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Knowledge and Use of Emergency Contraception in College Women

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Abstract

Despite the value of emergency contraception (EC) in reducing unintended pregnancy, use in college women has not been widely studied. This exploratory descriptive study, using a web-based survey, described knowledge and use of EC in 2,007 college women and identified associations between selected personal characteristics and EC use. Most women (72.2%) knew EC could be obtained over the counter and was most effective within 72 hr of intercourse (93%). Women inaccurately thought EC was effective through the first trimester of pregnancy (87.1%) and could cause birth defects (27.8%). Among sexually active women, 37% reported use. Experiencing a false alarm pregnancy, knowing that EC was available over the counter, and being Asian/Pacific Islander were positively associated with use. Additional studies should explore the utility of EC in other populations and efforts should be stepped up to provide accurate information about access and mechanism of use.

Keywords

post-coital contraception; emergency contraception; contraceptive methods; pregnancy; reproductive health

Of more than 3.2 million unintended pregnancies, almost 68% occur in women aged 18 to 29 (Finer & Zolna, 2011), a common age of college attendees. Although it is not known how many women seeking post-secondary education at 4-year and graduate institutions are unable to complete their education due to unintended pregnancy, research on women attending 2-year institutions indicates that managing an unplanned pregnancy threatens the pursuit of a college education (Bradburn, 2002; Clery & Harmon, 2012; Prentice, Storin, & Robinson, 2012). Women who experience unplanned pregnancy during college are almost twice as likely as women without a pregnancy to leave college without graduating (Bradburn, 2002) due to challenges of child care, employment, student loans, and housing (Clery & Harmon, 2012). Women who have a child during college struggle academically,

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27% report reducing hours or quitting school because of problems with child care (Prentice et al., 2012). Emergency contraception (EC) may offer an additional option for preventing pregnancy and allow women to avoid an unintended pregnancy that may threaten completion of their college degree.

EC and Unintended Pregnancy

EC is the only post-intercourse method of pregnancy prevention. ECs include a copper intrauterine device and an oral form widely available in the United States. Because the oral form can be accessed without provider intervention, the oral form is the focus of this article.

The Federal Drug Administration (FDA) first approved over the counter (OTC) availability of EC in August 2006. In addition to pharmacies, many women's health clinics and student health centers offer EC. The drugs are composed of progestin-only, combination progestin and estrogen, or anti-progestin formulations (Trussell & Raymond, 2013). In 2009, the regional cost of EC OTC at a pharmacy was \$50 to \$60, and 70% of pharmacies in the state dispensed EC (Lehan Mackin & Clark, 2011). The WHO and the American College of Obstetricians and Gynecologists (ACOG) have made statements in support of EC as safe and effective post-coital methods of pregnancy prevention (ACOG, 2010; WHO, 2012).

EC adds to the range of known and accepted options of birth control methods and may assist in preventing unintended or unwanted pregnancies. Unwanted pregnancies increase the risk of poor birth outcomes (Mohllajee, Curtis, Morrow, & Marchbanks, 2007) and maternal depression (Cheng, Schwarz, Douglas, & Horon, 2009); predisposes a woman and child to long-term economic, health, and social disadvantages (Hellerstedt et al., 1998); and affects a woman's lifetime earning potential (Bailey, 2006; Goldin & Katz, 2000; Logan, Holcombe, Manlove, Ryan, & Trends, 2007). The effects of poor infant health can last into adulthood and include risk of lower educational attainment (Potharst et al., 2011). Increasing knowledge and use of EC may be one way of supporting women so that they may bear children when (or if) they feel they are physically, emotionally, and financially ready.

Despite the value of EC in reducing unintended pregnancy, research suggests that it may be underutilized (Hickey, 2009; Miller, 2011; Vahratian, Patel, Wolff, & Xu, 2008). Vahratian et al. (2008) suggest EC may avert 60% to 80% of pregnancies that are unintended in women aged 18 to 24. It may also provide an alternative to the non-use of contraception or an option for those who use withdrawal as a method of birth control (Connor, 2008).

Use of EC has not been widely studied and only five studies have examined EC in college women. Two of the studies examined EC in male and female university populations when EC could only be obtained with a provider prescription. Corbett, Mitchell, Taylor, and Kemppainen (2006) described knowledge, perception, and use of EC. In the study sample, most (75.3%) knew of a method of post-coital contraception, 87.6% believed EC was the same as RU-486 and rate of use was 12.4%. Vahratian et al. (2008) focused on approval of EC and perceptions of whether or not EC should be made available OTC, reporting that the majority approved of EC use in the case of rape (93.2%) or if a condom broke (85.8%). In terms of access, 33.6% of women would purchase EC in advance of need if the drug was available OTC. Both studies concluded that knowledge of availability would increase use.

The three remaining studies with college women were conducted after EC became available OTC. Two of the three studies examined knowledge, perceptions, and use (Hickey, 2009; Miller, 2011). In both of these studies, awareness of EC was high (81.4%–98%); some women knew EC was available without a prescription (31.6%–66%); however, a substantial proportion (48%–70.7%) did not distinguish EC from abortion or RU-486. In addition, Hickey reported that the majority of women approved of EC use in the case of rape (96%) or contraceptive method failure (82%) and that the majority of women would pay as much as \$10 to \$30 to purchase EC. Miller also inquired about appropriate time frame for use and found that 38.4% could correctly indicate the 72-hr window for highest effectiveness. The final study by Waltermaurer, Doleyres, Bednarczyk, and McNutt (2013) is the only study to examine associations of sample descriptives with EC consideration and use in a sample limited to 482 conveniently sampled, sexually active, heterosexual, female undergraduates. In this study sample, 46.5% of women reported ever using EC and significant predictors of use included having three or more sexual partners, often or always using a condom, identifying racially as non-White, and ever binge drinking. All reports recognized that rates of EC use could be higher considering that the majority college age women are sexually active, many have inconsistent contraceptive use, and that the college environment poses unique risks.

In addition to the aforementioned study findings, there are other factors that may affect women's EC use. Demographic characteristics such as age, race and ethnicity, and educational attainment have been associated with pregnancy intendedness (Finer & Henshaw, 2006; Orcutt & Cooper, 1997). Sexual behavior and pregnancy history also influence efforts to prevent pregnancy (Finer & Henshaw, 2006; Orcutt & Cooper, 1997). Therefore, level of sexual activity, frequency of unprotected intercourse, pregnancy history, and use of a primary method of contraception could be potentially important in determining factors associated with EC use. However, few studies have evaluated these characteristics in relation to EC use. Waltermaurer et al.'s (2013) examination of the association of EC use with regular use of a primary method of contraception reported no significant associations with hormonal methods but women were 0.70 times less likely to use EC if they often or always used a condom. Although the literature is conflicted regarding the association of a pregnancy false alarm (defined as a time when women thought they might be pregnant but were not) and sexual behavior, it is potentially important in the context of EC use as fear of pregnancy has been a motivator for contraceptive use (Evans, Selstad, & Welcher, 1976; Hirsch et al., 1989; Orcutt & Cooper, 1997).

Purpose

Prior studies highlight a need for additional inquiry about women's knowledge and use of EC. Therefore, the purpose of this study was to describe knowledge and use of EC in college women aged 18 to 35 and determine whether select demographic characteristics, sexual behaviors, or pregnancy history was associated with knowledge of EC access and EC use. This study sought to answer the following research question: What personal factors (e.g., race, year in college, frequency of unprotected sex, history of false alarm) are associated with knowledge that EC can be accessed OTC or prior use of EC?

Method

Design and Sample

This exploratory descriptive study was completed as the first phase of a larger mixed method study in the fall of 2010 using a questionnaire designed to assess college women's knowledge and use of EC. The target population included all female undergraduate, graduate, and non-degree seeking students attending a large Midwestern university. To be eligible for inclusion, women needed to be between 18 and 35 years old. This age range was chosen to be purposefully diverse in personal experience, cognitive development, and life goals. Of those invited, 2,007 of 14,456 (14%) participated.

Measures

Women's knowledge and use of EC were assessed via the Social Context and Unintended Pregnancy (SCUP) questionnaire developed by the first author. Questionnaire development was guided by relevant literature in survey methodology (Devellis, 2003; Dillman, Smyth, & Christian, 2009; Fowler, 2002); questions were based on a review of literature, existing questionnaires, and clinical experience. Content validity testing occurred in three phases. The first phase occurred with other researchers and sexual health practitioners as it was being developed. A second phase involved three college women (two graduate, one undergraduate) who talked aloud as they completed a paper and pencil version and provided narration about items that were unclear or confusing (Fowler & Mangione, 1990). In a third phase, the questionnaire was converted to web format and pilot tested with 15 college women. Revisions were made during each phase as necessary.

The final version of the questionnaire included 44 items and addressed demographic characteristics of participants and their sexual behavior and pregnancy history (9 items), EC knowledge (17 items), and EC use (11 items). Findings related to some knowledge items are not reported because, at the time the study was conducted, the mechanism of action of EC was not definitively determined, and may not be relevant considering what is known today about how EC works.

Demographic characteristics, sexual behavior, and pregnancy history questions were adapted from previous surveys such as the Family Growth Survey and the California Women's Health Survey (unpublished version). Examples of sexual behavior questions included the following: "Have you ever had vaginal intercourse with a man?" and "Are you (or your male sex partner(s) currently using a birth control method to prevent pregnancy?" Pregnancy history questions included, "Have you ever thought you might be pregnant but it turned out to be a false alarm?" or "Have you ever been pregnant?" Demographic and sexual history questions were forced choice but included an "other" option providing space for additional free text explanations.

Questions about EC knowledge focused on two components. The first component addressed the women's awareness of EC and whether they knew where to obtain it. Awareness was assessed with the question, "To the best of your knowledge, if a woman has unprotected sex is there anything she can do following intercourse that will prevent pregnancy?" EC access questions asked about availability of EC OTC, at community clinics, and student health and

emergency departments. The second component addressed knowledge related to mechanisms of action and acceptability of use. All knowledge questions were forced choice with either yes/no/not sure or agree/disagree/not sure as the designated responses. Example questions include, "Emergency contraception is most effective when taken within the first few days after intercourse." "Emergency contraception can cause birth defects if it is taken when a woman is pregnant."

Questions about EC use asked about actual and acceptable use. Questions about acceptability included, "Would you approve of using emergency contraception if a woman was raped?" or "Would you approve of using emergency contraception in place of a primary method of birth control?" Items about EC use included "Have you ever used emergency contraception?" These questions prompted a forced choice of yes, no, or not sure.

Data Collection

The research invitation was extended via mass university e-mail to all female students. Interested students were directed to an online survey created and distributed through Websurveyor (version 5) software. This is a secure, online data collection platform. Informed consent was implied if, after reading the study description and invitation, the participant proceeded to complete the questionnaire. Initial demographic questions ensured respondents met inclusion criteria. The electronic questionnaire took 15 to 20 min and could be completed anonymously or confidentially. Data were not anonymous if women agreed to participate in a future phase of the study and provided personal information connected to questionnaire responses. Compensation methods included a chance to win 1 of 40 \$10 gift certificates. All procedures were approved by the Institutional Review Board.

Analysis

Data analysis was completed using SAS (version 9.1.3). Means and medians were used to describe continuous variables and proportions for categorical variables. Multivariate analysis was completed using stepwise logistic regression. Separate models were developed to identify the association of select sample characteristics with one of two different dichotomous dependent variables: (a) knowing or not knowing EC is available OTC or (b) ever or never used EC. When modeling knowledge of EC OTC availability, data from all participants were included. Models for EC use as the dependent variable were constructed for two subsets of the original sample. The first model considered all women in the sample who were sexually active. The second model considered only those women who reported one or more episodes of unprotected intercourse in the previous 12 months. For all models, year in college was collapsed into three categories and represented underclassmen (freshman and sophomore status), upperclassmen (junior and senior status), and graduate student status. Race/ethnicity was condensed into five categories of White/Caucasian, African American, Asian/Pacific Islander, Hispanic/Latina, and Other.

Each of the initial models for the multivariate analyses considered all variables bivariately associated with either knowing EC was available OTC or EC use at the .10 level within the relevant sample subpopulation. This included age, year in college, college funding source, current use of a primary method of birth control, race/ethnicity, history of false alarm, ever

been pregnant, history of abortion, and frequency of unprotected intercourse (never or 1 or more times). Knowledge models also included prior use of EC and use models included knowledge of OTC access. These variables were tested for co-linearity and all bivariate correlations were less than .56. After the main variables were chosen, all possible two-way interactions were tested for potential significance. Odds ratios (ORs) were computed by exponentiating the beta estimates. The stepwise approach identified the factors that were most strongly associated the dependent variables which, in the future, could be helpful in directing interventions. Although confirmation of study findings is recommended when using the stepwise approach, it is appropriate for exploratory descriptive studies (Polit & Polit, 2010).

Results

Demographic Characteristics

Women's ages ranged from 18 to 35 years with a median of 22 years. Women 25 or younger comprised 75.8% ($n = 1,521$) of the respondents. Undergraduate and graduate students comprised 59.6% ($n = 1,195$) and 39.5% ($n = 793$) of the respondents, respectively. The ethnic make-up of the sample was largely Caucasian/White ($n = 1,739$, 86.8%) with 13.2% ($n = 265$) minority population (Table 1).

To finance their education, 59.5% ($n = 1,194$) used student loans, 51.4% ($n = 1,036$) obtained scholarships, 23% ($n = 463$) received grants, 52% ($n = 1,044$) worked full- or part-time, and 53.7% ($n = 1,078$) received family assistance to pay for school and living expenses. The large majority had some type of health coverage; 3.8% ($n = 77$) reported no health benefits.

Sexual Behavior and Pregnancy History

The majority of women ($n = 1,716$, 86%) reported at least one episode of sexual intercourse in their lifetime and 85% ($n = 1,463$) of those women reported they had been sexually active in the past month (Table 1). Of all women who had ever had sexual intercourse, 74.1% ($n = 1,484$) were currently using a primary method of birth control. Of those who had ever had intercourse, 20% ($n = 342$) reported using no method of pregnancy prevention from a few times to every time intercourse occurred in the previous 12 months. Of those women who had ever been sexually active with a man, 15.2% ($n = 261$) had one or more pregnancies. Of these, 26.2% ($n = 68$) had spontaneous abortions, 44.2% ($n = 114$) had medical or surgical abortions, and 29.6% ($n = 79$) had live births. Of all women who had been previously pregnant, 54.8% ($n = 143$) had one or more children. (These values include women who may have experienced multiple pregnancies with different outcomes.) More undergraduates (9.3%, $n = 160$) than graduate students (5.8%, $n = 99$) reported ever being pregnant.

EC Knowledge

Most respondents, 94.1% ($n = 1,877$) knew something could be done after intercourse to prevent pregnancy and 98.2% ($n = 1,959$) had heard something about EC prior to participation in the study (Table 2). Women seemed fairly knowledgeable about where to get EC. The majority (72.2%, $n = 1,435$) knew EC could be obtained from a pharmacy OTC,

a community clinic (88.4%, $n = 1,517$), student health services (51%, $n = 1,016$), or an emergency treatment center (46.4%, $n = 920$).

With regard to EC's mechanism of action, respondents' insight varied regarding the time frame of effective use and potential side effects. A preponderance of women, 93.8% ($n = 1,872$), correctly identified that the most effective window for use to be within 72 hr of intercourse. Surprisingly, however, 87.9% ($n = 1,755$) believed EC would work after the first trimester of a confirmed pregnancy and more than one quarter ($n = 555$, 27.8%) believed EC could cause birth defects if taken during a pregnancy. A large percentage ($n = 1,414$, 70.8%) thought EC was the same as abortion.

Associations between knowing of EC OTC availability and demographic characteristics, sexual behavior, and pregnancy history were identified using logistic regression. Table 3 presents the final model with the variables listed in the order they entered the models. The strongest associations were observed for age (OR = 0.88, confidence interval [CI] = [0.84, 0.91]) and prior EC use (OR = 1.77, CI = [1.4, 2.24]) with younger women and women who previously used EC more likely to know EC was available OTC.

Graduate students were 1.9 times (CI = [1.45, 2.60]) more likely than underclassmen (freshman and sophomores) to be aware of OTC availability, but underclassmen were 2.4 times (CI = [1.64, 3.45]) more likely than upperclassmen (juniors and seniors) to know about OTC availability. Finally, women who currently used a primary method of birth control were 1.6 times (CI = [1.29, 2.02]) more likely to know that EC was available OTC. Race was not significantly associated with knowledge of EC OTC availability.

EC Use

Of women who reported having ever been sexually active, 37.1% ($n = 637$) had used EC, and 74.3% ($n = 1,481$) would consider using it in the future (Table 4). When asked about appropriate uses of EC, 95.5% ($n = 1,904$) approved of the drug's use in the case of rape. Fewer thought EC was appropriate in the case of a broken condom or when no other method of birth control was used (87.9%, $n = 1,751$ and 70.8%, $n = 1,409$, respectively). A minority (4.6%, $n = 92$) approved the use of EC as a replacement for a primary method of birth control. Greater than 84% ($n = 1,680$; 1,682) would use EC if they had to pay for a portion of the cost themselves or their insurance covered the costs. A portion (17.1%, $n = 339$) said that they would not use EC under any circumstances (Table 2).

Demographic characteristics, sexual behavior, pregnancy history, and knowledge of EC access were modeled for associations with EC use. The final model included four variables presented, in Table 5, in the order in which they entered the model. The strongest associations with EC use were experiencing a false alarm pregnancy and knowing EC was available OTC. Women who reported a prior false alarm were 2.06 times (CI = [1.67, 2.55]) more likely to report EC use, whereas women who knew EC was available without prescription were 1.8 times (CI = [1.4, 2.3]) more likely to use EC. Race also was significantly associated with EC use. Women of Asian/Pacific Islander descent were 1.9 times (CI = [1.15, 2.97]) more likely to use EC when compared with women identifying as White/Caucasian. Although graduate students had higher odds of using EC, the association

was not statistically significant. No significant interactions were observed at the $\alpha = .05$ level.

Because unprotected intercourse may precipitate a need for post-intercourse pregnancy prevention, a separate logistic regression model was created to evaluate associations of EC use ($n = 237$) in the population of women reporting one or more incidents of unprotected intercourse ($n = 463$; Table 6). Variables are presented in the order in which they were entered into the model. The final model included three significant variables: (a) current use of a primary method of birth control, (b) knowing EC was available from a pharmacy OTC, and (c) having a prior false alarm pregnancy. No significant interactions were observed at the $\alpha = .05$ level.

Among women who had one or more episodes of unprotected sex in the previous 12 months, those who experienced a false alarm were 1.8 times more likely to use EC. Women who used a primary method of birth control were twice as likely to use EC; and those who knew EC was available from a pharmacist OTC were 1.9 times more likely to use EC.

Discussion

This study described the knowledge and use of EC among college age women following approval of its purchase OTC. Consistent with previous research (Hickey, 2009; Miller, 2011; Vahratian et al., 2008), we found that more than 94% of women knew that there was something that could be done post-intercourse to prevent pregnancy. Fewer women knew that EC was available from a pharmacy or clinic without a prescription; however, the proportion was still high at 74%. This is much greater than the 31% reported by Hickey (2009), but similar to 70% of women reported by Miller (2011), and could reflect the longer time since EC was approved for OTC use. Of note, particularly for college students, is that only about half of the women knew the campus student health center could dispense EC. Although much higher than the 18.9% reported by Miller (2011), this finding indicates a need to increase local knowledge and develop awareness campaigns at student health centers.

It is interesting, but concerning, that many in our university cohort had inaccurate information about the mechanism of action, time frame for effective use, and potential adverse effects of ECs. About 70% of women equated EC with abortion, 87% thought it would be effective throughout the first trimester, and almost 28% thought EC would cause birth defects. Although not directly comparable, our findings with respect to abortion appear higher than the 48% of women who could not differentiate EC from RU-486 reported by Hickey (2009) and the 19% who reported EC as closer to abortion than contraception by Miller (2011). We are unable to determine whether women found EC similar to abortion because of moral or religious beliefs, mechanism of action, or something else. Future studies need to confirm these findings in addition to examining why women associate EC with abortion and evaluating the quality and sources of information about EC effectiveness and side effects.

Overall, EC approval was high with about three fourths stating they would consider using EC in the future and most believed it was appropriate in cases of rape, primary contraceptive failure, or if no method of birth control was used during intercourse. These findings are consistent with prior studies (Hickey, 2009; Vahratian et al., 2008) and support the potential utility of EC in preventing unintended pregnancy.

Despite the high rates of overall acceptability, 17.1% ($n = 339$) stated they would never use EC under any conditions. This may reflect a sense of stigma or morality attached to the use of contraception and religious or cultural acceptance of efforts to prevent pregnancy (Merchant et al., 2006; Srikanthan & Reid, 2008). Although beyond the scope of this study, further exploration of this is warranted.

The actual proportion of women using EC was much higher in this study than had been reported in one study with college women conducted prior to OTC availability (12.4%; Corbett et al., 2006). This is not surprising because the FDA policy change was designed to increase access to EC and is consistent with findings that more pharmacies are opting to offer EC now that it is sold OTC (Lehan Mackin & Clark, 2011). Compared with other studies conducted post-OTC, the proportion of EC users in our study was also higher than the 17% reported by Miller and the 28% reported by Hickey but lower than the 46.5% reported by Waltermaurer et al. (2013). Increases in rates of use may be a function of time. Studies conducted in Australia (Mohoric-Stare & De Costa, 2009) and Norway (Pedersen, 2008), where EC has been available OTC for a longer time, have associated time since OTC availability to increased use.

The high overall proportion of women who knew EC was available without a prescription was significantly and consistently associated with EC use among women who were sexually active and the subset of women who reported episodes of unprotected sex. This finding supports continued attempts to disseminate information about where EC can be obtained in an effort to increase use.

Experiencing a false alarm pregnancy was also significantly associated with EC use in both groups of women. This finding is consistent with prior research that found fear of pregnancy to be a motivator to using contraception (Evans et al., 1976; Hirsch et al., 1989; Orcutt & Cooper, 1997). It also suggests that there is a connection between women who recognize when there is an actual risk of pregnancy and those who sought EC in an effort to attenuate the risk. It would also be interesting to examine reasons why women who have a pregnancy alarm do not seek EC.

It is interesting that having a primary contraceptive method was positively associated with EC use among those women who reported unprotected intercourse in the past 12 months. Because of the cross-sectional design, interpretation of this finding is not straight forward. It could be that women used EC prior to establishing a primary contraceptive method. However, it may also be that EC was used for additional “protection.” This sentiment is reflective of qualitative investigations suggesting that women using a primary birth control method will use EC “just to be safe” or to be “doubly sure” they are protected against pregnancy (Lehan Mackin, unpublished data, 2010). Unfortunately, separate use of condoms

and hormonal birth control was not evaluated to allow comparison with findings by Waltermaurer et al. (2013) who found condom use negatively associated with EC and hormonal methods of birth control were not significantly associated. Better understanding of this relationship is needed because it is possible that in cases where primary methods are highly effective, EC may be unnecessary or over-used.

In this study, race was the only demographic characteristic associated with EC use. Among all sexually active women, women who self-identified as Asian/Pacific Islander were more likely to use EC than women who self-identified as White. Although not statistically significant, our data indicate that women who identified as Hispanic/Latina or Multiracial also had increased odds of using EC when compared with those identifying as Caucasian/White. These results are likely affected by the small sample of minorities participating in the study. Only one other study has explored race and EC use finding that there were no associations of EC use with identification as Asian/Pacific Islander, but did find women identifying as White as the least likely to use EC of all racial/ethnic groups (Waltermaurer et al., 2013). Because race and ethnicity are known to be associated with differences in attitudes and approaches to contraception (Borrero, Farkas, Dehlendorf, & Rocca, 2013; Dehlendorf et al., 2014; Hayford & Guzzo, 2013; Pflieger, Cook, Niccolai, & Connell, 2013), it will be important to explore racial and ethnic differences within EC use in samples with higher proportions of minority participants.

Although not the primary focus of this research, the 42.2% prevalence of elected abortion in this sample of college women is worth highlighting. About the time this study was conducted, the prevalence of abortion for the general population of women age 15 to 44 was 22% among women who had experienced a pregnancy (Jones & Kooistra, 2011). It is possible that disparities between this study and findings by Jones and Kooistra can be attributed to population differences; however, the high rate of abortion found in this study suggests there are additional and unrecognized factors influencing pregnancy decisions. Although we understand these results need to be confirmed, it may well be that understanding “other” factors at work in this environment will be the key to promoting all methods of contraception, understanding barriers to use, and ultimately help women avoid unintended pregnancy.

Although this research contributes to our knowledge of EC, it has limitations. We did not include items in the questionnaire about marriage or partner status. Future research will need to include these variables as this may have some association with use (Waltermaurer et al., 2013). Also, for research on sensitive topics, women may have reservations discussing unprotected sex, outcomes of pregnancies, or any sexual issues. The option to complete the questionnaire anonymously was intended to ameliorate this risk. Due to recall bias and self-reports, there are likely some expected response errors; however, there is no reason to suggest that these errors would be unique to the context of EC knowledge and use, encompassed by this study. Finally, it is not known whether the 14% of women who responded represented all female students. Although a response of 14% (2,007/14,456) was lower than expected and may be a source of bias, it was not considerably different than responses reported by studies using electronic data collection in the similar time period. (As

examples, see Hickey, 2009, 22%; Gilbert, Temby, & Rogers, 2005, 18.6%; and Turok et al., 2011, 14.2%.)

Because all respondents were university students, they might behave differently than less educated women, women less affluent, or women without similar pregnancy prevention resources available on college campuses. Nevertheless, this sample was diverse in other ways. First, education financing revealed that women's economic status varied: About half reported they required student loans, part- or full-time jobs, or family assistance to fund their college education. The variability in economic background, the Midwest, public university setting, sample size, and the inclusion of women age 18 to 35 who were both undergraduate and graduate students further sets this study apart from the previous studies on post-EC perceptions and use.

Additional studies should explore the utility of EC in other populations. Our results in a university population suggest that efforts should be stepped up to dispel misconceptions and provide accurate information about EC to the general public. In addition, further investigation is needed to determine why women faced with the threat of unintended pregnancy (such as those experiencing a false alarm, or choosing to abort an unwanted pregnancy) might not seek EC.

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Table 1Background Characteristics and Sexual Histories of Sample of College Women ($N = 2,007$)

Characteristic	<i>n</i>	%
Year in college		
Freshman	200	10.0
Sophomore	272	13.6
Junior	315	15.7
Senior	408	20.3
Graduate student	793	39.5
Other	19	1.0
Race/ethnicity		
African American	38	1.9
Asian/Pacific Islander	105	5.2
Caucasian/White	1,739	86.8
Hispanic/Latina	39	2.0
Other/Multiracial	83	4.1
Sexual behavior and pregnancy history ^a		
Ever had vaginal intercourse	1,716	86.0
Sexually active in last month	1,463 ^b	85.2
Currently using birth control	1,484	74.0
Ever used birth control	1,736	86.5
Experienced a false alarm pregnancy	1,029 ^b	60.0
Ever been pregnant	261 ^b	15.2
Outcome: spontaneous abortion	68 ^c	26.2
Outcome: medical or surgical abortion	114 ^c	44.2
Outcome: childbirth	143 ^c	54.8
Frequency of unprotected intercourse in previous 12 months ^a		
Never	1,245 ^d	72.6
One time	121 ^d	7.1
A few times	225 ^d	13.1
Much of the time	75 ^d	4.4
Every time	42 ^d	2.5

^a. Denominators vary due to question branching and missing responses.^b. Reported for those women who had ever been sexually active ($n = 1,716$).^c. Reported for those women who had ever been pregnant ($n = 261$). Some women report multiple pregnancies with different outcomes.^d. Reported for those women who had ever been sexually active ($n = 1,708$ due to 8 missing responses).

Table 2

Knowledge of EC in Sample of College Women.

Characteristic	<i>n</i>	%
Awareness of a method for post-intercourse pregnancy prevention	1,877	94.1
Agreed EC can be purchased OTC	1,435	72.2
Agreed EC can be obtained at a community reproductive health clinic	1,517	88.4
Agreed EC can be obtained from student health services	1,016	51.0
Agreed EC can be obtained from an emergency treatment center	920	46.4
Agreed EC is the same as abortion	1,414	70.8
Agreed EC is most effective within first few days after intercourse	1,872	93.8
Agreed EC could work through the first trimester of pregnancy	1,755	87.9
Agreed EC will cause birth defects	555	27.8
Heard of EC prior to participating in study	1,959	98.2
Would use EC if they had to pay a portion of the cost	1,682	84.7
Would use EC if insurance covered the cost	1,680	84.7
Would use EC if they had to pay the entire cost	1,442	72.5
Would not use EC under any circumstances	339	17.1

Note. EC = emergency contraception; OTC = over the counter.

Table 3

Characteristics Associated With Knowing EC Could Be Accessed OTC in a Sample of College Women.

Characteristic	β	Standard Error	Odds Ratio	CI
Intercept	2.9197	0.3693		
Age	-0.1314	0.0181	0.877	[0.84, 0.91]
History of EC use	0.5701	0.1199	1.768	[1.40, 2.24]
Graduate student	0.6640	0.1484	1.943	[1.45, 2.60]
Undergraduate student: Underclassman	0.8649	0.1901	2.375	[1.64, 3.45]
Current use of Birth Control	0.4815	0.1141	1.618	[1.29, 2.02]

Note. EC = emergency contraception; OTC = over the counter; CI = confidence interval.

Table 4

Use Characteristics of EC in a Sample of College Women.

Characteristic	<i>n</i> ^a	%
History of EC use	637 ^b	37.1
Would consider using EC if needed	1,481 ^c	74.3
Agreed appropriate to use EC in the case of rape	1,904 ^c	95.5
Agreed appropriate to use EC if condom broke	175 ^d	87.9
Agreed appropriate to use EC if no birth control used	1,409 ^e	70.8
Agreed appropriate to use EC as primary method of birth control	92 ^c	4.6

Note. EC = emergency contraception.

^a. Denominators vary due to question branching and missing responses.

^b. Reported for those women who had ever been sexually active (*n* = 1,716).

^c. *n* = 1,994; 14 missing responses.

^d. *n* = 1,992; 16 missing responses.

^e. *n* = 1,990; 18 missing responses.

Table 5

Characteristics Associated With Use of EC in a Sample of Sexually Active College Women.

Characteristic	β	Standard Error	Odds Ratio	CI
Intercept	-1.5868	0.1656		
History of false alarm pregnancy	0.7240	0.1078	2.06	[1.67, 2.55]
Know EC available from pharmacy OTC ^a	0.5946	0.1226	1.81	[1.4, 2.3]
Race: African American	-0.3076	0.4159	0.735	[0.33, 1.66]
Race: Asian/Pacific Islander	0.6127	0.2423	1.85	[1.15, 2.97]
Race: Hispanic/Latina	0.6420	0.3452	1.9	[0.97, 3.74]
Race: Other/Multiracial	0.3823	0.2633	1.47	[0.88, 2.46]
Graduate student	0.2704	0.1401	1.31	[1.0, 1.73]
Undergraduate student: Underclassman	0.0189	0.1391	1.02	[0.78, 1.38]

Note. OTC = over the counter; EC = emergency contraception; CI = confidence interval.

Table 6

Characteristics Associated With EC Use for Sexually Active Women in a Sample of College Women With One or More Incidents of Unprotected Sex in Previous 12 Months.

Characteristic	β	Standard Error	Odds Ratio	CI
Intercept	-1.3374	0.2711		
History of false alarm	0.5636	0.2124	1.757	[1.6, 2.6]
Current use of birth control	0.7109	0.2132	2.036	[1.3, 3.1]
Know EC available from pharmacy OTC ^a	0.6278	0.2187	1.873	[1.2, 2.9]

Note. EC = emergency contraception; CI = confidence interval; OTC = over the counter.