

Contraceptive discontinuation and its relation to emergency contraception use among undergraduate women in Brazil

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ABSTRACT

Objective: This paper examines the factors related to emergency contraception (EC) use in the context of contraceptive discontinuation among undergraduate women in Brazil.

Study design: This a retrospective cohort study conducted among a probability sample of 1679 undergraduate women in Sao Paulo, Brazil. Data were collected online using a contraceptive calendar. We examined factors related to EC use following contraceptive discontinuation for method-related reasons and contraceptive abandonment. We also analyzed factors related to EC use following inconsistent use of contraception. Analyses were conducted using Pearson's Chi-square tests and logistic regression.

Results: More than half (54.6%) of young women reported lifetime EC use and 16.5% had used EC in the 12-months prior to the survey. Last use of EC was mostly related to inconsistent or incorrect use of regular contraception (90.6%). Three quarters of women (76.2%) who discontinued contraception and were at risk of becoming pregnant did not use EC following discontinuation, and only 10.5% used EC after stopping contraception altogether. Women who were younger, who self-identified as Evangelicals, who reported more than four lifetime sexual partners, and who had no pregnancy history had higher odds of using EC following discontinuation for method-related reasons.

Conclusion: We conclude that most undergraduate students in São Paulo Brazil do not use EC when needed, such as contraceptive discontinuation, potentially reflecting a lack of pregnancy risk recognition.

Introduction

A 2018 analysis of worldwide trends in unintended pregnancy showed that, although rates have declined globally since 1990, they still remain a public health concern [1]. There is therefore continued interest in promoting strategies to reduce unintended pregnancy rates, even in low fertility countries, where the proportion of pregnancies that are unintended remains high [2].

Unintended pregnancies are generally attributed – but not limited – to a combination of non-use, misuse or discontinuation of contraception [3,4]. As a result, long acting contraceptive methods are increasingly promoted to improve consistent and prolonged use of regular contraception while easy access to emergency contraceptive (EC) methods is also encouraged as a second chance to reduce the risk of pregnancy

after unprotected sexual intercourse [2]. EC is particular useful in cases of errors of use of regular methods (condom rupture and missed oral contraceptives) or to protect against pregnancy when transitioning between different forms of regular contraception [5].

Until 2014, at least one method of EC (either ulipristal acetate EC, levonorgestrel EC, combined oral contraceptive pills or copper-bearing intrauterine devices) was available in 148 countries with different combinations of accessibility [6]. Availability and accessibility largely determine patterns of EC use, in combination with individual knowledge about EC and awareness of situations when it should be used [7].

National estimates of EC use are difficult to compare as studies refer to different time frames (lifetime or annual incidence), different study populations (all women of reproductive age, young women, abortion patients) and different time periods extending over 15 years.

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Nonetheless, studies point out that EC use is significantly more frequent among young women, especially if they are highly educated [8,9], like undergraduate students.

While EC has proven effective in preventing pregnancy [10], studies have failed to demonstrate a public health impact of making EC widely available (no reductions in rates of unintended pregnancy), due to the fact that EC is not used sufficiently enough to curve unintended pregnancy risk [11,12]. However, EC is still an important strategy to prevent unintended pregnancy for individual women exposed to the risk of unintended pregnancy. This is especially true in contexts where abortions are highly restricted, such is the case of Brazil, as unintended pregnancies are terminated with unsafe procedures associated with high morbidity and mortality [13].

A better understanding of EC use in relation to contraceptive use dynamics, including discontinuation, is an important step in informing more effective strategies to reduce unintended pregnancies and ultimately, unsafe abortions. This study focuses on the factors that are related to EC use by examining EC use following contraceptive discontinuation use versus EC use related to nonuse of contraception. We also examine EC use following discontinuation for method-related reasons and method abandonment.

Methods

We conducted a 12-month retrospective cohort study among a probability sample of undergraduate female students from a large public university in Brazil (more than 58,000 undergraduates enrolled in 88 units in 2018).

All female students between the ages of 18–24, who ever had sexual intercourse and had used contraception at any time during the 12-months prior to the study were eligible to participate in the study designed to assess frequency and correlates of contraceptive discontinuation. Female students were selected by simple random sampling without replacement, based on a list of students' email addresses ($n = 18,193$ e-mails in 2015). In total, 3078 students were selected and were sent the online questionnaire; 2182 (71%) accessed the questionnaire, but 50 refused to participate, and 453 were not eligible for this study (aged < 18 ($n = 2$), had never had sexual activity ($n = 358$), had not used contraception in the past 12-months ($n = 93$)). The final population comprised 1679 undergraduate female students aged 18–24 years old. The ethical approval was obtained from the Human Research Ethics Committee of the University of São Paulo School of Nursing.

Selected students received an electronic message, and after providing electronic consent, they responded to a self-administered questionnaire through Google Form, which was pre-tested and took on average 5–7 min to complete. The questionnaire collected sociodemographic and sexual and reproductive characteristics: age (18–19/20–24), race/ethnicity (white/black/others), religious affiliation (no religion/catholic/Kardecist Spiritualism/Evangelical/others), relationship status (steady/casual), socioeconomic status (A/B: high level of income, and C–D/E: middle or low level of income) (ABEP 2015), field of study (Human/Health/Exact Sciences), period of study (full-time/part-time), campus site (São Paulo/out of São Paulo); time since first sexual intercourse (≤ 1 year/2–3 years/ ≥ 4 years), number of sexual partners (1partner/2–3 partners/ ≥ 4 partners), previous pregnancy (no/yes).

Women also answered a monthly contraceptive calendar (12-months), modeled off of the Demographic and Health Survey (DHS) [14]. We collected information on type of contraceptive method used, partnership status, and EC use in each month of the contraceptive calendar. In addition, women were questioned about their lifetime use of EC, and the circumstances of last use of EC, including reasons for use (by sheer insecurity/forgot to use some contraception/contraception failed/others).

We defined four measures of EC use:

Table 1

Sociodemographic and sexual and reproductive health characteristics of undergraduate women in the sample. São Paulo, Brazil – 2015.

Variables	Total	
	N	%
Sociodemographic characteristics		
Age (years)		
18–19	402	23.9
20–24	1277	76.1
Race/ethnicity		
White (caucasian)	1353	80.6
Black	228	13.6
Other race/ethnicity ^a	98	5.8
Religion		
No religion	775	46.2
Roman Catholic	526	31.3
Kardecist Spiritualism Doctrine	203	12.1
Evangelical	105	6.3
Other religion ^b	70	4.2
Type of relationship		
Steady	1102	65.6
Casual relationship or None	577	34.4
Socioeconomic status		
A/B	1326	79.0
C–D/E	353	21.0
Educational background		
Field of study		
Human Sciences	688	41.0
Health Sciences	621	37.0
Exact Sciences	370	22.0
Period of study		
Full-time	855	50.9
Part-time	824	49.1
Campus		
São Paulo	1106	65.9
Out of São Paulo	573	34.1
Variables	Total	
	N	%
Sexual, reproductive and contraceptive behavior		
Time since first sexual intercourse		
≤ 1 years	329	19.6
2 – 3 years	588	35.0
≥ 4 years	762	45.4
Number of sexual partners in lifetime		
1 partner	599	35.7
2 – 3 partners	485	28.9
≥ 4 partners	595	35.4
Previous pregnancy		
No	1642	97.8
Yes	37	2.2
Current use of contraceptive method		
No	132	7.9
Yes	1547	92.1
Type of current contraceptive method (n = 1547)		
Highly effective method ^c	1158	74.9
Non-highly effective method ^d	389	25.1
Total	1679	100.0

^a Other race/ethnicity includes: Asian origin and indigenous people.

^b Other religions include: Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, and Islam.

^c Highly effective methods include: hormonal contraception and an intrauterine device.

^d Non-highly effective methods include: condoms, spermicides, fertility-awareness and withdrawal.

- (1) EC use following use of regular contraception: EC used when women were using a regular method or when they switched between regular methods;
- (2) EC use in the context of non-regular use of contraception: EC used when women stopped their method and did not resume

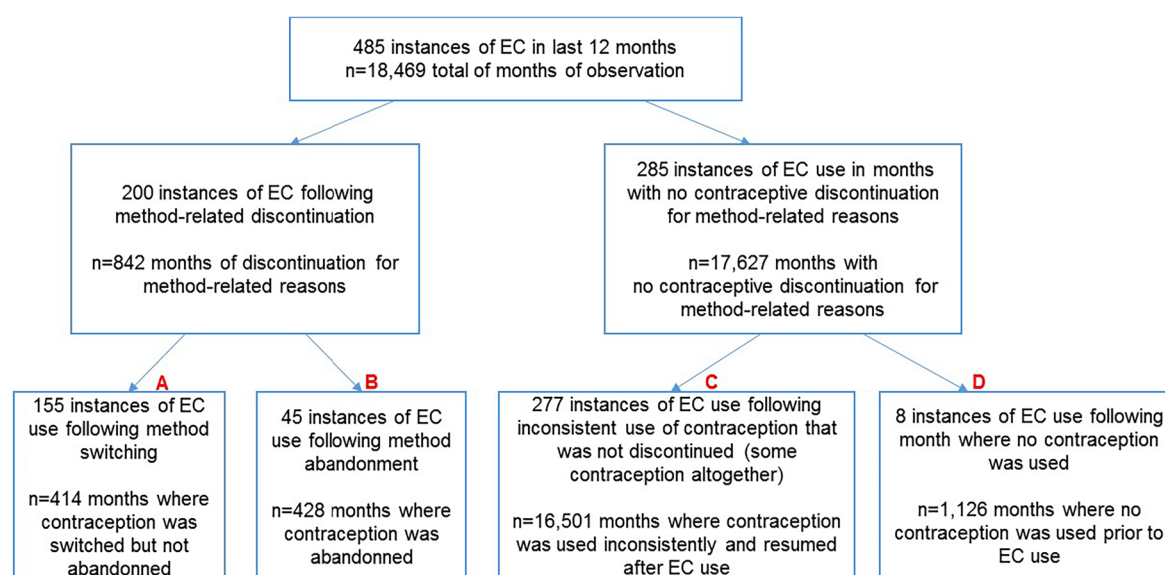


Fig. 1. Using of emergency contraception in context or not of contraceptive discontinuation for method-related reasons. São Paulo, 2015.

- contraception within a month of discontinuation, and EC used when women were not using any contraception;
- (3) EC use following discontinuation for method-related reasons: EC used when women discontinued their regular method while still in need of contraception, i.e., with a partner, not pregnant, not trying to conceive, not sterile);
 - (4) EC use following method abandonment: EC used when women stopped using their method while still in need of contraception and they did not resume contraception within a month of discontinuation.

Analyses were conducted using Stata 14.2. First, we compared factors related to EC use following use of contraception to factors related to EC use in the context of non-regular contraception, using Pearson's chi-square tests. We then compared factors related to EC use following contraceptive discontinuation for method-related reasons, and factors related to EC use following method abandonment. In the last phase, we conducted multivariate logistic regression models to identify factors related to EC use following contraceptive discontinuation for method-related reasons and factors related to EC use following method abandonment. Adjusted odds ratios and 95% confidence intervals were estimated. While women could theoretically report several episodes of EC use after method discontinuation, there were only few months of discontinuation reported by the same women, which reduces the issue of inter-correlation between observations.

Results

Women were, on average 21 years old. The majority was white, from high socioeconomic status and reported no religion. Most were single, in a steady relationship. The majority had more than 2 years of sexual experience and reported more than two lifetime sexual partners. Only 2.2% reported a previous pregnancy. Almost 9 out of 10 female students were using contraception at the time of the survey, mainly the pill (70.9%) or male condoms (23.7%) (Table 1).

More than half of respondents had ever used EC (54.6%), but a lower proportion had used EC in the 12-months prior to the study (16.5%). The most frequent cited reason for using EC was uncertainty about the effectiveness of their current method (by sheer insecurity), while the second most cited reason was forgetting to use contraception. A significant proportion of young women (almost 40%) reported having had unprotected sexual intercourse in the last 12-months but did not

use EC (data not shown in Table).

Based on information collected in the contraceptive calendar, 442 women reported using EC in the last 12-months, contributing to 485 months in which EC was used (Fig. 1). In most cases, EC was used in relation to incorrect use of regular contraception rather than in the context of non-use. Specifically, 277 instances of EC use occurred when women reported using the same method during the 12-months of observation, reflecting potential inconsistent use (Fig. 1C). On the other hand, 155 instances of EC use followed method switching (Fig. 1A). Both continuous use and method switching correspond to EC use in the context of a breach in contraceptive protection, which accounts for the majority of EC usage (89%). A total of 45 instances of EC followed the 428 months where contraception was abandoned (no resumption of contraception in the month following discontinuation) (Fig. 1B); and only 8 instances of EC use followed the 1126 months where no contraception was used (Fig. 1D).

Comparison of factors related to EC in the context of regular contraceptive use (90.6% of EC use) versus non-regular contraceptive use (10.4%) are presented in Table 2. Respondents who were in causal relationships, from less privileged socioeconomic backgrounds, who were enrolled part-time, and were using condoms as their last method before EC use (as opposed to pills) were more likely to use EC in the context of non-regular use of contraception, than in the context of regular use (inconsistent or error of use).

Factors related to EC following method discontinuation for method related reasons (76.2%) are presented in Table 3. The Table also presents factors related to EC use following method abandonment (10.5%) among women still in need of contraception. Age and previous pregnancy were associated with EC use following contraceptive discontinuation for method-related reasons. Field of study and type of method discontinued were associated with EC use following method abandonment.

Results from multiple logistic regression models, presented in Table 4, indicate that women who were younger, who self-identified as Evangelicals, who reported more than 4 lifetime sexual partners, and who had no pregnancy history had higher odds of using EC following discontinuation for method-related reasons. Women who self-identified as Roman Catholic, and male condom users had higher odds of using EC following method abandonment.

Table 2

Sociodemographic and sexual and reproductive health characteristics of undergraduate women by context of EC use (use of contraception or in the context of non-regular contraception). São Paulo, Brazil – 2015.

Variables	Total	EC ^a use (n =)		p ^b
	N	In use of contraception %	Non-regular contraception %	
<i>Sociodemographic characteristics</i>				
Age				0.242
18 – 19	132	86.4	13.6	
20 – 24	353	90.1	9.9	
Race/ethnicity				0.579
White (caucasian)	375	88.5	11.5	
Black	75	89.3	10.7	
Other race/ethnicity ^c	35	94.3	5.7	
Religion				0.181
No religion	228	91.2	8.8	
Roman Catholic	130	83.9	16.1	
Kardecist Spiritualism	59	93.2	6.8	
Doctrine				
Evangelical	41	90.2	9.8	
Other religion ^d	27	85.2	14.8	
Type of relationship at the time of discontinuation				0.021
Steady	276	90.6	9.4	
Casual relationship	209	87.1	12.9	
Socioeconomic status				0.029
A/B	367	89.9	10.1	
C – D/E	118	86.4	13.6	
Educational background				
Field of study				0.149
Human Sciences	202	87.1	12.9	
Health Sciences	178	92.7	7.3	
Exact Sciences	105	86.7	13.3	
Period of study				0.011
Full-time	245	92.7	7.4	
Part-time	240	85.4	14.6	
Campus				0.395
São Paulo	313	88.2	11.8	
Out of São Paulo	172	90.7	9.3	
Sexual, reproductive and contraceptive behavior				
Time since first sexual intercourse				0.153
≤ 1 year	98	83.7	16.3	
2 – 3 years	169	89.9	10.1	
≥ 4 years	218	90.8	9.8	
Number of sexual partners in lifetime				0.144
1 partner	115	91.3	8.7	
2 – 3 partners	150	84.7	15.3	
≥ 4 partners	220	90.9	9.1	
Previous pregnancy				0.263
No	475	88.8	11.2	
Yes	10	100.0	0.0	
Total	485	89.07	10.93	
Type of contraceptive method^e				0.024
Oral pill	260	93.5	6.5	
Male condom	172	88.4	11.6	
Other method ^e	45	82.2	17.8	
Total	477	90.6	9.4	

^a EC = Emergency contraception.

^b Pearson's chi-square test.

^c Other race/ethnicity includes: Asian origin and indigenous people.

^d Other religions include: Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, and Islam.

^e Other methods include: injectable, withdrawal/Fertility-awareness patch, an intrauterine device, diaphragms, implants, vaginal ring, female condoms, and spermicide.

Table 3

Sociodemographic and sexual and reproductive health characteristics of undergraduate women according to using of emergency contraception following discontinuation for method-related reasons and method abandonment. São Paulo, Brazil – 2015.

Variables	Discontinuation for method-related reasons			Method abandonment		
	Total N	Used EC ^a %	p ^b	Total N	Used EC ^a %	p ^b
<i>Sociodemographic characteristics</i>						
Age (years)			0.034			0.548
18–19	213	29.1		117	12.0	
20–24	629	21.9		311	10.0	
Race/ethnicity			0.133			0.760
White (caucasian)	671	22.4		322	10.5	
Black	132	28.0		67	11.9	
Other race/ethnicity ^c	39	33.3		29	6.9	
Religion			0.252			0.178
No religion	396	23.3		201	8.0	
Roman Catholic	241	22.0		115	15.7	
Kardecist Spiritualism	97	21.7		51	5.9	
Doctrine						
Evangelical	53	35.9		33	12.1	
Other religion ^d	55	27.3		28	14.3	
Type of relationship at the time of discontinuation			0.818			0.437
Steady	484	23.9		242	9.5	
Casual relationship	358	23.2		186	11.8	
Socioeconomic status			0.617			0.278
A/B	639	0.41		323	9.6	
C/D/E	203	0.35		105	13.3	
Educational background						
Field of study			0.662			0.281
Human Sciences	384	23.7		181	13.3	
Health Sciences	290	25.2		157	8.3	
Exact Sciences	168	21.4		90	8.9	
Period of study			0.736			0.026
Full-time	387	24.3		210	7.1	
Part-time	455	23.3		218	13.8	
Campus			0.293			0.179
São Paulo	581	22.7		275	12.0	
Out of São Paulo	261	26.1		153	7.8	
Sexual and reproductive behavior						
Time since first sexual intercourse			0.293			0.378
≤ 1 year	163	26.4		73	15.1	
2–3 years	285	25.6		159	9.4	
≥ 4 years	394	21.3		196	9.8	
Number of sexual partners in lifetime			0.366			0.346
1 partner	47	22.6		93	8.6	
2–3 partners	54	21.3		131	13.7	
≥ 4 partners	99	26.0		204	9.3	
Previous pregnancy			0.037			0.328
No	808	24.4		420	10.5	
Yes	34	8.8		08	12.5	
Type of contraceptive method when abandoned the method			0.126			0.001
Oral pill	333	20.4		243	7.0	
Male condom	341	25.5		157	12.7	
Other method ^e	168	27.4		28	28.6	
Total	842	23.8		428	10.5	

^a EC = Emergency contraception.

^b Pearson's chi-square test.

^c Other race/ethnicity includes: Asian origin and indigenous people.

^d Other religions include: Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, and Islam.

^e Other methods include: injectable, withdrawal/fertility-awareness patch, diaphragms, vaginal ring, and spermicide.

Table 4

Multiple logistic regression of using emergency contraception following discontinuation for method-related reasons and method abandonment. São Paulo, Brazil – 2015.

Variables	Discontinuation for method-related reasons ORadjust (CI) ^a	Method abandonment ORadjust (CI) ^a
Sociodemographic characteristics		
Age (years)		
18–19	1.0	1.0
20–24	0.7 (0.5–1.0)^c	1.1 (0.5–2.3)
Race/ethnicity		
White (caucasian)	1.0	1.0
Black	1.3 (0.8–2.0)	1.2 (0.5–2.9)
Other race/ethnicity ^b	1.9 (0.9–3.9)	0.6 (0.3–2.4)
Religion		
No religion	1.0	1.0
Roman Catholic	1.0 (0.7–1.5)	2.3 (1.1–2.2)^c
Kardacist Spiritualism Doctrine	1.0 (0.6–1.7)	0.9 (0.2–2.5)
Evangelical	2.2 (1.2–3.1)^c	1.8 (0.5–3.1)
Other religion ^d	1.7 (0.9–3.5)	1.8 (0.5–3.5)
Type of relationship at the time of discontinuation		
Steady	1.0	1.0
Casual relationship ^e	0.8 (0.6–1.2)	1.3 (0.6–2.6)
Socioeconomic status		
A/B	1.0	1.0
C–D/E	0.9 (0.6–1.4)	1.3 (0.6–2.8)
Educational background		
Field of study		
Human Sciences	1.0	1.0
Health Sciences	1.1 (0.8–1.6)	0.5 (0.2–1.1)
Exact Sciences	1.0 (0.6–1.5)	0.6 (0.2–1.4)
Sexual and reproductive behavior		
Time since first sexual intercourse		
≤ 1 year	1.0	1.0
2 – 3 years	0.8 (0.5–1.3)	0.5 (0.2–1.3)
≥ 4 years	0.7 (0.4–1.2)	0.4 (0.2–1.4)
Number of sexual partners in lifetime		
1 partner	1.0	1.0
2 – 3 partners	1.1 (0.7–1.8)	2.2 (0.8–3.3)
≥ 4 partners	1.8 (1.1–2.1)^c	1.5 (0.5–3.6)
Previous pregnancy		
No	1.0	–
Yes	0.2 (0.7–0.9)^c	–
Type of contraceptive method when abandoned the method		
Oral pill	1.0	1.0
Male condom	0.8 (0.5–1.1)	1.6 (0.3–0.9)^c
Other method ^e	1.1 (0.7–1.6)	2.8 (1.0–2.1)

^a OR: odds ratio and IC: Confidence Interval.

^b Other race/ethnicity includes: Asian origin and indigenous people.

^c $p \leq 0.050$.

^d Other religions include: Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, and Islam.

^e Other methods include: injectable, withdrawal/fertility-awareness patch, diaphragms, vaginal ring, and spermicide.

Discussion

This is the first paper from Brazil to evaluate EC use following contraceptive discontinuation among women who are at risk of becoming pregnant. While EC use is prevalent among college students in our study (55% lifetime prevalence), few took advantage of EC in situations at risk and most used EC to reduce risk of inconsistent use rather non-use of regular contraception.

Even though the extent of inconsistent use of regular methods has not been assessed in our study, this was the main motivation for women to use EC in the 12-months of observation as women reported using EC by “sheer insecurity” with their regular contraception. These findings are consistent with prior reports, suggesting EC is little used among women at risk of unintended pregnancy [12,15]. Likewise, a study conducted in France noted that EC was predominantly used in

situations of contraceptive errors, with only 15% related to no contraception use [15]. The same was reflected in a qualitative study conducted in Scotland [16]. In our study, women who were at highest risk of pregnancy following discontinuation (method abandonment) were the least likely to use EC (10%) while a quarter of women who switched methods also used EC during the one month bridge period. These findings underline the extent of underutilization of EC even in a highly educated population.

According to a Brazilian study also conducted with a population of undergraduate women [8], EC use is grounded in women’s strength of motivations to prevent pregnancy, which in turn is shaped by women’s educational and professional expectations. However, motivation to avoid pregnancy may not be sufficient to use EC if women do not recognize the risk of pregnancy. Our findings show that 40% of women who reported having had unprotected sexual intercourse in the 12-months prior to the survey had not used EC. Several studies have pointed that the lack of recognition of pregnancy risk after unprotected intercourse prevents women from using EC [12,17,18]. Low perception of pregnancy risk may be related to a number of factors, like assuming having had sexual intercourse in a “safe period” of the menstrual cycle; belief that the risk of pregnancy is low because they are breastfeeding; or simply misperceiving the risk of pregnancy [19,20].

Studies have noted that misperception of pregnancy risk and, consequently, EC non-use, are more common among youth from low socioeconomic status [16,21]. However, our findings suggest non-use of EC remains high even among more affluent women, such as undergraduate women in Brazil. Our findings also show a positive association between religious affiliation and EC use following discontinuation and method abandonment, which contrasts with previous studies [22–24]. However, religious affiliation doesn’t reflect religiosity, which may explain some of the discrepancies.

In our study, sexual lifestyles were associated with EC use following contraceptive discontinuation. Specifically, women several sexual lifetime partners were more likely to use EC use following contraceptive discontinuation. This association was noted in previous studies conducted in the United States and Greece [25,26]. We also found that women in casual relationships and who were using condoms (as compared to pill) were more likely to use EC in context of non-regular contraception. Studies that evaluated EC use in general have noted that women in casual sexual relationships were more likely to use EC than those in more stable relationships [27,28]. A possible explanation for this association is that women in casual relationships use condoms more frequently and may be more motivated to prevent a pregnancy using a backup method than women in stable relationships. Finally, our findings denote that sexually more experienced young women take greater advantage of EC to prevent pregnancy, suggesting that youth’s behavior is building on their prior experiences.

Women with a pregnancy history were less likely to use EC after discontinuation, which was surprising as previous research suggests young women who become pregnant have subsequent stronger motivations to prevent pregnancy [29,30]. Few students reported prior pregnancy history and pregnancies ending in abortion are likely under reported in this population, which limits the interpretation of these findings.

Although the present study makes several noteworthy contributions to inform contraceptive discontinuation and its relation to EC use, some limitations need to be considered. As this is a retrospective study, recall bias may lead to an underestimation of EC use. Our study sample comprises only undergraduate students, and since education level is associated with contraceptive use, the result cannot be generalized to the overall population. Replication of this study among other populations would allow an assessment of EC use across more diverse cultural and socio-economic groups. Another limitation of our study is the small number of women reporting contraceptive abandonment, which limits the statistical power of the analysis.

Future research perspectives should assess women’s perceptions of

pregnancy risk in relation to their contraceptive behaviors and responses to contraceptive disruptions. This would provide a more complete understanding of the role of EC and contraceptive discontinuation in women's lives in.

Conclusion

We conclude that the majority of undergraduate students in our study do not use EC after unprotected sex, potentially reflecting a lack of pregnancy risk recognition. Future research should assess women's perceptions of pregnancy risk in relation to their contraceptive behaviors and responses to contraceptive disruptions. This would provide a more complete understanding of the role of EC in contraceptive use dynamics to tailor interventions for women to prevent unintended pregnancy and achieve their life goals.

Declaration of Competing Interest

No potential conflict of interest was reported by the authors.

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Appendix A. Supplementary material

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.srh.2019.06.008>.

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