Use of Levonorgestrel Emergency Contraception In Utah: Is It More than "Plan B"?

By Lindsay Melton, Joseph B. Stanford and M. Jann Dewitt

Lindsay Melton is public health professional graduate, Joseph B. Stanford is professor, and M. Jann Dewitt is emerita associate professor—all with the Division of Public Health, University of Utah, Salt Lake City.

CONTEXT: *It is important to understand why some women use levonorgestrel emergency contraceptive pills repeatedly, because the method is not intended for repeated use, and current evidence suggests that it is approximately 77% effective at preventing pregnancy.*

METHODS: *An anonymous patient survey of 1,040 women aged 18–29 purchasing levonorgestrel at Planned Parenthood clinics in Utah was conducted during a 4–6-week period in 2007. Chi-square tests and analyses of variance were used to examine associations between selected characteristics and level of levonorgestrel use. Logistic regression was used to assess characteristics independently associated with repeated use.*

RESULTS: *Twenty-nine percent of participants had used levonorgestrel more than twice in the prior year. Fifty-eight percent believed that levonorgestrel is at least 90% effective in protecting against pregnancy; 16% believed that it is 100% effective. In univariate analyses, lifetime number of partners, currently having multiple partners, substance use at last intercourse and perceived effectiveness of levonorgestrel were positively associated with repeated levonorgestrel use in the previous year. The measure most strongly associated with repeated levonorgestrel use in multivariate analyses was perceived effectiveness: Women who believed that the method is 90–99% or 100% effective in preventing pregnancy had greater odds of repeated use than those who believed it is 75–89% effective (odds ratios, 1.8 each).*

CONCLUSION: *Women who repeatedly use levonorgestrel may have an inflated perception of its effectiveness. Future research, including qualitative research, may help clarify factors that lead to inflated perceptions of effectiveness.*

Perspectives on Sexual and Reproductive Health, 2012, 44(1):22–29, doi: 10.1363/4402212

Emergency contraception with levonorgestrel* has been developed and promoted as a backup method to reduce the incidence of unwanted pregnancy, but it is not as effective as nonemergency contraceptive methods and is not designed for regular or frequent use.[1–3] The method became available in the United States by prescription beginning in 1999, and its use has been increasing since then.[2,4] Many questions remain, however, about the patterns and reasons for levonorgestrel use at the individual and population levels; actual patterns of use could decrease or increase risks of unwanted pregnancy or STD for different groups of women.[5]

Levonorgestrel has been estimated to be up to 90% effective in preventing pregnancy if taken within 120 hours of intercourse.[1,3,6] The most methodologically rigorous analyses, however, suggest lower effectiveness;[7,8] two meta-analyses found effectiveness rates of 72% and 77%, respectively.[9,10] Expanding access to emergency contraception increases its use, but multiple studies have failed to demonstrate that increased access to emergency contraception decreases the rate of unintended pregnancy within the population.[11–13] According to a study in Utah, however, sales of levonorgestrel increased from 21.3 to 87.8 doses per 1,000 women aged 15–44 between 2000 and 2006, and the statewide abortion rate dropped by 6% over that period.[14]

The most common reason women cite for their use of emergency contraception is contraceptive method failure; the next most common is sex with no contraceptive method.[15–19] Among 1,130 women aged 15–45 visiting community clinics in California, 28% reported using emergency contraception because of contraceptive method failure, and 27% because of sex with no contraceptive method.[16] In a study of 572 women visiting family planning clinics in the United Kingdom, 51% cited a condom problem as their reason for emergency contraception use, and 29% cited sex without a contraceptive method.[17] And of 171 women attending family planning clinics in London, 47% reported using emergency contraception because they had had a condom break or fall off during sex, and 45% had used no contraceptive method.[15]

Because emergency contraception is not intended to be used as a regular form of birth control, the topic of its repeated use is of interest to researchers. In the study of

*For brevity, we use "levonorgestrel" throughout the article to refer to the use of levonorgestrel for emergency contraception.

UK clinic clients, 23% reported using emergency contraception three or more times in 12 months.[17] According to the London study, 32% of women had used emergency contraception at least one other time in the past 12 months.[15] In addition, a retrospective study in the midwestern United States found that 10% of women using emergency contraception had done so more than once within a year;[18] in contrast, a survey of 500 Italian women found no substantial rate of repeated use.[19] In a study of 147 women in Kenya who purchased emergency contraception for themselves, 48% reported using the method "most times" or "every time" they had sex, and 71% had not practiced contraception at last sex.[20]

Although previous studies have suggested that the most significant correlates of emergency contraception use pertain to a woman's perception of pregnancy risk, other characteristics may also be important: personal constraints, knowledge, negotiation skills, social or structural constraints, alcohol use, cost of and access to services, and such outside influences as parents or peers.[15,21]

Utah has a number of unique social factors that could impact the use of emergency contraception. State law prohibits sex education in the public schools from engaging in "the advocacy or encouragement of the use of contraceptive methods or devices."[22] About 70% of Utah's population identify as members of the Church of Jesus Christ of Latter-Day Saints (LDS).[23] The religion is pronatalist and states that sex should occur only within marriage;[24] it prohibits abortion in most circumstances, but has no official position regarding birth control or emergency contraception.[25] Utah had an unintended pregnancy rate of 45 per 1,000 women 15–44 in 2006 and a 2008 abortion rate of 6.7 per 1,000 women of reproductive age;[26,27] in comparison, the median U.S. unintended pregnancy rate in 2006 was 51 per 1,000, and the overall U.S. abortion rate in 2008 was 19.6 per 1,000.

The purpose of this study was to provide descriptive information about women in Utah who have obtained levonorgestrel through its largest distributor, and to determine if those who have used it repeatedly differ from those who have used it occasionally in terms of demographic characteristics, religion, sexual history, contraceptive history and attitudes about levonorgestrel.

TABLE 1. Percentage distribution of female clinic clients purchasing levonorgestrel for emergency contraception, by selected demographic characteristics; and percentage distribution of clients with each characteristic, by type of levonorgestrel use; Planned Parenthood Association of Utah, 2007

Characteristic	All (N=1,030)	Type of use				
		Occasional	Repeat	Extensive	Unknown/ missing	Total
Annual income						
≤$10,000	34.2	64.1	21.3	5.8	8.8	100.0
$10,001–30,000	35.2	59.8	22.7	8.2	9.4	100.0
>$30,000	30.5	61.8	22.2	8.2	7.8	100.0
Race/ethnicity						
White	69.1	64.0	19.4	8.2	8.4	100.0
Hispanic	12.4	60.9	25.0	4.7	9.4	100.0
Other	12.0	56.9	28.5	5.7	8.9	100.0
Multiple	6.5	53.7	23.9	9.0	13.4	100.0
Religious affiliation						
Catholic	24.7	61.0	25.7	4.0	9.2	100.0
LDS	36.2	58.8	21.7	8.8	10.7	100.0
Other	14.5	64.4	16.4	9.6	9.6	100.0
None	24.6	65.7	20.6	8.1	5.7	100.0
Religious service attendance						
≥weekly	23.0	56.4	22.7	9.0	12.0	100.0
<weekly, ≥monthly	11.2	65.8	22.8	7.0	4.4	100.0
<monthly	20.7	65.9	19.9	7.6	6.6	100.0
Never	45.1	62.0	21.1	7.0	10.0	100.0
High school graduate in Utah						
Yes	78.5	61.6	21.4	8.3	8.7	100.0
No	21.5	63.4	21.7	4.5	10.4	100.0
Received contraceptive information in high school						
Yes	70.3	63.8	21.1	6.1	8.9	100.0
No	29.7	58.2	22.0	10.5	9.2	100.0
Highest educational level						
Some high school	9.3	55.8	28.4	7.4	8.4	100.0
High school diploma/ equivalent	32.4	60.8	20.2	8.1	10.8	100.0
Some college/ university	42.6	63.1	20.6	7.3	8.9	100.0
≥college	15.7	65.2	22.4	6.8	5.6	100.0
Total	100.0	na	na	na	na	na

Notes: LDS=Church of Jesus Christ of Latter-Day Saints. na=not applicable. Occasional use denotes two or fewer times in the past year; repeat use, 3–5 times; extensive use, six or more times. No differences between groups were significant at p<.05, as assessed by chi-square or Fisher's exact tests. Some items had up to 27 missing observations.

METHODS

Study Setting and Design

We conducted our study at all six clinics run by Planned Parenthood Association of Utah (PPAU) during a 4–6-week period in the spring of 2007. PPAU is the state's largest distributor of levonorgestrel.[14] During 2006, it distributed 39,668 two-pill packets (one packet is one course of treatment) to women aged 18–29, among a client population of 29,213 women of this age, who made up 70% of all PPAU clients.[28] In comparison, Utah Medicaid paid 235 levonorgestrel claims among the 68,684 female patients aged 18–45 it covered at any point during 2006.[29] Given that the number of doses of levonorgestrel distributed at PPAU clinics in 2006 was higher than the number of women served, and that some clinic clients did not use the method at all, it is reasonable to assume that some were using levonorgestrel repeatedly.

To participate in the study, a client had to be an 18–29-year-old woman who purchased levonorgestrel during the study period. Participants completed a written questionnaire, which collected no identifying data. Questionnaires were distributed by the principal investigator or trained clinic staff at the front desk of each clinic; participants could complete the survey in the waiting room or in a private intake room. Return of the survey was considered consent.

The survey instrument included questions about demographic characteristics, attitudes and knowledge about contraception, sexual history and past use of emergency

TABLE 2. Percentage distribution of female clinic clients purchasing levonorgestrel for emergency contraception, by selected sexual history characteristics; and percentage distribution of clients with each characteristic, by type of levonorgestrel use

Characteristic	All (N=1,039)	Type of use				
		Occasional	Repeat	Extensive	Unknown/ missing	Total
Ever pregnant						
Yes	32.4	60.4	23.5	7.1	8.9	100.0
No	67.6	62.7	20.8	7.6	9.0	100.0
Lifetime no. of partners*						
<5	58.9	64.4	19.7	6.4	9.4	100.0
5–10	29.1	57.3	24.9	7.2	10.6	100.0
11–20	9.8	64.7	23.2	11.1	1.0	100.0
>20	2.2	48.4	22.6	12.9	16.1	100.0
Ever forced to have intercourse						
Yes/don't know	18.7	57.0	25.9	9.3	7.8	100.0
No	81.3	63.3	20.6	7.6	9.1	100.0
Current relationship status						
None	10.8	70.0	18.2	6.4	5.5	100.0
Casual	15.3	64.1	20.5	9.0	6.4	100.0
<1 month	5.0	62.8	21.6	5.9	9.8	100.0
1–12 months	21.5	56.8	22.3	8.6	12.3	100.0
>12 months	27.5	58.2	22.9	8.2	10.7	100.0
Married	15.1	64.9	20.8	5.2	9.1	100.0
Divorced	4.7	58.3	33.3	6.3	2.1	100.0
Current multiple partnership*						
Yes	10.2	58.7	25.0	14.4	1.9	100.0
No	79.7	62.6	21.5	6.2	9.7	100.0
Don't know	10.2	59.6	20.2	9.6	10.6	100.0
Planned last intercourse						
Yes	35.7	62.6	22.5	6.8	8.1	100.0
No/don't know	64.3	61.8	21.1	7.8	9.3	100.0
Substance use at last sex*						
Yes/don't know	17.3	57.0	25.1	9.5	8.4	100.0
No	82.7	63.2	20.9	7.0	9.0	100.0
Total	100.0	na	na	na	na	na

*p<.05. *Notes:* na=not applicable. Occasional use denotes two or fewer times in the past year; repeat use, 3–5 times; extensive use, six or more times. Differences between levonorgestrel use groups were assessed by chi-square or Fisher's exact tests. Some items had up to 22 missing observations.

contraception. It was developed specifically for this study, but included some items adapted from previous questionnaires.[5,17–19] Except where noted, the items reported in this analysis were all asked as closed-ended questions. Prior to use, the instrument was examined by clinicians at PPAU, reproductive epidemiologists and other researchers for content validity. A pilot test was conducted at the Salt Lake City clinic with 15 female patients and staff members, after which some items were modified. The study protocol, study procedure, patient survey tool and informed consent were approved by the institutional review boards of the University of Utah and Planned Parenthood Federation of America.

PPAU clinics received 1,327 questionnaires for distribution during the study period, of which 1,156 (87%) were returned at least partially completed; the most common reason women gave for not completing a questionnaire was that they did not have enough time. Fifty-five respondents were ineligible because of their age, two because they were unable to read English and 59 because they had previously filled out a questionnaire during the study period, leaving a final sample of 1,040.*

*During the study period, PPAU also conducted a computer audit of levonorgestrel packages sold to female patients aged 18–29. In all, 3,495 packages were sold, 417 of them to repeat purchasers; 90 patients purchased levonorgestrel three or more times.

Analyses

Our outcome variable of interest was type of levonorgestrel user. On the basis of respondents' self-reported frequency of levonorgestrel use in the year prior to survey, we classified those who had used the method one or two times as occasional users, and those who had used it three or more times as repeat users (following the precedent of previous research[17]). In addition, we created a subcategory of extensive users, those who had used the method six or more times in the past year, because almost 30% of our sample were repeat users—a higher proportion than in previous studies.[15,17]

Data were coded and entered into a computer spreadsheet. All analyses were conducted using Stata. To evaluate univariate associations between each user type and selected measures, we used chi-square tests for categorical variables and analyses of variance for continuous variables; in addition, Fisher's exact tests were used when 20% of expected values were less than or equal to five. For multivariate analyses, we used logistic regression to examine the likelihood of repeated (including extensive) levonorgestrel use, controlling for variables identified as significant in the univariate analyses or considered important because of theoretical considerations.

RESULTS

Descriptive and Univariate Findings

Women's mean age was 21.5 years; 30% were aged 18–19, 54% were 20–24 and 16% were 25–29. Sixty-nine percent of participants were white, and 36% reported being LDS members (Table 1, page 23). Twenty-three percent attended religious service at least once a week; 11% went less than weekly, but at least once a month; 21% went less than monthly; and 45% did not go at all. Most had graduated from high school (81%) and had received contraceptive information in high school (70%). None of the demographic or religious variables we assessed was associated with repeated levonorgestrel use.

Ninety-six percent of study participants indicated that they were purchasing levonorgestrel to "use it now," not for future use. The five most common reasons selected for purchase of levonorgestrel were condom breakage or slippage (38%), "didn't have or use condoms" (33%), "sex was not planned" (32%), "forgot regular birth control method recently" (21%) and "it's the most affordable method" (18%). Sixty-two percent of participants were considered occasional users, and 29% were repeat users (including 7% extensive users); for the remaining 9%, we were missing information about frequency of use.

Participants' age at first intercourse ranged from 12 to 27 and averaged 17.1; the mean age at first intercourse was 17.2 for occasional users, 17.1 for repeat users and 16.8 for extensive users. Two-thirds of women reported never having been pregnant (Table 2). The majority (59%) had had fewer than five lifetime sexual partners; 29% had had 5–10 partners, 10% had had 11–20 and 2% had had more than 20. Twenty-eight percent of women reported being in a nonmarital relationship of more than 12 months' duration, and 15% were married. Only 10% reported that either they or their partner currently had multiple partners. Thirty-six percent of women reported that their most recent intercourse had been planned, and 17% that drugs or alcohol had been used at last sex or that they did not know whether they had been.

Three sexual history characteristics—lifetime number of partners, current multiple partnerships and substance use at last intercourse—were associated with repeated levonorgestrel use. Greater proportions of women who had had more than 20 lifetime partners than of those who had had fewer than five were repeat users (23% vs. 20%) and extensive users (13% vs. 6%). Twenty-five percent of women who reported that they or their partner currently had multiple partners were repeat users, and 14% were extensive users, compared with 22% and 6%, respectively, of those currently without multiple partners. Finally, among women who reported that drugs or alcohol had been used at their last intercourse or who did not know whether they had been, 25% were repeat users and 10% were extensive users; the proportions were 21% and 7%, respectively, among those reporting no substance use at last intercourse.

Fifty-eight percent of participants believed that levonorgestrel is at least 90% effective in preventing pregnancy (Table 3); 16% believed it is 100% effective. Fifteen percent of women reported ever purchasing more than one dose of levonorgestrel at a single time. The vast majority (88%) said that they would use levonorgestrel in the future; however, when asked about their contraceptive plans overall, 75% did not include levonorgestrel in their multiple-choice responses.

Four of the six levonorgestrel use attitude measures were positively associated with repeated use. The proportion of participants who were extensive users increased with greater perceived effectiveness, ranging from 2% among those who believed levonorgestrel to be less than 75% effective to 11% among those who believed it to be 100% effective. Among those who had ever purchased more than one course of levonorgestrel at the same time, 36% were repeat users and 14% were extensive users; the proportions among those who did not recall ever purchasing multiple doses at once were 19% and 6%, respectively. Twenty-three percent of participants who reported intending to use levonorgestrel in the future were repeat users, and 8% were extensive users, compared with 14% and 2%, respectively, of those who did not expect to use it again. Similarly, among those who included levonorgestrel in their plans to prevent pregnancy, 26% were repeat users and 12% extensive users; however, among those who did not include the method in their pregnancy prevention plans, 20% were repeat users and 6% extensive users.

Nearly all participants reported some previous use of contraceptive methods (Table 4, page 26). Ninety percent had ever used condoms, 65% had used levonorgestrel emergency contraception, and 64% had used combined hormonal methods (the pill, patch or ring); 32% of women reported ever having had sex without using a method. Ever-use of combined hormonal methods or no method was positively associated with repeated use of levonorgestrel; in addition, the use of natural family planning, rhythm or withdrawal (combined because of small numbers in each group) was marginally associated with repeated levonorgestrel use.*

TABLE 3. Percentage distribution of female clinic clients purchasing levonorgestrel for emergency contraception, by attitudes and behaviors related to the method; and percentage distribution of clients with each attitude and behavior, by type of levonorgestrel use

Attitude or behavior	All (N=1,038)	Type of use				
		Occasional	Repeat	Extensive	Unknown/ missing	Total
Perceived effectiveness**						
<75%	5.6	63.6	23.6	1.8	10.9	100.0
75–89%	36.4	69.0	16.3	7.0	7.6	100.0
90–99%	41.8	56.9	27.7	7.8	7.6	100.0
100%	16.2	53.2	22.2	11.4	13.3	100.0
Purchased >1 dose at same time***						
Yes	15.0	41.3	36.1	14.2	8.4	100.0
No/don't know	85.0	65.6	19.1	6.3	9.1	100.0
Option if method fails						
Continue the pregnancy	50.0	62.1	21.9	6.4	9.7	100.0
Consider adoption	6.4	66.7	18.2	12.1	3.0	100.0
Consider abortion	14.3	58.8	23.7	8.1	9.5	100.0
Undecided	29.4	62.8	20.7	7.9	8.6	100.0
Partner knows of use						
Yes	78.8	61.2	22.4	7.3	9.2	100.0
No/don't know	21.2	63.8	19.7	8.3	8.3	100.0
Intend to use again**						
Yes	87.8	60.7	22.5	8.3	8.5	100.0
No/don't know	12.2	72.2	13.5	1.6	12.7	100.0
Future contraceptive plans include the method***						
Yes	25.2	55.0	26.2	11.9	8.9	100.0
No	74.9	65.4	19.8	5.9	8.9	100.0
Total	100.0	na	na	na	na	na

**p<.01. ***p<.001. *Notes:* na=not applicable. Occasional use denotes two or fewer times in the past year; repeat use, 3–5 times; extensive use, six or more times. Differences between levonorgestrel groups were assessed by chi-square or Fisher's exact tests. Some items had up to 59 missing observations.

*Current contraceptive use was an open-ended, write-in item in the questionnaire. Women most commonly reported using condoms (32%) and oral contraceptives (22%). None reported current use of rhythm or the implant, diaphragm or cervical cap, and fewer than 1% reported using natural family planning or withdrawal.

TABLE 4. Percentage distribution of female clinic clients purchasing levonorgestrel for emergency contraception, by ever-use of specific contraceptive methods; and percentage distribution of clients who have used each method, by type of levonorgestrel use

Method	All (N=1,035)	Type of use				
		Occasional	Repeat	Extensive	Unknown/ missing	Total
Condoms						
Yes	89.9	61.8	22.0	7.3	8.8	100.0
No	10.1	64.8	16.2	8.6	10.5	100.0
Levonorgestrel emergency contraception* **						
Yes	65.1	56.7	26.0	8.5	8.9	100.0
No	34.9	72.3	13.0	5.5	9.1	100.0
Pill/patch/ring*						
Yes	64.2	60.1	24.3	7.7	8.0	100.0
No	35.9	65.8	16.4	7.0	10.8	100.0
Injectable						
Yes	22.2	62.2	20.4	7.0	10.4	100.0
No	77.8	62.1	21.7	7.6	8.6	100.0
IUD						
Yes	4.8	64.0	24.0	6.0	6.0	100.0
No	95.2	62.0	21.3	7.5	9.1	100.0
Spermicide						
Yes	5.8	66.7	18.3	6.7	8.3	100.0
No	94.2	61.9	21.6	7.5	9.0	100.0
Abstinence						
Yes	47.8	64.4	21.0	7.1	7.5	100.0
No	52.2	60.0	21.9	7.8	10.4	100.0
Natural family planning/ rhythm/withdrawal†						
Yes	27.0	57.9	26.1	8.9	7.1	100.0
No	73.0	63.7	19.7	6.9	9.7	100.0
Other						
Yes	2.2	60.9	13.0	8.7	17.4	100.0
No	97.8	62.2	21.6	7.4	8.8	100.0
None**						
Yes	31.7	55.2	27.1	9.5	8.2	100.0
No	68.3	65.4	18.8	6.5	9.3	100.0
Total	100.0	na	na	na	na	na

*p<.05. **p<.01. ***p<.001. †p<.10. *Notes:* na=not applicable. Occasional use denotes two or fewer times in the past year; repeat use, 3–5 times; extensive use, six or more times. Differences between levonorgestrel groups were assessed by chi-square or Fisher's exact tests. Some items had one missing observation.

Some 35% of women who had used levonorgestrel in the past year did not include it as one of the birth control methods they had ever used. Among these, 13% were repeat users, and 6% extensive users.

Multivariate Findings

Our logistic regression analysis controlled for religious affiliation, religious service attendance, having received contraceptive information in high school, lifetime number of partners, history of forced intercourse, currently having multiple partners, substance use at most recent intercourse and perceived effectiveness of levonorgestrel. Although three additional variables—previous purchase of more than one dose of levonorgestrel at the same time, expecting to use levonorgestrel again at some time and having a pregnancy prevention plan that includes levonorgestrel—were significant in univariate analyses, we omitted them because they were too similar to the outcome of interest.

In the multivariate model, only one individual measure was associated with repeated use of levonorgestrel (Table 5). Women who believed that levonorgestrel is 90–99% or 100% effective at preventing pregnancy had greater odds than those who believed it to be 75–89% effective of being repeat users (odds ratios, 1.8 each).

DISCUSSION

The level of self-identified repeated use of levonorgestrel within the past 12 months (29%) was higher than we expected for Utah and higher than reported in previous studies.[16,17,19] This is remarkable, because not only is levonorgestrel less effective than other methods available at Planned Parenthood, it also is more expensive. At the time of the survey, levonorgestrel cost as much as $25 per use, while a month's supply of oral contraceptives cost up to $15; the monthly hormonal patch and ring cost as much as or less than levonorgestrel.[28] It is possible, however, that some women still considered levonorgestrel use several times per year to be more cost-effective than continuous use of hormonal contraceptives. Other factors, such as perceived side effects of continuous hormonal use, may have also influenced the choice among these options.

The prevalence of prior use of levonorgestrel as an emergency contraceptive method was 65% in our sample—much higher than in previous studies.[30–32] And given that 29% of our sample reported repeat use (including extensive use) and that prior research documents a very rapid increase of levonorgestrel sales in Utah between 2000 and 2006,[14] there appears to be a substantial population of experienced users of levonorgestrel in Utah.

Women's perceptions of the effectiveness of levonorgestrel to prevent pregnancy proved to be the only independent correlate of repeated levonorgestrel use. Our data do not permit an assessment of whether repeated levonorgestrel use leads to increased perceived effectiveness, increased perceived effectiveness leads to increased use or both. Past intercourse not involving contraceptive use that did not result in pregnancy may contribute to a decreased sense of vulnerability to pregnancy.[30] Similarly, if levonorgestrel emergency contraception has always seemed to work for some women, they may perceive their risk of unplanned pregnancy to be lower than it actually is.

Although many studies have found that use of emergency contraception does not impact use of regular family planning methods,[13] others have found that advance provision of emergency contraception is associated in some settings with an increased prevalence of unprotected sex or decreased use of more effective contraceptive methods.[33–36] For example, in a study of advance access to emergency contraception in Nevada, women who received increased access were more likely than others to substitute

TABLE 5. Odds ratios (and 95% confidence intervals) from regression analysis assessing the associations between selected characteristics and the likelihood of having used levonorgestrel more than twice in the past year

Characteristic	Odds ratio
Religious affiliation	
None (ref)	1.00
Catholic	0.98 (0.60–1.61)
LDS	1.31 (0.83–2.08)
Other	0.89 (0.52–1.50)
Religious service attendance	
Never (ref)	1.00
≥weekly	1.09 (0.70–1.70)
<weekly, ≥monthly	1.02 (0.60–1.74)
<monthly	0.86 (0.55–1.33)
Received contraceptive information in high school	
Yes (ref)	1.00
No	1.25 (0.90–1.74)
Lifetime no. of partners	
<5 (ref)	1.00
5–10	1.20 (0.84–1.71)
11–20	1.17 (0.70–1.97)
>20	0.92 (0.33–2.53)
Ever forced to have intercourse	
Yes/don't know (ref)	1.00
No	0.85 (0.58–1.26)
Current multiple partners	
Yes	1.44 (0.89–2.32)
No (ref)	1.00
Don't know	1.03 (0.62–1.73)
Substance use at last sex	
Yes/don't know (ref)	1.00
No	0.77 (0.51–1.15)
Perceived effectiveness of levonorgestrel	
<75%	0.81 (0.38–1.74)
75–89% (ref)	1.00
90–99%	1.81 (1.28–2.55)*
100%	1.80 (1.13–2.88)*

*p<.05. *Notes:* ref=reference group. LDS=Church of Jesus Christ of Latter-Day Saints. Overall p value for model=0.015.

emergency contraception for their usual contraceptive method.[33] If a woman believes levonorgestrel to be highly reliable for emergency contraception, she could easily make an apparently rational choice to select it as a primary method of pregnancy prevention, especially if she perceives that she has intercourse infrequently. It is unclear where some women acquired their inflated perceptions of emergency contraception's effectiveness, but it is possible that the overestimated effectiveness reported in earlier medical literature and public awareness campaigns may have contributed to such misperceptions.[37]

The U.S. Food and Drug Administration has made levonorgestrel emergency contraception available over the counter to women 18 and older since 2006, and to women 17 and older since 2009.[38] Not having to see a medical provider to obtain the method could also contribute to unrealistically high perceptions of its effectiveness. In our study, nearly six in 10 women thought that it was at least 90% effective, although it likely is 77% effective at best.[7–10] Although selling levonorgestrel over the counter increases access—including advance access—to the method, it may reduce professionals' opportunity to provide accurate information about the method's effectiveness in comparison with that of other contraceptive methods.

A study from Kenya offers some interesting parallels to our results.[20] As noted previously, of the 147 women who purchased emergency contraception from a pharmacy, 48% reported using it at most or all sexual encounters in the past six months. Of these repeat users, 42% thought emergency contraception could be used as a regular method, and only 39% believed that one can still become pregnant after taking it at the recommended time. The authors suggest that some women may use emergency contraception as their regular method and that "overconfidence in [its] efficacy is likely to be one factor underpinning repeat use.[20(p.350)] In addition, a qualitative study out of London found that choice of emergency contraception over the IUD was related to a perception of high effectiveness of emergency contraceptive pills.[39]

Some 88% of women in our sample reported that they would use levonorgestrel in the future, but when asked about plans to prevent a pregnancy, 75% did not include levonorgestrel in their responses. Similarly, 35% of women who reported using levonorgestrel in the past year did not list it among the contraceptive methods they had ever used. These results suggest that even though many women use levonorgestrel repeatedly, some do not consider it one of their methods of birth control.

Nearly four in 10 women cited condom breakage or slippage as the reason for their purchase of emergency contraception. Some of these women may wish to protect simultaneously against pregnancy and STDs. This raises the question as to whether they are obtaining screening for infection after condom failure. Unfortunately, our data do not allow us to examine this further.

Limitations

One limitation of this study is the sample size, although our sample was larger than those in many prior studies.[15,17,19,20] Some of the potential correlates we examined may have been significant with a larger sample size. A related weakness was that the level of missing responses was fairly high for key variables, including 9% for the outcome of frequency of levonorgestrel use. This likely reflects the sensitive nature of questions in the survey. Women who have repeatedly used levonorgestrel for emergency contraception may be less willing than those who used it only occasionally to report their frequency of use, in which case, our results would underestimate the level of repeated use.

We do not know how representative our sample of PPAU clients is of Utah women in general or of PPAU clients overall. Among the state's adult female population, 90% identify as white, and 88% are high school graduates;[23,40] those proportions among our sample were 69% and 81%, respectively. Moreover, 58% of the state's population indentifies as LDS,[23] whereas only 36% of the women in

our sample did so. It is unclear what proportion of PPAU clients in general identify with the religion, because PPAU does not collect information on religious affiliation. LDS women may be less likely than others to visit PPAU or utilize levonorgestrel; furthermore, LDS women visiting PPAU may have been less likely than others to respond to our survey. However, we examined a number of variables designed to assess Utah's cultural and social context; none was associated with levonorgestrel use.

Conclusions

Our findings suggest that an overly optimistic perception of emergency contraception's effectiveness is associated with repeated use of the method. Although levonorgestrel emergency contraception does not pose any known health risks to users, it is less effective than other family planning methods.[1,7,9] Some women may turn to levonorgestrel more than just for emergencies, yet not consider it their regular contraceptive method; other women may use it as a supplement to a regular method. Further research is needed to investigate why women of all religions, ethnicities and education levels use levonorgestrel emergency contraception more than occasionally and, likely in some cases, instead of more effective and affordable methods. Qualitative data will likely be necessary to examine these issues.

REFERENCES

1. World Health Organization (WHO), *Fact Sheet on the Safety of Levonorgestrel-Alone Emergency Contraceptive Pills*, 2010, <http://whqlibdoc.who.int/hq/2010/WHO_RHR_HRP_10.06_eng.pdf>, accessed Sept. 20, 2011.

2. Henry J. Kaiser Family Foundation, Emergency contraception, *Women's Health Policy Facts*, 2010, <http://www.kff.org/womenshealth/upload/3344-04.pdf>, accessed Dec. 30, 2011.

3. Grimes DA and Raymond EG, Emergency contraception, *Annals of Internal Medicine,* 2002, 137(3):180–189.

4. Weiss D, *A Brief History of Emergency Hormonal Contraception,* New York: Planned Parenthood Federation of America, 2005.

5. Keogh LA, A qualitative study of women's use of emergency contraception, *Journal of Family Planning and Reproductive Health Care,* 2005, 31(4):288–293.

6. WHO, Randomised controlled trial of levonorgestrel versus the Yuzpe regimen of combined oral contraceptives for emergency contraception, *Lancet,* 1998, 352(9126):428–433.

7. Raymond E et al., Minimum effectiveness of the levonorgestrel regimen of emergency contraception, *Contraception,* 2004, 69(1):79–81.

8. Mikolajczyk RT and Stanford JB, A new method for estimating the effectiveness of emergency contraception that accounts for variation in timing of ovulation and previous cycle length, *Fertility and Sterility,* 2005, 83(6):1764–1770.

9. Stanford JB and Mikolajczyk RT, Methodological review of the effectiveness of emergency contraception, *Current Women's Health Reviews,* 2005, 1(2):119–129.

10. Cheng L et al., Interventions for emergency contraception, *Cochrane Database of Systematic Reviews,* 2008, Issue 2, No. CD001324.

11. Broekhuizen FF, Emergency contraception, efficacy and public health impact, *Current Opinion in Obstetrics & Gynecology,* 2009, 21(4):309–312.

12. Polis CB et al., Advance provision of emergency contraception for pregnancy prevention: a meta-analysis, *Obstetrics & Gynecology,* 2007, 110(6):1379–1388.

13. Raymond EG, Trussell J and Polis CB, Population effect of increased access to emergency contraceptive pills: a systematic review, *Obstetrics & Gynecology,* 2007, 109(1):181–188.

14. Turok DK, Simonsen SE and Marshall N, Trends in levonorgestrel emergency contraception use, births, and abortions: the Utah experience, *Medscape Journal of Medicine,* 2009, 11(1):30.

15. Shawe J, Ineichen B and Lawrenson R, Emergency contraception: who are the users? *Journal of Family Planning and Reproductive Health Care,* 2001, 27(4):209–212.

16. Walsh TL and Frezieres RG, Patterns of emergency contraception use by age and ethnicity from a randomized trial comparing advance provision and information only, *Contraception,* 2006, 74(2):110–117.

17. Roizen J, Garside R and Barnett L, Repeat use of emergency contraception: How frequent is it? *Journal of Family Planning and Reproductive Health Care,* 2001, 27(4):197–201.

18. Ahonen KA and Buchman D, Emergency contraception: profiles of women using Plan B in a small Midwestern U.S. community, *Journal of the American Academy of Nurse Practitioners,* 2008, 20(1):35–39.

19. Bastianelli C, Farris M and Benagiano G, Reasons for requesting emergency contraception: a survey of 506 Italian women, *European Journal of Contraception & Reproductive Health Care,* 2005, 10(3):157–163.

20. Keesbury J, Morgan G and Owino B, Is repeat use of emergency contraception common among pharmacy clients? Evidence from Kenya, *Contraception,* 2011, 83(4):346–351.

21. Free C and Ogden J, Emergency contraception use and non-use in young women: the application of a contextual and dynamic model, *British Journal of Health Psychology,* 2005, 10(2):237–253.

22. Utah Code Title 53A, chapter 13, section 101, <le.utah.gov/~code/TITLE53A/htm/53A13_010100.htm>, accessed Dec. 30, 2011.

23. Pew Forum on Religion & Public Life, *U.S. Religious Landscape Survey, Religious Affiliation: Diverse and Dynamic*, 2008, <http://religions.pewforum.org/pdf/report-religious-landscape-study-full.pdf>, accessed Dec. 30, 2011.

24. Church of Jesus Christ of Latter-Day Saints, Gospel study: birth control, 2011, <http://lds.org/study/topics/birth-control?lang=eng>, accessed Sept. 20, 2011.

25. Church of Jesus Christ of Latter-Day Saints, Gospel study: abortion, 2011, <http://lds.org/study/topics/abortion?lang=eng>, accessed Sept. 20, 2011.

26. Finer LB and Kost K, Unintended pregnancy rates at the state level, *Perspectives on Sexual and Reproductive Health,* 2011, 43(2):78–87.

27. Guttmacher Institute, State facts about abortion: Utah, 2011, <http://www.guttmacher.org/pubs/sfaa/utah.html>, accessed Sept. 20, 2011.

28. Davies P, Planned Parenthood Association of Utah, Salt Lake City, personal communication, May 2007.

29. Morley T, Utah Department of Health, Salt Lake City, personal communication, May 2007.

30. Nelson AL, Recent use of condoms and emergency contraception by women who selected condoms as their contraceptive method, *American Journal of Obstetrics & Gynecology,* 2006, 194(6):1710–1715.

31. Ikeme AC, Ezegwui HU and Uzodimma AC, Knowledge, attitude and use of emergency contraception among female undergraduates in Eastern Nigeria, *Journal of Obstetrics & Gynaecology,* 2005, 25(5):491–493.

32. Fagan EB et al., Knowledge, attitudes, and use of emergency contraception among rural western North Carolina women, *Southern Medical Journal,* 2006, 99(8):806–810.

33. Weaver MA, Raymond EG and Baecher L, Attitude and behavior effects in a randomized trial of increased access to emergency contraception, *Obstetrics & Gynecology,* 2009, 113(1):107–116.

34. Skibiak JP, Ahmed Y and Ketata M, *Testing Strategies to Improve Access to Emergency Contraception Pills: Prescription vs. Prophylactic Distribution*, 1999, New York: Population Council, <http://www.popcouncil.org/pdfs/frontiers/OR_TA/Africa/zam3.pdf>, accessed Dec. 30, 2011.

35. Belzer M et al., Advance supply of emergency contraception: a randomized trial in adolescent mothers, *Journal of Pediatric and Adolescent Gynecology,* 2005, 18(5):347–354.

36. Parrish JW et al., Characteristics of women who sought emergency contraception at a university-based women's health clinic, *American Journal of Obstetrics and Gynecology,* 2009, 201(1):22.e1–e7.

37. Stanford JB, Emergency contraception: overestimated effectiveness and questionable expectations, *Clinical Pharmacology and Therapeutics,* 2008, 83(1):19–21.

38. Revised oral contraceptive labeling: FDA approves recommendation allowing delay of pelvic exam, *Contraception Report,* 1993, 4(5):4–7.

39. Bharadwaj P et al., What influences young women to choose between the emergency contraceptive pill and an intrauterine device? A qualitative study, *European Journal of Contraception & Reproductive Health Care,* 2011, 16(3):201–209.

40. U.S. Bureau of the Census, State and county quick facts, Utah, 2011, <http://quickfacts.census.gov/qfd/states/49000.html>, accessed Sept. 20, 2011.

Acknowledgments

The authors thank Kathy Burke and Penny Davies for support in obtaining data on distribution of levonorgestrel; Planned Parenthood Association of Utah staff for assistance in collecting data and obtaining associated information; Katie Ward for help with the study design, execution and initial analysis; Lynsey Gammon for data entry; Sara Ellis Simonsen for help with statistical analysis; Michael Lowe for help with manuscript preparation; and Dave Turok for continuous support. Funding for this study was provided by the Health Studies Fund, Department of Family and Preventive Medicine, University of Utah. The findings and conclusions in this article are those of the authors and do not necessarily represent the views of Planned Parenthood Federation of America.

Author contact: *melton_lindsay@hotmail.com*