The Effect of Increased Access to Emergency Contraception Among Young Adolescents

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Objectives: The United States Food and Drug Administration cited an absence of data on young adolescents as the reason the emergency contraceptive, Plan B, could not be moved over-the-counter. This study analyzed data on young adolescents with increased access to emergency contraception.

Methods: We conducted an age-stratified analysis with previously published data from a randomized, controlled trial of Plan B with a sample size of 2,117, including 964 adolescents, 90 of whom were aged younger than 16 years. Participants were randomly assigned to nonprescription pharmacy access, advance provision of 3 packs, or clinic access (control). We measured contraceptive and sexual risk behaviors at baseline and 6-month follow-up and tested for pregnancy and sexually transmitted infections. We used contingency table and logistic regression analysis to measure the effect of the intervention on risk behaviors in young adolescents (< 16 years), compared with middle adolescents (16–17 years), older adolescents (18–19 years), and adults (20–24 years).

Results: Adolescents aged younger than 16 years behaved no differently in response to increased access to emergency contraception (EC) from the other age groups. As with adults, EC use was greater among adolescents in advance provision than in clinic access (44% compared with 29%; $P \leq .001$), and other behaviors were unchanged by study arm, including unprotected intercourse, condom use, sexually transmitted infection acquisition, or pregnancy. Additionally, adolescents with increased access to EC did not become more vulnerable to unwanted sexual activity.

Conclusion: Young adolescents with improved access to EC used the method more frequently when needed, but did not compromise their use of routine contraception nor increase their sexual risk behavior.

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Level of Evidence: I

The United States Food and Drug Administration (FDA) cited an absence of data on adolescents aged younger than 16 years as the reason that the emergency contraceptive, Plan B, could not be moved to over-the-counter status. The FDA decision ran counter to the recommendations of the expert scientific advisory committees reviewing the data.[1] The American Medical Association and the American College of Obstetricians and Gynecologists, have publicly endorsed over-the-counter access to emergency contraception (EC) for all women (Foubister V. OTC emergency contraceptives pushed, but not imminent. American Medical News 2001. Available at: www.amednews.com/2001/prsc0305. Accessed July 15, 2005; American College of Obstetricians and Gynecologists (2001). ACOG supports safety and availability of over-the-counter emergency contraception [ACOG news release]. Available at: http://www.acog.org/from_home/publications/press_releases/nr02-28-01-2.cfm. Accessed June 30, 2005). Furthermore, the Society for Adolescent Medicine does not place an age limit on access to emergency contraception.[2]

Adolescents are an important target group for improving access to all forms of contraceptives, including emergency contraception, given their high

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rate of unintended pregnancy. Although adolescent pregnancy rates in the United States have declined over the last decade, they remain a significant public health concern. Pregnancy rates, as well as rates of sexually transmitted infection (STI) are higher in the United States than in comparable countries, such as Canada, England, or France.[3,4] In the year 2000, just over 820,000 women aged 15 to 19 years became pregnant, and almost 30% of these pregnancies resulted in abortion.[5] More than half of adolescents have had intercourse by the age of 17 years,[6] and most adolescent pregnancies are unintended.

In France, EC is available to adolescents for free without a prescription at pharmacies and is also dispensed by school nurses in junior and senior high schools, and in the United Kingdom, EC is available to women aged older than 16 years without a prescription.[7,8] In the United States 6 states allow pharmacy access to EC (Alaska, California, Hawaii, Maine, New Mexico, and Washington). A small study in Washington state of adolescents who received EC directly from a pharmacist showed that they were very satisfied with the pharmacy service; only 58% of the adolescents stated they would see a doctor if they could not get EC from the pharmacist.[9] However, all pharmacists may not be equipped to dispense contraceptives to adolescents while respecting confidentiality. One study found that pharmacists' attitudes and practices toward adolescents, particularly the younger adolescents, jeopardized access and confidentiality.[10]

Increased access to emergency contraception remains controversial, especially for adolescents. Policy makers have asked about the implications for risky sexual behavior and use of routine contraception. While adolescents have been included in studies on advance provision of EC that show these fears to be unfounded, none of the studies tested for age differences between adolescents and adults.[11–13] There were a few adolescent studies on advance provision and contraceptive behaviors, which reached similar conclusions as the studies on adults.[14–16] However, the studies did not measure the impact on young adolescents (younger than age 16), they had relatively small samples and high attrition rates, and provided only 1 course of EC, so are difficult to extrapolate to an over-the-counter situation. Opponents to EC have begun to speculate that it will be used as a new date rape drug. The existing literature on young adolescents and EC is scarce, and no studies have provided evidence of the effect of increased access to EC on unwanted sexual activity.

A large randomized, controlled trial of 2,117 young women in the United States recently showed that sexual behavior did not become more risky among those with increased access to EC, from either direct pharmacy access or advance provision of 3 packets.[17] In this article, we present the data on the adolescent participants from that trial, focusing on those aged younger than 16 years. We examined the influence of young age on use of emergency contraception and sexual risk-taking and address concerns that have been raised in policy decisions. The question that remains unanswered in the literature is whether young adolescents are any different in their response to increased access to EC from older adolescents and adult women. This question is important to address to inform policy decisions on access to emergency contraception.

MATERIALS AND METHODS

Adolescents comprised 45.5% (n = 964) of the full sample of the study. Participants were recruited from 4 clinics in the San Francisco Bay Area from 2001 to 2003. The study was approved by The Committee on Human Research at the University of California, San Francisco and by The Planned Parenthood Federation of America. The methods, including study participants, randomization, procedures, and flow chart are described in full elsewhere.[17] Briefly, women who were not pregnant and did not wish to become pregnant, and were using oral contraceptives, condoms, or other barriers or no method were eligible to participate. Women requesting EC or who had unprotected intercourse in the past 3 days were ineligible.

Participants were randomized into 1 of 3 study groups with different access to emergency contraception: pharmacy access, advance provision, or clinic access (control). A screening eligibility form was administered to all age-eligible women at the participating clinic sites. Eligible participants were given a urine test for pregnancy (Clearview One Step, Unipath Diagnostics, Waltham, MA, or equivalent) and for *Chlamydia* (BD ProbeTec, Becton Dickinson & Co., Sparks, MD). They also gave a finger stick sample of whole blood to test for herpes simplex virus type 2 (HSV-2) (POCkit HSV-2 Rapid Test, Diagnology Inc, Dublin, Ireland). All participants completed a survey, administered by research assistants, with items on sociodemographics, contraception, and sexual behavior. Participants were randomly assigned to groups and given identical-looking boxes. For the pharmacy group, the box contained a card explaining how to get EC directly from the pharmacy without a prescription. The cards listed the addresses of 13 pharmacies close to the clinic sites, including 2 24-hour stores. Trained pharmacists at the stores dispensed EC to study participants for free, as well as pamphlets on STIs and contraception. The advance provision group received 3 packets of Plan B emer-

gency contraception. The clinic access group received a card telling them to return to the clinic if they needed EC, where they would have access to EC according to standard clinic protocol. In 6 months, the participants returned for follow-up visits, and again had a urine test for pregnancy and *Chlamydia* and a finger stick blood sample for HSV-2. Participants completed a follow-up questionnaire with items measuring EC use, unprotected intercourse, use of routine contraception and sexual behaviors. We also reviewed medical charts for positive test results on pregnancies and STIs during the study period.

Although the overall study was powered to detect differences in pregnancy between advance provision and clinic access in the full sample, we calculated that within the adolescent sample, using a 2–tailed test, we had a power of 86% to detect a difference in EC use between the advance provision group (n = 379) and the clinic group (n = 142), with an alpha of 0.05 and a 2–sample comparison of proportions. Among adolescents, use in advance provision was 44% and in clinic access 29%.

We measured a series of outcome variables at follow-up to assess our hypothesis that adolescent contraceptive and risk behaviors were affected no differently by the intervention from adult behaviors. We included the set of variables already reported on the full sample[17] as a reference point for comparison with the adolescents, but for this analysis we also included additional measures that had particular relevance for young adolescents. The first set of measures intended for comparison with published results included use of EC (yes, no); repeat use of EC (yes, no); unprotected intercourse (yes, no); consistent condom use, ie, used a condom at every act at enrollment and follow-up (yes, no); contraceptive method (none, condom, hormonal, dual use of hormonal plus condom); more than 1 sexual partner (yes, no); STI acquisition (yes, no); pregnancy (yes, no). The measures that we selected specially for the adolescent anayses were whether they were able to take the EC regimen correctly, ie, took the 2nd pill (yes, no); and whether their ability to prevent unwanted sexual activity was compromised, including whether they were pressured into sex (yes, no) or were threatened into sex (yes, no). For the adolescents, we also examined whether their predictions at baseline about their own sexual risk behavior in response to the intervention (whether participants thought they would have more unprotected intercourse if they had increased access to EC) were in fact accurate at follow-up.

Our predictor variables were age group (young adolescents aged < 16 years, middle adolescents aged 16–17 years, older adolescents aged 18–19 years, adults aged 20–24 years) and type of access to EC (pharmacy access, advance provision, clinic access). The measures came from questionnaire items, whereas the STI and pregnancy measures included test results and diagnoses from medical record reviews.

We used modified intent-to-treat analysis on participants completing the study. In the first stage of the analysis, we presented the data for each outcome and age group by intervention arm. We measured the effect of the intervention on each outcome among the adolescents (aged 15–19 years) using contingency table analysis and χ^2 statistics, and for comparative purposes, we also measured the effect of the intervention on the adult participants (20–24 years). We tested for differences in outcomes between participants in the advance provision group and those in the clinic access group, and we compared those in pharmacy access to those in clinic access.

In the second stage of the analysis, we tested whether the intervention had a differential effect on the youngest group of adolescents (< 16 years of age) using logistic regression analysis on a series of outcome variables. To test whether access to multiple packs of EC had a differential effect for that age group, we included interaction terms of the youngest adolescents (under age 16) with the advance provision treatment group. A significant interaction term means that the intervention has a different effect for the youngest adolescents on the outcome measured. If the interaction term is not significant, then the intervention has a similar effect on the youngest adolescents as it does on the other age groups for the outcome measured. The logistic regression analysis was performed on the following outcomes: EC use, unprotected intercourse, consistent condom use, multiple sexual partners, STI acquisition and pregnancy. Included in the model were main effects for age group (< 16 years, 16–17 years, 18–19 years, 20–24 years), treatment group (advance provision, pharmacy access, clinic access) and an interaction variable to test the effect of the advance provision treatment specifically for the youngest adolescents (< 16 years). We also measured the effect of advance provision for all adolescents (aged 15–19 years) compared with adults. We included tests for pharmacy and clinic access, but found no differences and did not present results. We did not correct for multiple comparisons in the results presented. However, we conducted all analyses with Bonferroni corrections to ensure consistency with the results presented. Results are reported in odds ratios (ORs) with *P* values. The significance level was set at 0.049 rather than 0.050 because an interim analysis was performed on the data, according to Fleming et al.[18]

RESULTS

Adolescent participants ranged in age from 15 to 19 years, with a mean age of 17.4 years. Ninety participants were aged 15 years, 166 aged 16 years, 227 aged 17 years, 230 aged 18 years, and 251 aged 19 years. The sample was of diverse racial and ethnic background, and 20% of adolescents had used EC in the past 6 months (Table 1). The mean age of first intercourse was 15.3 years (± 1.5 years), and 24% had previously experienced pregnancy. At enrollment, 24% reported a history of STIs or tested positive for *Chlamydia* or HSV-2. Although 37% reported a strong desire to avoid pregnancy, 52% reported having unprotected intercourse in the past 6 months. The condom was the most frequently used contraceptive method (59%), with the youngest adolescents, aged 15 years, more likely to report relying solely on condoms (76%) than the middle adolescents aged 16–17 years (64%) or the older ones (52%).

Of the 964 enrolled adolescents, 93% (n = 893) completed the study. The pharmacy access arm had 372 adolescent participants, advance provision 379, and clinic access 142; there was no difference in proportion of participants lost to follow-up by study arm. An attrition analysis showed those adolescents who completed follow-up were no different from all adolescents in age, race and ethnicity, contraceptive method, use of EC, history of pregnancy, or STIs.

During the course of the study, 36% (n = 320) of all adolescents used emergency contraception, with a significantly higher proportion reporting use in the advance provision group than in clinic or pharmacy access (44%, 29%, and 30% respectively; $P \leq .001$). In general, use among the youngest adolescents (38%) was the same as the middle group (38%), and slightly higher than the older adolescents aged 18–19 years (33%). Adult participants aged 20–24 years had lower levels of overall use (24%) (Table 2). Nevertheless, the effect of the intervention was similar among adolescents and adults, with a positive effect for advance provision and no difference between pharmacy and clinic access. Logistic regression results of EC use show lower levels among adults, but a similar effect of the intervention: the significant main effects on EC use for adult age group (OR = 0.50; $P < .001$) shows lower use levels among the adults, whereas the nonsignificant interaction term for youngest adolescents and advance provision (OR = 1.41; $P = .468$) shows that the effect of the intervention did not vary for that age group (Table 3).

Sixty-two percent of adolescents who used emergency contraception only used it once, similar to 65% of adults. A logistic regression analysis of those participants who used EC more than once also showed that the overall level of use for adolescents was significantly higher than for adults, but that the effect of the intervention on repeat use did not vary by age.

Table 1. Characteristics of Adolescent Compared With Adult Participants at Enrollment, by Age Group

	Young (< 16 y) (n = 90)	Mid (16-17 y) (n = 393)	Late (18-19 y) (n = 481)	Adults (20-24 y) (n = 1,153)	Adolescent Age Groups *P*	Adolescents Compared With Adults *P*
Race or ethnicity					≤ .001*	≤ .001*
African American	32 (35.6)	94 (23.9)	75 (15.6)	117 (10.2)		
Latina	24 (26.7)	96 (24.4)	106 (22.0)	195 (16.9)		
White	5 (5.6)	71 (18.1)	106 (22.0)	466 (40.4)		
Asian	16 (17.8)	78 (19.8)	137 (28.5)	239 (20.7)		
Multiracial or other	13 (14.4)	54 (13.7)	124 (12.9)	136 (11.8)		
Used EC†	21 (23.3)	85 (21.7)	85 (17.9)	163 (14.2)	0.225	≤ .001*
Mean age at 1st intercourse (y)	14.0 (± 0.9)	15.0 (± 1.3)	15.9 (± 1.6)	16.7 (± 2.3)	≤ .001*	≤ .001*
Contraceptive method					≤ .001*	≤ .001*
Oral contraceptives + condoms	6 (6.7)	48 (12.2)	91 (19.1)	223 (19.4)		
Oral contraceptives	6 (6.7)	60 (15.3)	105 (22.0)	419 (36.5)		
Condoms	68 (76.4)	251 (64.0)	248 (52.0)	430 (37.4)		
None	9 (10.1)	33 (8.4)	33 (6.9)	77 (6.7)		
Unprotected intercourse†	48 (53.3)	198 (50.4)	258 (53.6)	477 (41.4)	.618	≤ 0.001*
Would have more unprotected intercourse with EC available	9 (10.0)	39 (9.9)	27 (5.6)	64 (5.6)	.044‡	0.040*
Ever been pregnant	4 (4.4)	70 (17.8)	154 (32.0)	458 (39.7)	≤ .001*	≤ .001*
Ever had STI	8 (9.1)	52 (13.8)	87 (18.3)	302 (26.5)	.040*	≤ .001‡
Positive STI test at enrollment	5 (5.6)	44 (11.2)	57 (11.9)	145 (12.6)	.211	.266

EC, emergency contraception; STI, sexually transmitted infection.
Values are n (%) or mean (± standard deviation).
* $P \leq .001$.
† In past 6 months.
‡ $P \leq .049$.

Table 2. Contraception and Sexual Risk-taking, by Age: Follow-up Data by Study Group

Outcome Variables	Pharmacy Access	Advance Provision	Clinic Access	Total	Pharmacy Compared With Clinic *P*	Advance Compared With Clinic *P*
Used emergency contraception						
Adolescents 15-19 y (n = 893)*	111 (29.8)	168 (44.3)	41 (28.9)	320 (35.8)	.830	.001†
< 16	8 (23.5)	19 (51.3)	5 (38.5)	32 (38.1)		
16-17	51 (32.9)	74 (47.1)	17 (28.3)	142 (38.2)		
18-19	52 (28.4)	75 (40.5)	19 (27.5)	146 (33.4)		
Adults 20-24 y (n = 1,057)‡	86 (19.5)	141 (31.5)	24 (14.3)	251 (23.8)	.135	≤ .001§
Unprotected intercourse						
Adolescents 15-19 y (n = 892)	147 (39.5)	173 (45.8)	67 (47.2)	387 (43.4)	.115	.773
< 16	13 (38.2)	20 (54.0)	7 (53.8)	40 (47.6)		
16-17	58 (37.4)	74 (47.1)	27 (45.0)	159 (42.7)		
18-19	76 (41.5)	79 (42.9)	33 (47.8)	188 (43.1)		
Adults 20-24 y (n = 1,057)	127 (28.7)	155 (34.7)	60 (35.7)	342 (32.4)	.095	.810
Consistent condom use						
Adolescents 15-19 y (n = 888)	64 (17.2)	63 (16.8)	17 (12.1)	144 (16.2)	.153	.185
< 16	11 (32.3)	12 (32.4)	2 (15.4)	25 (29.8)		
16-17	25 (16.1)	25 (16.0)	11 (18.3)	61 (16.4)		
18-19	28 (15.3)	26 (14.3)	4 (5.9)	58 (13.4)		
Adults 20-24 y (n = 1,051)	46 (10.4)	36 (8.1)	22 (13.2)	104 (9.9)	.343	.057
Pressured into sex						
Adolescents 15-19 y (n = 891)	9 (2.4)	13 (3.4)	5 (3.5)	27 (3.0)	.953	.643
< 16	1 (2.9)	2 (5.4)	0 (0.0)	3 (3.6)		
16-17	3 (1.9)	2 (1.3)	3 (5.1)	8 (2.2)		
18-19	5 (2.7)	9 (4.9)	2 (2.9)	16 (3.8)		
Adults 20-24 y (n = 1,056)	19 (4.3)	15 (3.4)	8 (4.8)	42 (4.0)	.804	.416
More than 1 sexual partner						
Adolescents 15-19 y (n = 892)	91 (24.5)	86 (22.7)	29 (20.4)	206 (23.0)	.326	.578
< 16	9 (26.5)	8 (21.6)	1 (7.8)	18 (21.4)		
16-17	33 (21.4)	39 (24.8)	11 (18.3)	83 (22.4)		
18-19	49 (26.8)	39 (21.1)	17 (24.6)	105 (24.0)		
Adults 20-24 y (n = 1,057)	101 (22.8)	94 (21.0)	30 (17.7)	225 (21.3)	.180	.380
STI acquisition						
Adolescents 15-19 y (n = 893)	53 (14.2)	46 (12.1)	19 (13.4)	118 (13.2)	.808	.702
< 16	8 (23.5)	1 (2.7)	2 (15.4)	11 (13.1)		
16-17	18 (11.6)	22 (14.0)	7 (11.7)	47 (12.6)		
18-19	27 (14.7)	23 (12.4)	10 (14.5)	60 (13.7)		
Adults 20-24 y (n = 1,057)	50 (11.3)	49 (10.9)	19 (11.3)	118 (11.1)	0.999	0.896
Pregnancy						
Adolescents 15-19 y (n = 892)	29 (7.8)	47 (12.4)	14 (9.9)	90 (10.0)	.450	.416
< 16	3 (8.8)	5 (13.5)	4 (30.8)	12 (14.3)		
16-17	11 (7.1)	27 (17.2)	6 (10.0)	44 (11.8)		
18-19	15 (8.2)	15 (8.1)	4 (5.8)	34 (7.8)		
Adults 20-24 y (n = 1,057)	29 (6.6)	19 (4.2)	13 (7.7)	61 (5.8)	.608	.083

STI, sexually transmitted infection.
Values are n (%).
* The *P* values in the row for adolescents are from χ^2 statistics testing for differences in the treatment compared with clinic groups among all adolescents aged15-19 years.
† $P \leq .010$.
‡ The *P* values in the row for adults are from χ^2 statistics testing for differences in the treatment compared with clinic groups among all adults aged 20-24 years.
§ $P \leq .001$.

Fewer than 1% of adolescents reported that they thought it would be very difficult to take EC correctly. Indeed, 93% of adolescents who took EC used it correctly (n = 295), including 95% in the advance provision group (n = 157). Among the participants aged younger than 16 years, 97% (n = 30) reported correct use. Among adults 94% (n = 232) reported correct use.

The large majority of participants at baseline did not think that availability of EC would have an effect on their likelihood of having unprotected intercourse (92%). However, adolescents were significantly more

Table 3. Differential Effect of Emergency Contraception Intervention in Youngest Adolescents: Logistic Regression Analysis of 6 Contraception and Sexual Risk Outcomes

	Emergency Contraception Use	Unprotected Intercourse	Consistent Condom Use	Multiple Sexual Partners	Sexually Transmitted Infection Acquisition	Pregnancy
Main effects						
Age group (y)						
Adolescents						
< 16	0.832 (0.42-1.64)	1.064 (0.57-1.98)	1.829 (0.90-3.70)	0.923 (0.44-1.95)	1.850 (0.85-4.00)	1.347 (0.56-3.23)
16-17*	–	–	–	–	–	–
18-19	0.807 (0.60-1.08)	1.016 (0.77-1.34)	0.785 (0.53-1.16)	1.096 (0.79-1.52)	1.097 (0.73-1.65)	0.631 (0.39-1.01)
Adults 20-24	0.496 (0.38-0.64)†	0.640 (0.50-0.82)†	0.558 (0.40-0.78)‡	0.938 (0.70-1.25)	0.868 (0.60-1.24)	0.456 (0.30-0.69)†
Study group						
Pharmacy access	1.210 (0.88-1.67)	0.729 (0.56-0.95)§	1.083 (0.73-1.61)	1.315 (0.95-1.82)	1.035 (0.69-1.54)	0.804 (0.50-1.30)
Advance provision	2.250 (1.64-3.08)†	0.937 (0.71-1.23)	0.914 (0.61-1.38)	1.183 (0.85-1.65)	1.002 (0.67-1.50)	0.922 (0.57-1.49)
Clinic access*	–	–	–	–	–	–
Age by treatment interaction						
Youngest adolescents by advance provision	1.411 (0.56-3.58)	1.350 (0.55-3.28)	1.455 (0.54-3.89)	1.057 (0.36-3.09)	0.105 (0.01-0.88)§	0.829 (0.23-3.00)
No. of Observations	1,949	1,949	1,939	1,949	1,950	1,949

Values are odds ratio (95% confidence interval) unless otherwise specified.
* Reference category.
† $P \leq .001$.
‡ $P \leq .010$.
§ $P \leq .049$.

likely than adults to believe that it would increase their chances of unprotected intercourse, particularly the young adolescents ($P = .009$). Nevertheless, unprotected intercourse at follow-up did not vary by level of access to EC, not even among the adolescents (Table 2). Overall, adolescents reported higher levels of unprotected intercourse than adult participants (43% compared with 32%). Logistic regression results confirmed the higher levels of unprotected intercourse, but also showed that the effect of the intervention was no different for the youngest age group from that for the other ages (OR = 1.34; $P = .508$) (Table 3).

We included 2 measures of the adolescents' ability to avoid unwanted sexual activity, whether they were pressured or threatened into sex. Few participants reported having been pressured into sex, and there were no differences by age: 3% of the adolescents (n = 27) compared with 4% of adults (n = 42). Younger adolescents were not any more likely to report being pressured into sex than the other adolescents ($P = .437$). Adolescents in the advance provision group were not any more likely to be pressured into sex than those in the control group ($P = .953$). Reports of being threatened into sex were uncommon: fewer than 1% of participants were threatened and there was no detectable difference between age groups or intervention arms.

Adolescents were far more likely than adults to rely on the condom as their contraceptive method, both at baseline and follow-up. At follow-up, 67% of the youngest adolescents reported condoms as their contraceptive method, as did 54% of the middle adolescent group and 48% of older adolescents, compared with 39% of adults. However, there was no difference in contraceptive method by study arm among adolescents at follow-up (advance provision compared with clinic $P = .181$; pharmacy access compared with clinic $P = .345$). Among the adolescents, the youngest age group was significantly more likely to report consistent condom use both at enrollment and follow-up (30%) than the middle and older adolescents (16% and 13%, respectively; $P = .001$). Adults, who were less likely to rely on condoms as their contraceptive method, were correspondingly the least likely to report consistent condom use (10%). In the logistic regression analysis, the significant main effects for age confirmed greater consistent condom use among adolescents than adults. The interaction term for the youngest adolescents and the treatment arm was not significant (OR = 1.455; $P = .454$).

Another measure of risk behavior, multiple sexual partners, showed no variation by age. Twenty-three percent of adolescents reported more than 1 sexual partner in the past 6 months (21% of the youngest, 27% middle, 24% older), similar to the 21% of adults. For adolescents, as for adults, there was no variation in number of sexual partners by type of access to EC. Results from the logistic regression analysis of multiple sexual partners did not vary by age, and the youngest adolescents had similar experiences to participants of other age groups.

Sexually transmitted infection acquisition was not any higher among adolescents than adults. Thirteen percent of the youngest adolescents acquired an STI, similar to 12.6% of the middle adolescents and 13.7% of the older adolescents. Type of access to EC had no effect on STI rates (pharmacy compared with clinic $P = .808$; advance provision compared with clinic $P = .702$). The main effects for age and study group (ie, the additive effects) were insignificant in the logistic regression results, although the interaction term for the youngest age group and advance provision showed a significant negative effect, that is, the youngest adolescents were less likely to acquire an STI than older participants in the advance provision group. This finding runs counter to the hypothesis of increased risk in the youngest age group.

Pregnancy rates, however, were higher among adolescents than among adults (10% compared with 6%; $P < .001$). Rates were highest among the youngest adolescents (14%) and progressively decreased by age: 12% of middle adolescents, 8% of older adolescents, and 6% of adults. There were no differences in pregnancy rates by study arm among the adolescents. Logistic regression confirmed that pregnancy rates were significantly higher among adolescents than adults, but that the effect of the intervention did not vary by age group. The outcomes presented above were also estimated with models with Bonferroni corrections, and results were consistent with those without the corrections.

DISCUSSION

As a society we tend to be more protective of adolescents and concerned with their sexual risk and negative reproductive health outcomes than we are of adults.[19] Adolescents in this study were indeed at higher risk of pregnancy than the adult participants, due to differences in contraceptive use. Adolescents, particularly the youngest age group, were more likely to rely on condoms as their contraceptive method, rather than hormonal methods, and were more likely to have unprotected intercourse than adults. These differences in contraceptive and risk behavior by age are seen in national statistics as well; adolescents are more likely to use less effective forms of contraception and to use contraception intermittently compared with adults.[20–24]

Studies in the United States also show adults are

more likely to use EC even when they are less likely to know about it.[23–25] In contrast, in our intervention of increased access to EC, adolescents were significantly more likely to report use of EC than adults. Perhaps surprisingly, the younger and middle adolescents were slightly more likely to use EC than the older adolescents, even though they reported similar levels of unprotected intercourse. The findings from this study, that adolescents demonstrated a greater willingness to use the method when needed, suggests that a policy change toward greater access to EC could be of particular benefit to this age group.

Results showed that although most adolescents did not believe that their risk behavior would worsen with easy access to EC, the adolescents were more likely than adults to believe that it would. Nevertheless, despite their own concerns, their behavior did not become riskier. The overall high level of unprotected intercourse among adolescents points to the importance of including adolescents in efforts to increase use of contraception, including EC. It is especially critical for the young adolescents who are sexually active to have access to effective forms of routine contraception to help to prevent the higher rates of pregnancy experienced in this age group.

Although research has explored how certain characteristics of adolescents can enhance or compromise their ability to refuse unwanted sex,[26,27] it is important to understand how contraceptive interventions might affect unwanted sex among adolescents. Although concerns exist that adolescents with EC on hand might be more vulnerable to unwanted sexual activity, these results showed that this was not the case, including for the youngest participants.

The adolescents were equally capable as adults in taking EC correctly, with the youngest adolescents, under 16 years, showing the best results. These results are consistent with findings from our previous study that specifically examined young adolescents: an observational study of 13 to 16 year olds showed that correct use of EC, the effect on the menses, and the adverse effects were consistent with data on adult women and that there was no reason to restrict access in this age group.[28] The high levels of correct use in the advance provision group in this study suggest that physician supervision does not improve adherence to the regimen and that young adolescents should not be singled out due to concerns about their inability to follow the regimen correctly.

A limitation of this study is that participants were enrolled from clinics, and the results are not generalizable to all adolescents. Research has shown that adolescents are likely to start sexual activity before obtaining contraception or visiting a provider.[29] However, the sexually active adolescents who have never visited a clinic would presumably have the greatest need for EC, and to be able to locate it through over-the-counter access. A second study limitation is that we had 90 adolescents aged younger than 16 years. Our research design, however, which included adolescents age 16 and older as well as young adults, did allow us to make comparisons between the age groups. Additional studies on younger adolescents would be useful in helping us to understand how to reduce unintended pregnancy among this age group.

Similar to adult participants, pharmacy access did not increase use over clinic access, although advance provision of 3 packs did. In summary, results showed the effect of the EC intervention on the youngest adolescents to be the same as it was on the adult participants: easier access led to greater use of the method, but it did not lead to any changes in sexual risk behavior or use of routine contraception.

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