancy (either using no method at all or depending only on withdrawal or natural family planning). The last variable measured whether female contraceptive users reported inconsistent use in the past three months; inconsistent use included missing any pills, not using a condom each time, getting an injection late, and relying on withdrawal or natural family planning. (We excluded men from this measure because they were asked only about consistency of condom use.)

•**Independent variables.** The social and demographic variables used were age (18–19, 20–24 or 25–29); race, ethnicity and nativity (white, black, U.S.-born Hispanic, foreign-born Hispanic or other); relationship status (whether the respondent had a current sexual partner or girlfriend or boyfriend); employment status (working at all, in school only, other); educational level (high school or less, some college or vocational school, completed college); and receipt of Medicaid or welfare in the past 12 months.

A summary score measuring respondents' objective knowledge of methods was created by adding the number of correct responses to 23 true-or-false statements (see box) about the use of different contraceptive methods (Cronbach's alpha, 0.77). In the bivariate analysis, summary scores were coded into grades: The top 10% of all respondents received an A (19–23 correct answers); the following three groups of 20% received a B (16–18 correct), C (14–15 correct) or D (11–13 correct); and the lowest 30% received an F (10 or fewer correct).^{*} In the regression analyses, the full scale (0–23) was used. A second measure of objective knowledge assessed whether respondents underestimated the pill's effectiveness;

Survey items used to measure young adults' objective knowledge about contraceptive methods

- It is okay to use the same condom more than once. (False)
- Condoms have an expiration date. (True)
- When putting on a condom, it is important to leave a space at the tip. (True)
- It is okay to use petroleum jelly or Vaseline as a lubricant when using latex condoms. (False)
- When using a condom, it is important for the man to pull out right after ejaculation. (True)
- Wearing two latex condoms will provide extra protection. (False)
- Birth control pills are effective even if a woman misses taking them for two or three days in a row. (False)
- Women should "take a break" from the pill every couple of years. (False)
- If a woman is having side effects with one kind of pill, switching to another type or brand might help. (True)
- Birth control pills reduce the chances that women will get certain types of cancer. (True)
- After a woman stops taking birth control pills, she is unable to get pregnant for at least two months. (False)
- In order to get the birth control pill, a woman must have a pelvic exam. (False)
- All IUDs are banned from use in the United States. (False)
- A woman can use an IUD even if she has never had a child. (True)
- Women who use IUDs cannot use tampons. (False)
- To obtain an IUD, a woman must undergo a surgical operation. (False)
- An IUD cannot be felt by a woman's partner during sex. (True)
- IUDs can move around in a woman's body. (False)
- Women using the birth control shot, Depo-Provera, must get an injection every three months. (True)
- Even if a woman is late getting her birth control shot, she is still protected from pregnancy for at least three more months. (False)
- Negative effects that a woman has from Depo-Provera can last for the rest of her life. (False)
- Women using the vaginal ring, NuvaRing, must have it inserted by a doctor or health care provider every month. (False)
- Long-acting methods like the implant or IUD cannot be removed early, even if a woman changes her mind about wanting to get pregnant. (False)

answers to an open-ended item were considered underestimates if they indicated that a woman's chance of getting pregnant while using the pill was 15% or more.

We assessed how much respondents thought they knew about each of four methods (condoms, the pill, the injectable and the IUD); responses were coded as "heard of method or know nothing" (0), "know a little" (1) or "know a lot or everything about the method" (2). For the bivariate analysis, we summed the responses and created a four-category scale: "know a lot" (6–8), "know some" (4–5), "know a little" (2–3) or "know nothing" (0–1). For the regression analyses, the full scale (0–8) was used.

Fear or dislike of side effects, whether due to actual experience or to subjective expectations, is often reported as a reason for discontinuing or avoiding use of certain methods.²⁴ Hence, we included respondents' expectations of side effects of hormonal or long-acting methods as a proxy for their evaluation of the consequences of method use. After asking respondents about six possible side effects (e.g., weight gain, cancer risk and infertility), we summed the number they believed were extremely likely, and grouped the responses into a three-category scale (none, one, two or more). In the multivariate analyses, this

^{*}Method knowledge grades were created using the full survey sample of 1,800 respondents.

was treated as a continuous variable (0–2; the small number of respondents who indicated more than two were combined with the highest group).

Respondents' norms were measured by items regarding nonmarital childbearing ("It is OK for an unmarried female to have a child"), pregnancy ("Every pregnancy is a blessing") and birth control use ("Most of my friends think using birth control is important"). All items used a five-point scale (from 1="strongly disagree" to 5="strongly agree").

Single items assessed respondents' attitude toward use of birth control ("It is too much of a hassle to use a condom every time you have sex") and fatalistic pregnancy attitude ("It doesn't matter whether you use birth control or not; when it is your time to get pregnant, it will happen"). Both were measured on a five-point scale (from 1="strongly disagree" to 5="strongly agree"). A composite measure of respondents' commitment to and ambivalence toward avoiding pregnancy was created from responses to two questions: how important it was to avoid pregnancy now ("very," "somewhat," "a little," "not at all") and how they would feel if they got (or got their partner) pregnant now ("very" or "somewhat upset," "very" or somewhat happy"). Participants were defined as committed to avoiding pregnancy if they responded "very" or "somewhat important" to the first question and "very" or "somewhat upset" to the second. They were considered ambivalent if they responded "very" or "somewhat important" to the first question and "very" or "somewhat happy" to the second. Respondents were coded as not committed if they reported that it was "a little" or "not at all" important to avoid pregnancy.

We constructed a composite measure of respondents' mistrust of government regarding birth control from three items, with responses on a five-point scale (from "strongly agree" to "strongly disagree"): "The government makes certain that birth control methods are safe before they come onto the market"; "The government and public health institutions use poor and minority people as guinea pigs to try out new birth control methods"; and "The government is trying to limit blacks and other minority populations by encouraging the use of birth control." Respondents were classified as mistrustful if they strongly disagreed with the first or strongly agreed with either of the others.

Finally, for the model measuring the consistency of method use, we asked respondents about their satisfaction with their current method (on a five-point scale from 1="completely satisfied" to 5="completely dissatisfied").

Analysis

We examined frequencies and correlations, and conducted factor analysis, to understand bivariate relationships between measures, and to assess whether and how to construct scales or composite measures and which independent variables to use in multivariate analyses. We tested bivariate associations between all independent and dependent variables using correlation and chi-square tests. All independent variables included in the multivariate

models exhibited significant bivariate associations with at least one of the dependent variables.

Multivariate models were used to examine the associations between the variable domains and the measures of respondents' contraceptive behavior. Each dependent variable was coded dichotomously; we therefore used multiple logistic regression to test each model. Models were constructed by entering the domains according to their placement in the overarching theoretical model: the background characteristics first, followed by each of the other domains. In several cases, we examined interaction terms for measures that were strongly correlated with each other and might theoretically vary in a systematic way. However, none of the interactions tested was significant, so they were excluded from our final multivariate models. We also calculated the pseudo- R^2 (Nagelkerke) for each domain, in two ways: first, as the amount of variation in the outcome explained by each domain when entered alone in the bivariate models, and second, as the amount of the total variation it contributed in the multivariate models after all prior domains were controlled for.

When men and women were combined in an overall model, gender was highly significant, and some other variables lost significance because of differing, and even opposite, associations with the dependent variable according to gender. Therefore, models are presented for women and men separately. Results are presented according to domain, to highlight the significant findings across the dependent variables.

The analysis was conducted using SPSS, version 18. Sample weights and an adjustment for the complex survey design were used so that significance tests correctly accounted for the design, as well as for differential non-response and coverage.

RESULTS

Descriptive

One in four respondents were aged 18 or 19; four in 10 were 20–24 and a third were 25–29 (Table 1). Six in 10 respondents were white, and one-third were black or Hispanic. Five percent of females and 10% of males were foreign-born Hispanics. Most respondents were in a relationship (75% of women and 64% of men). About two-thirds were employed, and one in four were students only; more than half of respondents had received at least some college education or vocational training. Four in 10 women had received Medicaid or welfare in the past year, as had one in six men.

Many young adults—men, in particular—displayed serious gaps in objective knowledge about the major contraceptive methods. Half of young women and one in five young men received an A or B knowledge grade; a quarter of women and six in 10 men received a grade of D or F. Six in 10 of both young men and women underestimated the effectiveness of oral contraceptives.

Subjective knowledge about condoms, the pill, the injectable and the IUD also was low. More than half of

TABLE 1. Percentage of U.S. young adults who are at risk of unintended pregnancy, by selected characteristics, according to gender, National Survey of Reproductive and Contraceptive Knowledge, 2009

Characteristic	Total (N=1,241)	Women (N=623)	Men (N=618)	Characteristic	Total (N=1,241)	Women (N=623)	Men (N=618)
BACKGROUND				EVALUATION OF SIDE EFFECTS			
Age				No. of side effects extremely likely			
18–19	25	25	26	0	69	71	67
20–24	39	40	39	1	19	18	21
25–29	35	35	35	≥2	12	12	12
Race/ethnicity/nativity				NORMS			
White	59	60	58	OK for unmarried female to have a child‡			
Black	16	20	14		76	82	70
U.S.-born Hispanic	11	9	13	Every pregnancy is a blessing‡			
Foreign-born Hispanic	8	5	10		77	82	74
Other	6	6	6	Friends think using birth control is important‡			
Has current sexual partner	69	75	64		87	88	85
Employment status				ATTITUDES			
Working at all	63	61	66	Using condoms is a hassle‡			
In school only	23	23	23		25	21	29
Other	14	16	12	Fatalistic about pregnancy‡			
Education					40	41	38
≤high school	47	44	49	Commitment to avoid pregnancy			
Some college/vocational	35	35	35	High commitment	56	69	45
Completed college	18	21	15	Ambivalent	31	20	41
Received Medicaid/welfare in past year	28	41	17	Low commitment	13	12	15
OBJECTIVE KNOWLEDGE				Mistrust government regarding birth control			
Method knowledge grade‡					59	59	59
A	9	16	3	Not completely satisfied with current method††			
B	25	34	18		u	8	u
C	21	23	19	CONTRACEPTIVE USE			
D	20	14	25	Expect unprotected sex in next 3 mos.			
F	24	13	35		36	29	43
Underestimates pill effectiveness	60	57	62	Use hormonal/long-acting method			
SUBJECTIVE KNOWLEDGE					43	54	34
Perceived method knowledge				Use no method§			
Know a lot	26	42	12		24	24	23
Know some	34	34	35	Used inconsistently in last 3 mos.††			
Know a little	34	21	45		u	43	u
Know nothing	6	3	9				

†See page 109 for grade scoring. ‡Percentage who strongly or somewhat agreed with statement. §Among those currently in a relationship, percentage who used no method or withdrawal or natural family planning only. ††Among method users. Note: u=unavailable.

young men and one in four young women reported that they knew only a little or nothing about the four methods. Eighteen percent of women and 21% of men thought one side effect of hormonal or long-acting methods was extremely likely, and 12% of each gender thought two or more were extremely likely.

High proportions of young adults agreed with social norms that both contribute to and protect against unintended pregnancy. Seventy percent of men agreed that it is acceptable for an unmarried woman to have a child, and 74% agreed that every pregnancy is a blessing; 82% of women agreed with these norms. Eighty-eight percent of women and 85% of men agreed that their friends think using birth control is important.

Young adults expressed conflicting attitudes regarding pregnancy and contraceptive use. Some 21–29% thought using condoms every time one has sex is a hassle, and

about 40% held the fatalistic view that using birth control really does not matter. Sixty-nine percent of young women and 45% of young men were committed to avoiding pregnancy. Two in five young men and one in five young women were ambivalent.

Six in 10 young adults reported some mistrust of the government as regards birth control safety or inappropriate promotion of contraception among minority populations. Eight percent of young women who were using a contraceptive said they were not completely satisfied with their current method.

Forty-three percent of male respondents said they were somewhat or extremely likely to have unprotected sex in the next three months, and 34% reported that their partner was currently using a hormonal or long-acting reversible method. Twenty-nine percent of female respondents expected to have unprotected sex in the next three

months, and 54% were using a hormonal or long-acting method. Among respondents in relationships, one in four of each gender were not using any medical contraceptive method. In addition, 43% of female contraceptive users reported using their method inconsistently.

Bivariate and Multivariate

•*Objective knowledge.* Young adults' objective knowledge about contraceptive methods showed the strongest and most consistent associations with contraceptive behaviors,

especially among women. In bivariate analysis, women's contraceptive knowledge was inversely related to their expectation to have unprotected sex in the next three months, and was positively related to their likelihood of using a hormonal or long-acting method (Figures 1 and 2). Among men, a similar relationship was found between knowledge scores and their partner's use of one of these methods, although the pattern did not hold for those with the highest score.

In five of the seven multivariate models, at least one of the two variables measuring objective knowledge was significant (Table 2). For each correct response on the method knowledge scale, women's odds of expecting to have unprotected sex in the next three months was reduced by 9%, and their odds of currently using a hormonal or long-acting method increased by 17%; among women in a current relationship, their likelihood of not using any method was decreased by 17%. Men's odds of having a partner who was using a hormonal or long-acting method rose by 11% with each correct response.

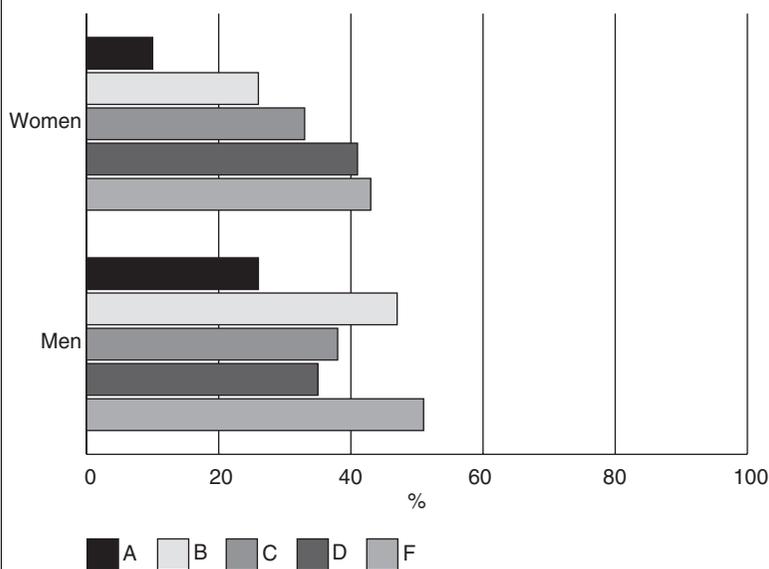
Compared with young women who correctly estimated the effectiveness of the pill, those who underestimated it were more likely to expect to have unprotected sex in the next three months (odds ratio, 2.2). Surprisingly, young men who underestimated the pill's effectiveness had a reduced likelihood of not using any method (0.3).

•*Subjective knowledge.* Young adults' subjective rating of their contraceptive knowledge, while correlated with their objective knowledge grade in preliminary analyses, had an independent association with behavior in some models. For men in a relationship, the higher the perceived rating of how much they knew, the lower their odds of being nonusers (odds ratio, 0.7). For women, perceived knowledge was marginally associated with the odds of using a hormonal or long-acting method (1.2) and with the odds of using a method inconsistently (0.8).

•*Evaluation of side effects.* Young adults' expectations of side effects were inversely associated with current use of hormonal or long-acting reversible methods. At the bivariate level, young men and women who expected that none of the cited side effects was extremely likely to occur were significantly more likely than those who expected side effects to use a hormonal or long-acting method (Figure 3). In the multivariate model (Table 2), with each additional side effect that women thought was extremely likely, they had reduced odds of using a hormonal or long-acting method (odds ratio, 0.7); this association was marginally significant among men (0.6).

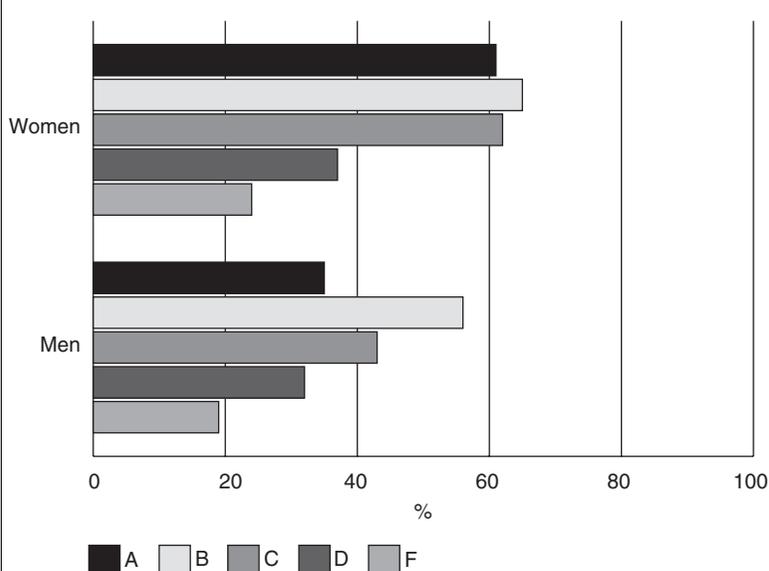
•*Norms.* Among the social norms included in the models, what friends think about birth control use had the strongest associations with behavior. The more strongly that both men and women agreed with the statement that most of their friends think using birth control is important, the higher their odds of relying on hormonal or long-acting methods (odds ratios, 1.5 and 1.3, respectively). The more strongly that women agreed with this statement, the lower their odds of being nonusers (0.7). In addition,

FIGURE 1. Percentage of respondents expecting to have unprotected sex in the next three months, by method knowledge grade, according to gender



Note: See page 109 for grade scoring.

FIGURE 2. Percentage of respondents currently using a hormonal or long-acting reversible method, by method knowledge grade, according to gender



Note: See page 109 for grade scoring.

TABLE 2. Odds ratios from logistic regression analysis assessing associations between respondents' contraceptive use and selected characteristics, according to gender

Characteristic	Expect unprotected sex in next 3 mos.		Use hormonal/long-acting method		Use no method [‡]		Used inconsistently in last 3 mos. [§]
	Women (N=605)	Men (N=580)	Women (N=611)	Men (N=597)	Women (N=451)	Men (N=378)	Women (N=436)
Objective knowledge							
Method knowledge score	0.91*	0.98	1.17**	1.11*	0.83**	0.99	0.99
Underestimates pill effectiveness	2.18*	1.27	0.98	1.27	1.51	0.34*	0.93
Subjective knowledge							
Perceived method knowledge	0.87	0.97	1.19†	1.08	0.98	0.71*	0.80†
Evaluation of side effects							
No. of side effects extremely likely	1.02	1.28	0.65*	0.64†	1.17	0.65	1.05
Norms							
OK for unmarried female to have a child	1.13	1.20*	1.01	0.99	0.98	1.25	0.99
Every pregnancy is a blessing	0.87	0.96	1.05	1.00	0.82	0.84	0.99
Friends think using birth control is important	0.93	0.98	1.45***	1.30*	0.65**	1.03	0.90
Attitudes							
Using condoms is a hassle	1.30**	1.28**	0.97	0.91	1.01	1.31*	1.29*
Fatalistic about pregnancy	1.07	1.09	1.06	0.93	0.92	1.43**	0.90
Commitment to avoid pregnancy							
High commitment (ref)	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ambivalent	0.49*	0.94	1.15	1.12	1.17	2.78*	0.60
Low commitment	1.81	0.73	0.92	1.11	1.36	6.46**	4.58**
Mistrust government regarding birth control	1.16	1.00	0.73	1.33	2.50*	1.65	1.27
Dissatisfaction with current method	na	na	na	na	na	na	1.67**
Nagelkerke R ²	0.29	0.15	0.30	0.29	0.36	0.41	0.29

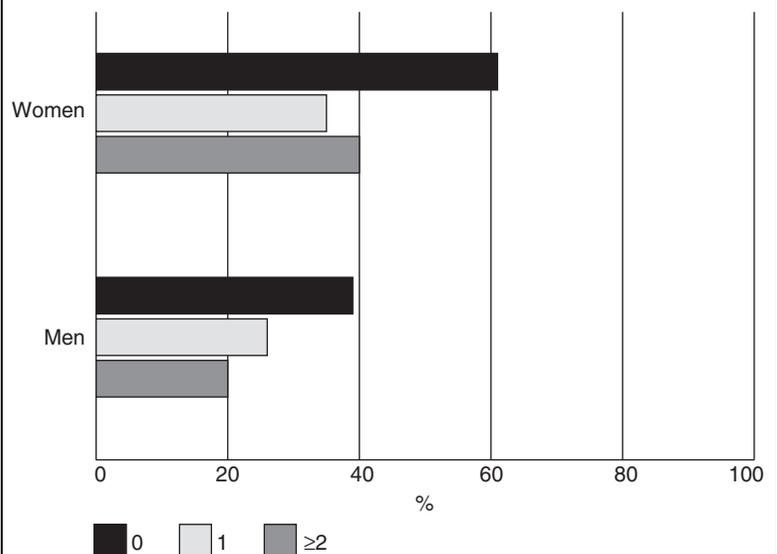
*p≤.05. **p≤.01. ***p≤.001. †p≤.10. ‡Among those currently in a relationship. §Among method users. Notes: The measures of pill effectiveness and mistrust of government are dichotomous, and except for commitment to avoid pregnancy, all others are continuous. All models control for respondents' background characteristics. Ns are unweighted. ref=reference group. na=not applicable.

men's support of nonmarital childbearing was positively associated with their likelihood of expecting to have unprotected sex in the next three months (1.2). Level of agreement with the statement "Every pregnancy is a blessing" was not associated with contraceptive use.

•**Attitudes.** The more strongly women and men agreed that regular condom use "is too much of a hassle," the greater their odds of expecting to have unprotected sex soon (odds ratios, 1.3 for each). Agreement with this statement was also positively associated with inconsistent method use among women (1.3) and with method nonuse among men (1.3). Agreement with a fatalistic attitude about pregnancy was significant in only one multivariate model: The more fatalistic men in relationships were, the greater their odds of being nonusers (1.4).

The composite measure of pregnancy ambivalence showed mixed results. In most cases, ambivalent women and men were no different in their behavior from respondents who were committed to avoiding pregnancy. However, ambivalent men in relationships had elevated odds of being nonusers (odds ratio, 2.8), and ambivalent women had reduced odds of expecting to have unprotected sex in the next three months (0.5). Furthermore, respondents who reported low commitment to avoiding pregnancy were more likely than those who were highly committed to engage in risky behavior: Such men in relationships had higher odds of being nonusers (6.5), and women had higher odds of inconsistent method use (4.6).

FIGURE 3. Percentage of respondents currently using a hormonal or long-acting reversible method, by number of side effects they consider to be extremely likely, according to gender



Women in relationships had elevated odds of being nonusers if they expressed mistrust in the government with regards to birth control (odds ratio, 2.5). And women who reported greater dissatisfaction with their current contraceptive method had increased odds of using their method inconsistently (1.7).

Amount of Variance Explained

Combined, the background variables contributed about half of the total variance explained in each model (Table 3). For women, these characteristics accounted for 14–18% of the variance; for men, the amount of variance explained by these characteristics ranged from 8% in the unprotected sex model to 19–20% in the other two models. The specific background variables that were significant also varied from model to model (not shown); race, ethnicity and nativity and relationship status were significant in several models (e.g., respondents with minority or immigrant backgrounds had elevated odds of engaging in risky contraceptive use practices), school and employment status was significant in two models (e.g., women in relationships who were in school and not working had reduced odds of being nonusers), and age and education were significant in one model (i.e., older women had reduced odds of being inconsistent users, and more educated women in relationships had decreased odds of being nonusers). Consistent with the literature,^{1,10,17} these results generally indicate that young adults who are disadvantaged have elevated odds of engaging in risky contraceptive behaviors, as do those who are not currently in stable ongoing relationships.

For all of the contraceptive behaviors except inconsistent use, the objective knowledge domain explained 10–13% of the variance among women when entered alone, and 6–9% of the variance beyond that explained by the background variables. For young men, objective knowledge played a similar role in the model predicting their partners' use of hormonal or long-acting reversible methods.

When entered alone, the subjective knowledge domain ranked high in terms of variance explained in the models assessing use of hormonal or long-acting methods—10%

in the women's model and 8% in the men's. It also ranked high in the men's model for contraceptive nonuse, explaining 11% of the variance. However, in the related multivariate models, the contribution of this domain was greatly diminished.

In the bivariate models, young adults' evaluation of side effects explained 4–5% of the variance in use of hormonal or long-acting methods for both women and men. And although the cumulative impact of this domain was diminished after background and knowledge variables were controlled for, these expectations still explained 2% of the variance for both genders.

For women, the social norms domain had a large impact on the model predicting method nonuse, explaining 12% of the variance when entered alone and 7% in the multivariate model. This domain was also important for women's use of hormonal or long-acting methods; it explained 8% of the variance in the bivariate model and 4% in the cumulative model.

Finally, the attitudes domain played an important role in the women's models for expecting to have unprotected sex, explaining 9% and 6% of the variance at the bivariate and multivariate levels, respectively. Attitudes were also very important in the multivariate models measuring method nonuse among men in relationships and inconsistent use among women, contributing 14% and 12%, respectively, of the variance explained.

DISCUSSION

Although most unmarried young adults are not trying to become pregnant, many are not taking the necessary precautions to avoid an unintended pregnancy. Substantial proportions of young women and men who are sexually active and not trying to get (or get their

TABLE 3. Nagelkerke R² values indicating amount of variance that each domain explains when entered alone in bivariate contraceptive use models and contributes to total variance explained in multivariate models controlling for all prior domains

Domain	Expect unprotected sex in next 3 mos.		Use hormonal/long-acting method		Use no method†		Used inconsistently in last 3 mos.‡	
	Bivariate	Multivariate	Bivariate	Multivariate	Bivariate	Multivariate	Bivariate	Multivariate
Women								
Background characteristics	0.15	0.15	0.15	0.15	0.18	0.18	0.14	0.14
Objective knowledge	0.10	0.06	0.10	0.09	0.13	0.09	0.03	0.02
Subjective knowledge	0.06	0.01	0.10	0.01	0.06	0.00	0.02	0.01
Evaluation of side effects	0.01	0.00	0.05	0.02	0.03	0.00	0.01	0.00
Norms	0.03	0.01	0.08	0.04	0.12	0.07	0.01	0.00
Attitudes	0.09	0.06	0.03	0.01	0.08	0.03	0.11	0.12
Full model	na	0.29	na	0.30	na	0.36	na	0.29
Men								
Background characteristics	0.08	0.08	0.20	0.20	0.19	0.19	u	u
Objective knowledge	0.03	0.02	0.10	0.05	0.08	0.03	u	u
Subjective knowledge	0.02	0.00	0.08	0.00	0.11	0.02	u	u
Evaluation of side effects	0.02	0.01	0.04	0.02	0.00	0.01	u	u
Norms	0.01	0.01	0.02	0.01	0.02	0.01	u	u
Attitudes	0.06	0.04	0.05	0.01	0.25	0.14	u	u
Full model	na	0.15	na	0.29	na	0.41	na	na

†Among those currently in a relationship. ‡Among method users. Notes: na=not applicable. u=unavailable.

partner) pregnant expect to have unprotected sex in the near future. Only half of young women are currently using a hormonal or long-acting method, and a quarter of those in relationships are not using any medical method. In addition, only a third of young men say that their partners are using a hormonal or long-acting method, and many female contraceptive users are using their method inconsistently.

When respondents' background characteristics were controlled for in regression models assessing contraceptive behavior, objective knowledge about contraceptives and attitudes toward contraception and pregnancy were typically the most important domains for both genders; social norms were more important for women than men. Knowledge was especially important in the models for the use or nonuse of methods, as well as the use of more effective ones. Among young women who were using a method, however, knowledge was not important in the consistency of use; attitudes were much more important in this model. Understanding the relative contributions of these various domains can help in designing programs and crafting messages to improve young adults' contraceptive knowledge.

Many reproductive health professionals consider it intuitively clear that knowledge influences behavior, but previous research, typically among adolescents, has found mixed results.^{8,10} Our study provides valuable evidence that improving contraceptive knowledge and dispelling misperceptions about methods and their use may have the potential to positively influence young adults' behavior. We also found that greater expectation of negative side effects was associated with reduced use of hormonal or long-acting reversible methods. Of course, some methods do have side effects, and some young women expect side effects and avoid using certain methods because they have experienced them while on the method. However, some of the side effects we asked about were either rare or not even possible, and the Contraceptive CHOICE study²⁵ indicated that when detailed, unbiased information about all methods is provided, uptake of long-acting methods increases substantially. This suggests that better knowledge about side effects is needed and could contribute to young adults' propensity to use hormonal or long-acting methods.

In our analysis, social norms played a small but important role in understanding contraceptive behavior, and personal attitudes played a key role in several models. Although it is much more difficult to design programs aimed at changing social norms and personal attitudes than ones to increase knowledge, simply knowing which attitudes and norms are associated with risky behavior may help program and policy planners craft sexual and reproductive health messages for young people. For example, messages that stress the importance of using birth control or that show how the benefits of condom use outweigh the hassles are two possible strategies suggested by this analysis.

Limitations

A few limitations to our analysis should be mentioned. As in all multivariate analyses, additional, unmeasured variables contribute to respondents' behavior. And the relative importance of different domains may somehow be related to how variables were measured and the number of variables included in each domain. To test for these possibilities, our exploratory models included additional variables and looked at different ways of coding them (dichotomous vs. continuous). Overall, these strategies did not change the basic findings, and we included only variables that were significant in bivariate models.

Another limitation is the inability to determine the direction of cause and effect, especially for the model looking at use of hormonal or long-acting reversible methods. Instead of greater contraceptive knowledge leading some young people to choose certain methods, it may be the case that their knowledge is increased during or after choosing the method. But the fact that knowledge was also associated with expectations for having unprotected sex, as well as method nonuse, suggests that the robust association between risky contraceptive use practices and knowledge was not simply due to information acquired while choosing or using a long-acting or hormonal method.

Conclusions

Strong evidence demonstrating a link between contraceptive knowledge and young adults' behavior, combined with findings about young adults' disturbingly low levels of knowledge, suggests that new educational strategies are urgently needed.

Several approaches are possible. Increases in health insurance coverage among young adults due to provisions in the Affordable Care Act²⁶ point to an opportunity for health care providers to reach and educate even greater numbers of young adults. Providers will need appropriate training and support to ensure that this does not become a missed opportunity. A second approach to improving young adults' contraceptive knowledge is through media campaigns, especially those that include social media and innovative ways to reach this population.

Finally, young adults' low levels of knowledge about contraceptives may partially reflect the strong emphasis on abstinence-until-marriage sex education that prevailed during the last decade, when this generation was in middle or high school. A shift to more comprehensive sex education curricula that include medically accurate information about contraception has the potential to contribute to increased knowledge among future generations. In the meantime, young adults, who often have a long window of exposure to the risk of unintended pregnancy and limited opportunities for ongoing sex education, need alternative educational support, including "booster" sex education sessions.^{18,27} Given the fluidity of most young adults' lives, multiple approaches are likely needed to reach different segments of this diverse population.

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