Characteristics Associated with Emergency Contraception Use by Family Planning Patients: A Prospective Cohort Study

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CONTEXT: *Little is known about how written family planning clinic policy regarding emergency contraception, as well as personal characteristics, behaviors and attitudes, may influence a woman to use emergency contraception.*

METHODS: *Between June 2001 and July 2002, women attending publicly funded family planning clinics in Pennsylvania were enrolled in an 18-month longitudinal study. Half attended clinics with a policy of offering emergency contraception in advance; the remainder had only emergent access to the drug. After providing baseline data, women completed monthly automated phone surveys about recent sexual activity, contraceptive use and attitudes toward pregnancy. Characteristics associated with recent use of emergency contraception were examined using multivariate logistic regression.*

RESULTS: *Responses to 3,700 phone surveys from 729 women showed that 25% of those who attended clinics offering advance access used emergency contraception at least once during the study, compared with 8% who attended emergent access clinics. Women attending advance access clinics had significantly elevated odds of having used emergency contraception in the past month (odds ratio, 2.6). Other characteristics positively associated with the likelihood of recent emergency contraception use were familiarity with the drug, having a new sex partner and having unprotected sex at least once (2.0 each); negative feelings toward pregnancy (1.4); and using condoms as one's main contraceptive method (1.8).*

CONCLUSIONS: *In addition to discussing and offering advance emergency contraception, providers should further explore specific behaviors and attitudes associated with emergency contraception use.*

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Making emergency contraception available in advance of need enables it to be used as soon as possible after unprotected sex, when it is most effective. Prospective randomized controlled studies in the United States,[1–5] the United Kingdom[6] and China[7,8] have shown that advance provision is associated with greater use of emergency contraception when needed, without adversely affecting other contraceptive use or sexual risk-taking. However, studies found that even with advance provision and among women who frequently had unprotected sex, emergency contraception use was an uncommon event. These studies are not completely generalizable, since they examined specific subpopulations (e.g., adolescents, adults younger than 25,[1,3,4] condom users,[7] postpartum women,[2,8] and women recruited after having used emergency contraception or having had an induced abortion[6]). Furthermore, most did not offer unlimited advance provision or replenish supplies of emergency contraception. Hypotheses of why the drug was not used more often included women's underestimation of their pregnancy risk and lack of education about emergency contraception, but little is known about what influences women to use or not use emergency contraception.

We conducted an observational (prospective cohort) study to provide further insight into the personal characteristics, behaviors and events that may be associated with women's use of emergency contraception. Prospective cohort studies provide valid alternative information to randomized controlled trials and overcome limitations such as limited generalizability, placebo effects and problems with intention-to-treat analysis.[9] The primary goal of this article is to analyze data collected at publicly funded clinics in the United States to determine the association between the recent use of emergency contraception and specific characteristics—particularly whether the policy of each participant's clinic was to provide access to emergency contraception in advance or only during emergency visits (for immediate use), but also environmental, situational and behavioral characteristics. Information from this study should help to guide efforts to increase emergency contraception use when needed.

METHODS

Study Design

This was a multisite prospective study of two cohorts of women attending Title X–funded family planning clinics in Pennsylvania. The clinics were located in a variety of urban, suburban and rural areas in the state. They were chosen according to two criteria: willingness to participate in the study and having a large client pool. Women

were eligible to enroll if they indicated a possible need for emergency contraception in the next 12 months—i.e., they were between the ages of 15 and 39, were sexually active (or planned to be in the next 12 months), were not pregnant or trying to become pregnant in the next 12 months, were not sterilized, did not have a partner who was sterilized and were not using a contraceptive implant or IUD.

One cohort was recruited from four clinics in southeastern Pennsylvania (Philadelphia and four adjacent suburban counties), where all Title X–funded clinics have a written policy to provide education about emergency contraception and offer the drug in advance of need to all eligible clients, as well as during emergent visits to the clinic. These women were not given emergency contraception at enrollment; fewer than half recalled having been offered emergency contraception during previous clinic visits. By contrast, in prior studies[1–8] on advance provision of emergency contraception, all participants were generally given the drug at the start of the study.

The second cohort was from five clinics in western Pennsylvania (predominantly Pittsburgh and Erie). Title X–funded clinics in this region have a policy of providing education about and offering to provide emergency contraception only on an emergent basis through either a visit to a clinic or a prescription call to a local pharmacy (for current clinic clients). A few of the women in this cohort recalled having been offered advance access to emergency contraception during a previous clinic visit.

Our study aimed to test whether women attending clinics with an advance access policy were more likely to have used emergency contraception than women attending clinics with an emergent access policy, and to identify environmental, situational and behavioral characteristics associated with use.[10] The study was approved by the institutional review boards of the Family Health Council (via the University of Pittsburgh), the Family Planning Council and the Planned Parenthood Federation of America.

Data Collection

Between June 2001 and July 2002, informed consent was obtained from potential participants and data were collected using a screener survey and an intake survey; monthly automated phone surveys continued through March 2004. All surveys were conducted in English. The monthly phone survey methodology was modeled on the experience sampling method, which repeatedly collects self-reported behavioral data over a representative sample of time in a participant's life.[11] Monthly surveys were deemed appropriate, as menses patterns are good proxies for such reproductive-related events as pregnancy status, sexual activity and emergency contraception use. Survey design and implementation procedures were identical in the two regions. Interviewers from both regions attended training for a day and a half on how to recruit potential participants, obtain informed consent, conduct in-person and telephone interviews, and perform scheduling and follow-up activities.

•*Screener and intake surveys.* Interviewers approached potentially eligible women in clinic waiting rooms, described the project and invited the women to participate. Women completed a self-administered screener survey to determine eligibility. This survey consisted of 10 closed-ended questions and collected basic demographic information and reproductive health data (e.g., pregnancy intentions, sexual activity, contraceptive use and familiarity with emergency contraception). The interviewers then administered the intake survey to all eligible women. All but two of the 26 intake questions were closed-ended. The survey collected information about participants' demographic characteristics (marital and partnership status, importance of religion, education and occupation); sexual activity (including unprotected intercourse); opinions about becoming pregnant in the next year; contraceptive history; and attitudes toward, knowledge of and use of emergency contraception. Data from both surveys were combined into a single baseline data set for analytic purposes.

•*Monthly automated phone survey.* At recruitment, participants were given a pager and free service to allow the research team to remind them of future surveys. Interviewers trained the participants in the use of the pager and the telephone interactive voice response system used to collect survey data, STAR. Participants were signaled by their pager to call the automated telephone survey service on a monthly basis for 18 months.

The survey consisted of 18 female-recorded, closed-ended questions that were developed and validated by the research team. These questions asked about the participants' sexual activity and contraceptive use in the past 30 days (including reasons for use or nonuse of emergency contraception), as well as partnership and pregnancy status. Participants indicated their responses using the telephone keypad. The survey company generated automatic monthly logs of participants' response data and indicated which women completed the monthly survey and the date of their responses. This enabled the research team to follow up with participants who did not respond to their pager reminders. Women who failed to respond to more than three consecutive pages had their pager service discontinued. The number of days between phone surveys was categorized by 30-day (one-month) intervals; thus, for instance, a call made 45 days after the previous call was counted as occurring two months (one "month" of 30 days, plus 15 days) later.

•*Sample.* A total of 1,938 women were screened; of these, 1,094 were enrolled, and the remainder either were ineligible or refused to participate because they were not interested or too busy. Women who were eligible but did not enroll did not differ in terms of their familiarity with emergency contraception from those who did enroll. STAR provided data for 5,230 phone surveys. Data for 12 women (47 surveys) were excluded from analyses

because subsequent information indicated that the eligibility criteria had not been met. Logic checks resulted in the exclusion of data from 124 additional phone surveys, including the surveys of three participants who continually provided invalid data (i.e., indicated repeated use of emergency contraception while pregnant), surveys completed either less than 28 days or more than 19 months after recruitment, and multiple surveys completed in one month by a single participant.

Of the 1,082 eligible enrolled participants, 75% completed between one and 18 valid phone surveys (mean, 6.3 per participant), for a total of 5,059 surveys (35% of the possible total); the remaining 25% were lost to follow-up. Loss to follow-up differed according to clinic type: 31% among women from advance access clinics and 19% among those from emergent access clinics ($p<.001$). At baseline, the participants who completed at least one valid phone survey were slightly older than those who completed none (mean age, 23.3 vs. 22.1 years; $p=.002$) and had a higher level of education (36% vs. 28% had some postsecondary education; $p=.002$). No other baseline variables (including past emergency contraception use) differed between responding and nonresponding participants.

In 1,359 phone surveys, participants indicated that they had not been sexually active in the previous month; because these women could not have been in a position to need emergency contraception, they were excluded from subsequent analyses. Seventy-nine women were thus excluded, leaving 729 women and their 3,700 phone surveys eligible for analysis. Statistically indistinguishable proportions of women who did and did not report use of emergency contraception in the first survey (59% and 64%, respectively) went on to complete a second phone survey. Thus, missing data for the second survey was not dependent on the value of the outcome variable in the first survey.

Measures

The primary outcome measure—emergency contraception use in the past 30 days—was derived from the question "Have you used emergency contraception in the last 30 days?" and was measured separately for each phone survey. Most independent variables were self-explanatory, but some were modified as follows.

Separate questions asked participants to indicate their race and ethnicity. Responses of American Indian or Alaska native, Asian, native Hawaiian or other Pacific Islander, or more than one race were collapsed into an "other" category. Responses on race and ethnicity were then combined into a single variable; women were categorized as non-Hispanic black, non-Hispanic white, non-Hispanic other and Hispanic.

Possible responses to the question "If you were to get pregnant in the next 12 months, how would you feel?" were "very bad," "bad," "OK," "good," "very good" and "don't know." Responses of "don't know" were considered ambivalent and grouped with "OK" because respondents did not choose good or bad categories. Very few women responded "very good," so they were grouped with those responding "good" to increase the precision of the odds ratio estimates.

The variable determining whether women had been offered emergency contraception was derived from the question "During any previous visit to this clinic, were you offered emergency contraception pills?" Perceived pregnancy probability was measured by the question "What is the chance that you would become pregnant the next time you had sex if you did not use any method of birth control?" The interviewer provided a visual analog scale (resembling a thermometer), on which participants were asked to mark their pregnancy probability on a scale from 0 (no chance) to 100 (certainty). The variable measuring sex without birth control in the past 30 days was constructed as a dichotomous variable from a question that asked the number of unprotected intercourse events in the past 30 days.

Analyses

Power was calculated using the primary outcome, emergency contraception use in the past 30 days. At the outset of the study, the best available published estimate was by Glasier and Baird,[6] who found that 47% of women in their advance access group and 27% of women in their emergent access group used emergency contraception during a one-year follow-up period. However, on the basis of information from family planning providers in each of our study regions, we estimated that only 20% of women in the advance access group and 12% of those in the emergent access group would use emergency contraception at least once over the 18-month study period. Using these estimates, and an alpha set at 5% (two-tailed test), we calculated that a sample size of 375 in each group would result in 85% power to detect a statistically significant difference in emergency contraception use.

Survey data were transferred into SPSS 12.0 for cleaning and preliminary analysis. Stata 6.0 was used for the multivariate analyses. The primary outcome was dichotomous, requiring a logistic model that included specified characteristics believed to be associated with the outcome. However, the model also needed to allow that participants completed different numbers of phone surveys (from one to 18), and that participants' characteristics (e.g., new sexual partner, birth control method used) and emergency contraception use potentially varied over time. Methods that analyze the individual repeated measures are more powerful than methods that collapse the repeated measures into an average measure for each participant.[12,13] The logistic modeling was thus performed using generalized estimating equations, a longitudinal repeated-measures technique that accounts for the potential within-subject correlation (over time) of the outcome, in order to produce valid confidence intervals and p values; this approach can be implemented with

TABLE 1. Percentage distribution of family planning clinic clients in a study of emergency contraception use, by selected baseline characteristics, according to clinic's emergency contraception provision policy, Pennsylvania, 2001–2002

Characteristic	Total (N=729)	Emergent access (N=399)	Advance access (N=330)
Race/ethnicity**			
Non-Hispanic black	46	27	69
Non-Hispanic white	45	65	22
Hispanic	5	4	5
Other	4	5	4
Education**			
<high school	24	22	26
High school/equivalent	40	35	46
>high school	36	43	29
Employment*			
Full-time	28	29	27
Part-time	30	34	26
None	41	37	47
Income from partner**			
Yes	40	32	50
No	60	68	50
Importance of religion**			
Very	37	28	49
Fairly	42	44	39
Not too	13	17	8
Not at all	5	5	4
Missing	3	6	0
Has main partner			
Yes	83	81	85
No	17	19	15
Cohabiting with main partner*			
Yes	27	30	22
No	73	70	78
Ever married			
Yes	15	16	14
No	85	84	86
Ever pregnant***			
Yes	64	56	74
No	36	44	26

Characteristic	Total (N=729)	Emergent access (N=399)	Advance access (N=330)
Feelings about pregnancy in next 12 months			
Very bad	28	25	31
Bad	22	23	22
OK/do not know	38	39	35
Good/very good	13	13	12
Sex in past 30 days			
Yes	77	74	80
No	23	26	20
Sex without birth control (if sexually active)**			
Yes	37	30	45
No	63	70	55
Main birth control method in past 30 days**			
None	13	10	16
Condoms only	18	10	28
Pill	40	47	31
Injectable	26	30	22
Other	4	4	4
Familiar with emergency contraception**			
No	30	33	26
Somewhat	49	55	41
Very	21	12	33
Ever taken emergency contraception**			
Yes	18	10	27
No	82	90	73
Previously offered emergency contraception**			
Yes	21	7	38
No	79	93	62
Previously accepted emergency contraception if offered**			
Yes	86	58	92
No	14	42	8
Total	100	100	100

*p<.05. **p<.001. *Note:* Percentages may not total 100% because of missing data or rounding.

unbalanced data (i.e., when participants have different numbers of observations). Generalized estimating equations are generally valid under the assumption that outcome data are missing completely at random.[14,15]

Both univariate and multivariate models were fitted, and robust variance estimates, odds ratios, confidence intervals and p values were computed. The interpretation of the results is the same as for ordinary logistic regression.

Independent variables in the univariate logistic regressions included questions concerning sexual behavior and birth control use asked in each phone survey, participant age at the time of each phone survey and baseline characteristics unlikely to change over the course of the study (region, race and ethnicity, and having been offered emergency contraception at some time before baseline). Some variables that might change over time (importance of religion, level of education, employment status, receipt of income from partner, having ever been pregnant, perceived probability of getting pregnant and familiarity with emergency contraception) were included at their baseline value. Multivariate analyses included only those independent variables that related to emergency contraception use in the past 30 days at p<.2 in the univariate analyses. Because of a high degree of collinearity between main contraceptive method and contraceptive method used at last sex, only the former was used. No other variables showed collinearity.

RESULTS

Participant Characteristics

At baseline, the mean age of participants in both cohorts was 23 years (standard deviation, 5.5 years); nearly half were younger than 21. Overall, slightly fewer than half of participants (45%) attended clinics with an advance access policy. Almost half of all participants identified themselves as non-Hispanic black, and almost half as non-Hispanic white (Table 1). More than four-fifths of participants had a main partner at baseline, and one-fourth of participants were living with this main partner;

TABLE 2. Percentage distribution of phone surveys in which use of emergency contraception was reported, by selected characteristics of the episode of use

Characteristic	% (N=159)
Reason for use	
No birth control	55
Method problem	28
Condom broke/slipped	16
Pill missed	8
Late for injectable	4
Other	14
Missing	3
Source of emergency contraception	
Clinic/doctor/nurse visited before	70
New clinic/doctor/nurse	11
Drugstore	2
Other	14
Missing	3
Timing of use (days after unprotected sex)	
≤1	72
2–3	15
>3	5
Missing	8
Side effects	
Yes	32
No	68
Type of side effect†	
Nausea	53
Vomiting	18
Menstrual changes	16
Headache	10
Other	2
Total	100

†Based on those reporting any side effect. *Note:* Percentages may not total 100% because of rounding.

only a small proportion had ever been married. Nearly two-thirds of participants had ever been pregnant. Participants perceived a median 50% chance that they would become pregnant the next time they had vaginal intercourse without using birth control (not shown), and half of all participants felt that becoming pregnant in the next year would be "bad" or "very bad." About a third of sexually active participants had had unprotected sex in the 30 days before baseline, and they had done so a median of three times (not shown).

The most popular birth control methods were the pill and depot medroxyprogesterone acetate (the injectable); 24% of participants used more than one method (68% of these reported using condoms and the pill; not shown). Although more than two-thirds of participants reported that they were "very" or "somewhat" familiar with emergency contraception, fewer than one-fifth had previously taken it. Among those participants, the median number of times they had used emergency contraception was one (not shown). When asked how long after unprotected vaginal intercourse emergency contraception remains effective, nearly half of participants correctly indicated 72 hours, a third said 24 hours or less and a quarter reported that they did not know (not shown). Despite the written policy of the clinics, only 38% of women attending the advance access clinics recalled clinic staff's offering them emergency contraception at a previous visit, while 7% at emergent access clinics recalled such an offer (Table 1). Among participants who reported having been offered emergency contraception, 86% had accepted the pills.

Emergency Contraception Use

Unprotected sex in the past 30 days was reported in 45% of the phone surveys, but emergency contraception use in the past 30 days was reported in only 4% (159 surveys). In all, 113 women (16% of the total) reported recent emergency contraception use in at least one phone survey (25% of participants attending advance access clinics and 8% of participants attending emergent access clinics). Of these 113 participants, 69% reported using emergency contraception in one survey only, 22% in two surveys, 8% in three surveys and 1% in four surveys. Of the 159 occasions of emergency contraception use, 20 were in consecutive months.

Participants who reported having used emergency contraception in the past 30 days were asked why they had used it (Table 2). In slightly more than half of the occasions on which emergency contraception was used, women cited the reason that no birth control method had been used during sex.

In nearly three in 10 cases, the cited reason was a problem with the birth control method used (in more than half of these cases, a condom either slipped off or broke). In nearly three-quarters of the occasions on which emergency contraception was used, the drug had been obtained from a clinic, doctor or nurse the woman had previously visited. Nearly every instance of use had occurred within 72 hours of unprotected intercourse; three-quarters had occurred within 24 hours. Side effects, the most common of which was nausea, were noted in approximately one-third of instances of emergency contraception use.

A total of 1,549 surveys reported unprotected sex in the past 30 days but did not report emergency contraception use. Reasons given for not having used emergency contraception included that the participant "believed [she] could not get pregnant" (26%), "wanted to get pregnant" (10%), "couldn't get emergency contraception" (10%) or was "opposed to emergency contraception" (10%); 44% of cases were due to an unspecified reason (not shown).

Characteristics Associated with Use

In univariate logistic regression analyses, baseline characteristics significantly associated with an increased likelihood of emergency contraception use in the past 30 days included reporting "other" race or ethnicity (as opposed to non-Hispanic black), receiving income from a partner and having been offered advance emergency contraception at a previous clinic visit (Table 3). Additionally, the likelihood of having used emergency contraception in the

TABLE 3. Percentage of phone surveys in which use of emergency contraception in the past 30 days was reported, by participant characteristics

Characteristic	%
Clinic's emergency contraception access policy	
Advance	8***
Emergent	2
Age at time of survey†	
15–20	5
21–29	4
30–41	5
Race/ethnicity‡	
Non-Hispanic black	7
Non-Hispanic white	2***
Hispanic	4
Other	12*
χ^2=46.0***	
Importance of religion‡,§	
Very	7
Fairly	3
Not too	3
Not at all	4
χ^2=7.3**	
Education‡,§	
<high school	6
High school/equivalent	4
>high school	3
χ^2=5.7*	
Employment‡,§	
Full-time	3
Part-time	4
None	6
χ^2=6.2*	
Income from partner‡	
Yes	5*
No	4
Ever pregnant‡	
Yes	5
No	4

Characteristic	%
Perceived pregnancy probability†,‡	
0–33%	3
34–67%	3
68–100%	7
χ^2=12.0**	
Familiar with emergency contraception‡,§	
Not	3
Somewhat	3
Very	10
χ^2=15.6***	
Emergency contraception offered at previous visit‡	
Yes	7***
No	4
Main partner in past 30 days	
Yes	4
No	5
New partner in past 30 days	
Yes	10**
No	4
Sex without birth control in past 30 days	
Yes	6***
No	3
Main birth control method in past 30 days	
None	5
Pill	3
Condom	7
Injectable	3
Other	5
χ^2=11.5*	
Feelings about pregnancy in next 12 months§	
Good/very good	1
OK/do not know	3
Bad	5
Very bad	6
χ^2=15.2***	

*p<.05. **p<.01. ***p<.001. †Measured as a continuous variable in the multivariate analysis. ‡Data from intake survey. §Measured as an ordered categorical variable in the multivariate analysis. *Notes:* Non-Hispanic black is the reference group for the race/ethnicity category. Significance levels are results of univariate logistic regression.

past 30 days increased as the importance of religion, perceived pregnancy probability and familiarity with emergency contraception at baseline increased. The lower participants' baseline level of education and employment status, the higher their chances of having used the drug. Age and having a main partner were not significantly associated with emergency contraception use.

Characteristics measured in the phone surveys (each pertaining to the 30 days prior to the survey) that were associated with an increased likelihood of emergency contraception use in the past 30 days included attending an advance access clinic, having a new sex partner and having sex without using birth control; increasingly negative feelings about becoming pregnant in the next 12 months were associated with increasing chances of having used emergency contraception. Birth control method used in the previous month and at last sex varied significantly in relation to emergency contraception use: Pill and injectable users were less likely to use emergency contraception than were condom users (p<.01; not shown). Compared with women who used no precoital contraceptive method, condom users were more likely and pill or injectable users were no less likely to use emergency contraception.

In a cross-tabulation of contraceptive methods and unprotected sex, 52% of surveys in which participants reported condoms as their main contraceptive method indicated at least one occasion of sex without birth control in the past 30 days, compared with 24% of surveys in which participants reported the pill or the injectable as their main method (not shown). Having had sex without birth control was not significantly associated with a lower perceived risk of getting pregnant.

Most demographic characteristics that were associated with emergency contraception use in the univariate analyses were no longer significantly associated with emergency contraception use in the multivariate analyses. Surveys from participants who attended clinics with an advance access policy remained more likely to indicate recent emergency contraception use than

TABLE 4. Odds ratios (and 95% confidence intervals) from logistic regression analyses assessing associations between emergency contraception use and selected participant characteristics

Characteristic	Odds ratio
Clinic's emergency contraception access policy	
Advance	2.63 (1.44–4.81)**
Emergent (ref)	1.00
Race/ethnicity†	
Non-Hispanic black (ref)	1.00
Non-Hispanic white	0.65 (0.35–1.20)
Hispanic	0.84 (0.32–2.18)
Other	4.59 (2.30–9.16)***
Importance of religion†,‡	0.81 (0.56–1.18)
Education†,‡	0.70 (0.49–1.01)
Employment†,‡	1.17 (0.89–1.54)
Income from partner†	
Yes	1.37 (0.89–2.13)
No (ref)	1.00
Perceived pregnancy probability†,§	1.01 (1.00–1.02)
Familiar with emergency contraception†,‡	1.97 (1.37–2.85)***
Previously offered emergency contraception†	
Yes	0.78 (0.44–1.32)
No (ref)	1.00
New partner in past 30 days	
Yes	2.03 (1.19–3.47)**
No (ref)	1.00
Sex without birth control in past 30 days	
Yes	2.00 (1.22–3.23)**
No (ref)	1.00
Main birth control method in past 30 days	
None (ref)	1.00
Pill	1.36 (0.70–2.40)
Condom	1.83 (1.09–3.07)*
Injectable	0.99 (0.45–2.18)
Other	1.11 (0.34–3.58)
Feelings about pregnancy in next 12 months‡	1.35 (1.12–1.61)**

*p<.05. **p<.01. ***p<.001. †Data from intake survey. ‡Ordered categorical variable. For a complete list of categories, see Table 3, page 163. §Continuous variable. *Note:* ref=reference group.

surveys from participants using clinics with an emergent access policy (odds ratio, 2.6; Table 4). Not surprisingly, surveys in which participants reported not having used birth control at each instance of intercourse in the past 30 days were more likely to report emergency contraception use that month than those reporting consistent contraceptive use (2.0). Other characteristics associated with emergency contraception use in the past 30 days included "other" race and ethnicity, compared with non-Hispanic black identity (4.6); having a new sex partner in the past 30 days (2.0); and using condoms, as opposed to no method, as a main birth control method in the past 30 days (1.8). The higher the baseline familiarity with emergency contraception and the more negative women felt about becoming pregnant in the next 12 months, the higher the likelihood of emergency contraception use in the past 30 days (2.0 and 1.4, respectively).

DISCUSSION

In this study, even after measured possible confounding influences were taken into account, women attending clinics with a policy to provide emergency contraception in advance of need were more likely to report emergency contraception use in a given monthly survey than were women who attended clinics providing the drug only on an emergent basis. Most demographic characteristics were not associated with emergency contraception use, but reproductive behavior and attitudes were significant.

Having sex without birth control at least once in the past 30 days was associated with emergency contraception use within the same time period. Unprotected sex in the past 30 days was reported in 45% of surveys. Other studies have indicated high proportions of participants reporting unprotected sex (40%[4]) or unprotected sex and withdrawal combined (54%[5]). Raine et al.[4] showed that in their advance provision group, emergency contraception use was twice as likely among women who reported unprotected sex as among others. Like Raine et al.[4] and Walsh and Frezieres,[5] we found that only a small proportion of women used emergency contraception more than once, even though unprotected sex was common.

It has been suggested[16] that nonuse of emergency contraception despite advance access may be due to women's underestimating the risk of unintended pregnancy and thereby their need for emergency contraception. However, in this study, perceived risk of pregnancy was not related to frequency of unprotected sex or to use of emergency contraception. Women with no main birth control method—who are assumed to be at high risk of unintended pregnancy—were less likely to use emergency contraception than were those who used condoms as their main method. That 44% of surveys from women who had had unprotected sex gave no clear reason for nonuse of emergency contraception suggests a degree of ambivalence about pregnancy prevention.

Published rates of emergency contraception use vary. In Scotland, Glasier and Baird[6] estimated that 47% of women given emergency contraception at study initiation and 27% of those who were given the drug on an emergent basis used it in a one-year period. In California, Raine et al.[4] found use rates over a six-month period to be 37% and 21%, respectively; Walsh and Frezieres[5] found rates of 19% and 12%, respectively, after 3–9 months. Gold et al.,[3] who studied women aged 15–20 in Pittsburgh, found that 17% of their advance access group and 13% of their controls used emergency contraception over six months. In our study, 25% of women attending clinics with an advance access policy and 8% of those attending clinics with an emergent access policy used emergency contraception (over a maximum of 18 months). Differences in three important baseline characteristics may explain why we observed a lower level of use than Raine et al.[4]: Our cohort had a lower level of previous emergency contraception use (18% vs. 35%) and condom-only

use (18% vs. 47%), and higher levels of injectable use (26% vs. none). Levels of past use of emergency contraception and condom-only use were also higher in Glasier and Baird's study (60% and 72%) than in ours.

Like some previous researchers,[17] but not others,[5] we found that younger women were no more likely than older women to report emergency contraception use. Women with a main partner were as likely as those without a main partner to have used emergency contraception in the past 30 days. Having a new partner was associated with increased odds of recent emergency contraception use; further research should explore whether this association reflects shifts in, for example, contraceptive use, pregnancy goals and partner communication when relationship status changes. In addition, most studies of emergency contraception use have looked at the effect of advance provision on subsequent contraceptive use, not the relationship between prior use of contraceptives and emergency contraception use. We found that prior condom use was associated with an increased likelihood of emergency contraception use in the past 30 days, although two other studies[1,3] that used a simple multivariate model did not find this association to be statistically significant.

Limitations

The study design eliminated many, but not all, forms of systematic bias. Women were recruited by convenience sampling at specified family planning clinics in each region. We do not know whether selection was independent of emergency contraception use during the study period, but this potential for bias was present for both cohorts and likely nondifferential. In addition, reported familiarity with emergency contraception (strongly associated with use in the past 30 days) did not differ between eligible women who enrolled in the study and those who did not. Participation in the phone surveys was a moderately high 75% and did not differ by past use of emergency contraception, but it was lower among women attending advance access clinics than among those who went to emergent access clinics. We suspect that the difference we observed in emergency contraception use by clinic policy would have been greater if all women had participated in the phone survey.

Emergency contraception use in the past 30 days was self-reported, but not verified medically, so it is possible that women misreported use. However, given both the method's side effects and the controversy surrounding its use, women are unlikely to forget having taken the drug, making respondent bias unlikely. Even if such bias existed, there is no reason to believe it would have differed by emergency contraception access policy. It is also unlikely that use was either underreported or overreported because of the relatively low survey completion rate (35%), as emergency contraception users in the first month were no more likely than nonusers to skip the second month's survey.

The two study regions were selected because they had differing policies pertaining to emergency contraception access, not because they were different in themselves. However, unmeasured differences between southeastern and western Pennsylvania in participants' attitudes and norms that could influence sexual behavior may confound the association between access policy and emergency contraception use. In addition, seven possible confounders, controlled for in the multivariate logistic regression model, were measured only at baseline, although their values may have changed over the nearly 19 months of the survey. For example, a woman unfamiliar with emergency contraception at baseline would have learned what it was simply by participating in the study, although we did not dispense any information on the drug's use and effects. Thus, these confounders may have been misclassified. However, we cannot know whether any changes in these characteristics varied by access policy or by emergency contraception use in the past 30 days; therefore, we do not know the direction of any potential bias.

Only 38% of eligible women attending advance access clinics recalled ever having been offered emergency contraception, compared with an expected outcome of 100%. At the same time, 7% of women attending emergent access clinics recalled ever having been offered it (when not requesting it for immediate use) in the past, compared with an expected outcome of 0%. Were this measure the "gold standard" for assessing exposure to emergency contraception access in this study, exposure would have been differentially misclassified, and our odds ratio estimates would have been biased in an unknown direction. However, women were chosen for participation on the basis of the written policy of the family planning clinics in their region, not whether they were actually offered emergency contraception on any prior visit, so exposure was not misclassified. While the rate of emergency contraception use among women attending clinics with a written policy of advance provision likely varies with the consistency of policy implementation, measuring those variations was not the goal of this study. In addition to decisions or omissions on the part of individual clinic providers, possible reasons for reported deviations from written clinic policies are that participants may have forgotten instances of having been offered the drug or confused having been "offered emergency contraception" with having "talked about it" (or confused having been "offered emergency contraception" with having been "given emergency contraception at an emergent visit"). Further investigations of the variations in clinic emergency contraception policy and practice are under way.

Conclusions

In conjunction with improved rates of effective contraceptive counseling and risk reduction behavior, the effective use, promotion and increased availability of emergency contraception are essential if emergency contraception is to reduce unintended pregnancy. Though advance provision of emergency contraception has had no impact on abortion rates in the United Kingdom,[16] one

U.S. study estimated that 51,000 abortions were prevented by emergency contraception use in 2000 alone.[18] Given the drug's potential for helping women achieve their reproductive goals, we suggest that women would benefit from continued promotion and evaluation of access to emergency contraception in U.S. clinics and pharmacies. Our study indicates that clinic policies promoting advance access to the drug are influential.

In addition, our study found that familiarity with emergency contraception was associated with increased likelihood of use, regardless of whether women had been offered emergency contraception in advance. Therefore, client education in all clinic environments and during every clinic visit is important to ensuring that women have the knowledge they need when they need it. This will continue to be important now that emergency contraception has over-the-counter availability for adults. When discussing emergency contraception with clients, clinic staff should probe for characteristics associated with a higher likelihood of use, such as having a new partner, having unprotected sex, using condoms as the main birth control method and not wanting to become pregnant in the next 12 months.

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