

# The European Journal of Contraception & Reproductive Health Care

ISSN: 1362-5187 (Print) 1473-0782 (Online) Journal homepage: <http://www.tandfonline.com/loi/iejc20>

## Contraceptive patterns after use of emergency contraception among female undergraduate students in Brazil

Christiane Borges do Nascimento Chofakian, Caroline Moreau, Ana Luiza Vilela Borges & Osmara Alves dos Santos


To cite this article: Christiane Borges do Nascimento Chofakian, Caroline Moreau, Ana Luiza Vilela Borges & Osmara Alves dos Santos (2018) Contraceptive patterns after use of emergency contraception among female undergraduate students in Brazil, The European Journal of Contraception & Reproductive Health Care, 23:5, 335-343, DOI: [10.1080/13625187.2018.1526897](https://doi.org/10.1080/13625187.2018.1526897)

To link to this article: <https://doi.org/10.1080/13625187.2018.1526897>



Published online: 24 Oct 2018.



Submit your article to this journal 



Article views: 10



View Crossmark data 

ORIGINAL RESEARCH ARTICLE



## Contraceptive patterns after use of emergency contraception among female undergraduate students in Brazil

Christiane Borges do Nascimento Chofakian<sup>a</sup> , Caroline Moreau<sup>b,c</sup>, Ana Luiza Vilela Borges<sup>d</sup>  and Osmara Alves dos Santos<sup>d</sup> 

<sup>a</sup>Direct-Entry Midwifery Program, School of Arts, Sciences and Humanities, University of São Paulo, São Paulo, Brazil; <sup>b</sup>Department of Population, Family, and Reproductive Health, Bloomberg School of Public Health, Johns Hopkins University, Baltimore, MD, USA;

<sup>c</sup>Gender, Sexual and Reproductive Health, CESP Centre for Research in Epidemiology and Population Health, Villejuif, France;

<sup>d</sup>Department of Public Health Nursing, University of São Paulo School of Nursing, São Paulo, Brazil

### ABSTRACT

**Objective:** The aim of our study was to describe contraceptive patterns 30 days after use of emergency contraception (EC) among female undergraduate students in São Paulo, Brazil.

**Methods:** This study was part of a larger project conducted in 2015 among 1679 female students aged 18–24 enrolled at the University of São Paulo. Analysis was restricted to the 916 students who reported lifetime use of EC. Logistic regression models were used to examine factors related to the use of contraception within the 30 day period following the last use of EC, changes in contraceptive behaviour before and after EC use, and gaps in contraceptive use within 30 days after EC use.

**Results:** Most women (75.4%) used contraception after accessing EC; 92.9% who used contraception prior to EC exposure resumed use of contraception afterwards, compared with 40.7% who did not use contraception prior to EC exposure. Only 6.3% of women switched to a less effective contraceptive method after EC use. Few women (7.5%) reported post-EC gaps in contraception.

**Conclusions:** The results of this study suggest that EC may serve as a potential precursor to regular contraception among undergraduates in Brazil, with few women reporting contraceptive gaps after EC use. These patterns may contribute to reducing the risk of unintended pregnancy in this population.

### ARTICLE HISTORY

Received 14 March 2018

Revised 1 August 2018

Accepted 17 September 2018

Published online 23 October 2018

### KEYWORDS

Contraception; emergency contraception; sexual and reproductive health; sexual behaviour; undergraduate students

## Introduction

When used up to 3–5 days after unprotected sexual intercourse, emergency contraception (EC) can avoid an unintended pregnancy [1]. EC is not only a backup option to prevent pregnancy but it may also serve as a potential incentive for regular contraceptive use: a concept referred to as ‘bridging’ [2]. Opponents of non-prescription access to EC have argued that its easy availability could deter women from using more effective contraception, but results from clinical trials and population-based surveys do not support such concerns [3–5]. In fact, a number of studies indicate greater use of regular contraception among women who have accessed EC [2,5,6]. For instance, a population-based cohort in France that identified women who had used EC during the course of a year showed that 84% resumed use of contraception after EC use, and almost half chose a highly effective method [7]. Another study conducted in Minnesota, USA, found that 68% of women who were not using a highly effective method before EC use switched afterwards to hormonal contraception [6].

In this context, while EC is not a good option to replace more effective contraception for women who have regular intercourse [8], it may nevertheless facilitate transition towards more effective contraception among the 32.2% sexually active Brazilian women at risk of unintended pregnancy who do not use a regular contraceptive method

[1,9]. In Brazil, while modern contraceptive prevalence is relatively high at 77% [10], 55% of pregnancies are mistimed or unwanted [11], mostly due to inconsistent or incorrect use, in addition to frequent contraceptive discontinuation [12]. These circumstances represent appropriate indications for backup contraception to reduce the chance of pregnancy. Women in Brazil are well aware of EC; in 2006, 12% indicated they had used it at least once [10]. Recent local studies have shown that EC use is now even more frequent, ranging from 42.0% to 50.4% lifetime use [13–15], with higher reports of use among young women. The circumstances of use and patterns of contraceptive use after EC exposure are, however, not well documented.

The ways in which EC fits within women’s contraceptive trajectories is of particular interest in Brazilian female undergraduates, who are highly motivated to avoid pregnancy and have a high prevalence of contraceptive use. This population struggles in the daily management of contraception, as indicated in their high rates of method discontinuation [16–18], as with undergraduate women elsewhere [19–21]. A 2008 study of 360 female university students in Brazil (published in 2012) indicated that 48% had used EC, most often after condom rupture (40%) or condom non-use (45%) [15]. Another study of 487 female undergraduates found that the main reasons for using EC were contraceptive failure (32%) and forgetfulness to use

regular contraception (32%) [13]. These studies, however, provide no insight into the opportunity for bridging to more effective methods after EC use. Building on this work, our study describes contraceptive behaviours in the month following EC use among undergraduate women in São Paulo, Brazil. More specifically, we explore changes in contraceptive use before and after accessing EC.

## Methods

### Study population

This study is part of a larger retrospective cohort study exploring the dynamics of contraceptive use and EC use over one year of observation in a probability sample of female undergraduates at the University of São Paulo, Brazil (the country's largest institution of higher education and research). Women aged 18–24 who had enrolled on a regular undergraduate course were eligible to participate in the study. Participants were selected by simple random sampling without replacement, using a list of email addresses of all female undergraduates ( $n = 18,193$ ). The study was approved by the Human Research Ethics Committee of the University of São Paulo School of Nursing.

A total of 3078 women were randomly selected and invited to participate in the study, 2182 (71%) of whom answered the online questionnaire. The final study population comprised 1679 students aged 18–24: 50 women refused to participate and 453 were not eligible for the study (age  $< 18$ ,  $n = 2$ ; had never had sexual intercourse,  $n = 358$ ; or had not used any contraceptive method in the 12 months preceding the interview,  $n = 93$ ). Among the 1679 participants, the 916 women who reported having ever used EC constituted our study sample.

### Study procedures

Data were collected online using Google Forms, comprising a self-administered, pre-tested questionnaire which took on average 5–7 min to complete. Sociodemographic data included: age (18–19/20–24), race/ethnicity (white/black/other), religious affiliation (no religion/Catholic/Kardecist spiritualist/evangelical/other), relationship status (steady/casual), socioeconomic status (A/B: high income; C–D/E: middle/low income) [22], field of study (human/health/exact sciences), period of study (full-time/part-time) and campus site (São Paulo/outside São Paulo). Sexual and reproductive information included: time since first sexual intercourse ( $\leq 1$  year/2–3 years/ $\geq 4$  years), number of lifetime sexual partners (one, two to three, four or more) and history of pregnancy (no/yes). Women who reported that they had used EC at any time completed an 'EC calendar' describing their contraceptive use at the time they last used EC. Specifically, they indicated on the daily calendar what contraception (if any) they had used in the 30 days before and after accessing EC.

### Measures

We defined three outcome measures assessing contraceptive behaviours after EC use. We first considered a

dichotomous measure of any use of contraception within 30 days after EC use (yes/no). We also defined a measure assessing patterns of pre- and post-EC contraceptive use in three categories. The first category, 'no change in contraception', referred to women who did not change their contraception in the 30 days before and after using EC; this category also included women who did not use contraception before and after EC. The second category, 'switching to a more effective method', referred to women who changed to a more effective method after EC use; women who started using a contraceptive method after accessing EC were included in this category. Contraceptive effectiveness was based on data given in the literature [8]. The third category, 'switching to a less effective method', referred to women who changed to a less effective method after EC use; women who stopped using contraception after accessing EC were included in this category. The third outcome measure referred to gaps in use of contraception in the 30 days after accessing EC (yes/no) and was defined among women who used any method after EC.

### Statistical analyses

Bivariate analysis was conducted to investigate participants' sociodemographic and sexual and reproductive health characteristics according to contraceptive use in the 30 days after EC exposure. We considered use of contraception in the 30 days before EC exposure as a key predictor of post-EC contraceptive use. We then conducted multivariate logistic regression to identify the independent effects of these factors on post-EC contraceptive use. Adjusted odds ratios (ORs) and 95% confidence intervals (CIs) were estimated. To analyse how EC affected contraceptive trajectories, we assessed changes in contraceptive use before and after EC exposure. Using multinomial regression models and as a reference group women who had no change in contraceptive use after accessing EC, we estimated factors related to switching to a more effective method and factors related to switching to a less effective or no method. The final model was chosen based on prior knowledge and was based on Akaike's Information Criterion (an estimator of the relative quality of statistical models). Finally, we used Pearson's  $\chi^2$  test to investigate gaps in contraceptive use in the 30 days after EC exposure among all women who used contraception afterwards. All analyses were conducted using Stata, version 14.2 (StataCorp, College Station, TX, USA).

## Results

Women were on average 21 years of age (standard deviation [SD] 0.05), 77.8% were white, 76.1% were of high or medium socioeconomic status and 64.5% were in a stable relationship. The average age at first sexual intercourse was 17 years (SD 0.06); 28 (3.1%) reported having had a previous pregnancy, with 22 of these pregnancies ending in abortion. Most women (66.4%) had used a contraceptive method prior to EC use (Table 1).

Referring to the last time they had accessed EC, three-quarters (75.4%) reported having used contraception in the 30 days afterwards (Table 2). The strongest predictor of contraceptive use after EC exposure was use of contraception

**Table 1.** Sociodemographic and sexual and reproductive health characteristics of São Paulo university students.

Variable	n	%
<b>Sociodemographic characteristics</b>		
Age, years		
18–19	217	23.7
20–24	699	76.3
Race/ethnicity		
White (Caucasian)	713	77.8
Black	141	15.4
Other <sup>a</sup>	62	6.8
Religion		
No religion	458	50.0
Roman Catholic	259	28.3
Kardecist spiritualist	102	11.1
Evangelical	62	6.8
Other <sup>b</sup>	35	3.8
Type of relationship		
Steady	591	64.5
Casual	325	35.5
Socioeconomic group		
A/B	697	76.1
C–D/E	219	23.9
<b>Educational background</b>		
Field of study		
Human sciences	383	41.8
Health sciences	333	36.4
Exact sciences	200	21.8
Period of study		
Full-time	454	49.6
Part-time	462	50.4
Campus		
São Paulo	589	64.3
Outside São Paulo	327	35.7
<b>Sexual and reproductive behaviour</b>		
Time since first sexual intercourse, years		
≤1	114	12.4
2–3	313	34.2
≥4	489	53.4
Number of sexual partners in lifetime		
1	219	23.9
2–3	278	30.3
≥4	419	45.7
Previous pregnancy		
No	888	96.9
Yes	28	3.1
Current use of contraception		
No	78	8.5
Yes	838	91.5
Type of current contraceptive method (n = 838)		
Oral contraceptive pill	561	66.9
Male condom	210	25.1
Other <sup>c</sup>	67	8.0
Number of times used EC in lifetime		
Once	350	38.2
Twice	249	27.2
Three or more times	317	34.6
Used contraceptive method prior to EC		
No	308	33.6
Yes	608	66.4
Total	916	75.4

<sup>a</sup>Other race/ethnicity includes Asian origin and indigenous people.

<sup>b</sup>Other religions include Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, Islam.

<sup>c</sup>Other methods include injectable, withdrawal/fertility awareness patch, intra-uterine device, diaphragm, implant, vaginal ring, female condom, spermicide.

in the 30 days before EC exposure: 92.9% of women who had used contraception in the 30 days before EC exposure resumed use of contraception afterwards, compared with 40.7% of women who had not used contraception in the 30 days prior to EC exposure. We found no difference in contraceptive use after EC exposure by type of method used prior to EC exposure, comparing condom users, pill users and other method users. Most women used oral contraceptive pills after accessing EC (61.9%), followed by the male condom (34.0%) and other methods (4.1%) (data not shown).

Results from the multivariate logistic regression assessing the independent effect of each variable on post-EC

contraceptive use confirmed the strong effect of pre-EC use on post-EC use (Table 2). The odds of using contraception after accessing EC were three times higher among women who had used contraception in the 30 days prior to EC use compared with women who had not. Women were less likely to use contraception after EC use if they belonged to an evangelical religion, were in a casual relationship or had had more than one sexual partner in the past.

Table 3 shows women's sociodemographic and sexual and reproductive health characteristics according to contraceptive switching patterns before and after EC use. We found that 64.4% of women had not changed their contraceptive behaviour after EC use: 409 consistently used the same method as before and 181 consistently used no method; 268 (29.3%) switched to a more effective method; and 58 (6.3%) switched to a less effective or to no method. More specifically, among the 307 women who were not using contraception prior to EC use, 59.3% continued without a method after EC use, 27.4% started taking the oral contraceptive pill, 11.4% used condoms and 1.9% used less effective methods after EC exposure. Among the 255 women who were using condoms prior to EC use, 72.1% continued afterwards with the same method, 19.2% switched to the oral contraceptive pill, 2.0% switched to a less effective method and 6.7% abandoned contraception. Among the 236 oral contraceptive pill users, 88.5% continued afterwards with their method, 3.0% switched to condoms, 1.3% switched to a less effective method and 7.2% abandoned contraception. Finally, among the 118 women who used a less effective method prior to EC use, 92.4% switched afterwards to a more effective method (mainly oral contraceptive pill and condom) (data not shown).

The results of the multinomial regression model indicated that women who were categorised as being of higher socioeconomic status and women enrolled in a health sciences programme had higher odds of switching to a more effective method after EC use (Table 4). Likewise, women who were in a stable relationship and women who reported several lifetime sexual partners had higher odds of switching to a more effective method. Conversely, women of lower socioeconomic status and women who were enrolled in a human sciences programme had higher odds of switching to a less effective method. The same was true of those who had had one lifetime sexual partner and those who were in a casual relationship.

Altogether, 52 women reported gaps in use of contraception within a month after EC use, corresponding to 7.5% of the 691 women who reported having used contraception during that month (Table 5). Women of Asian descent or indigenous women were more likely to report gaps, as were women in a lower socioeconomic group. Women in a casual relationship and women who reported several lifetime sexual partners were also more likely to experience gaps in use. Method type was not statistically associated with gaps in use of contraception after EC use.

## Discussion

### Findings and interpretation and differences and similarities in relation to other studies

This study describes contraceptive behaviours after EC use among female undergraduates, and more specifically

**Table 2.** Correlates of using contraception within 30 days after EC use.

Variable	Used contraception after EC (%)	<i>p</i> value <sup>a</sup>	Adjusted OR (95% CI) <sup>b</sup>
<b>Sociodemographic characteristics</b>			
Age, years		.504	
18–19	73.7		1.0
20–24	76.0		1.2 (0.7, 1.9)
Race/ethnicity		.153	
White (Caucasian)	74.5		1.0
Black	75.9		1.5 (0.8, 2.5)
Other <sup>c</sup>	85.5		1.8 (0.8, 2.3)
Religion		.186	
No religion	77.1		1.0
Roman Catholic	73.4		0.8 (0.5, 1.2)
Kardecist spiritualist	79.4		0.8 (0.4, 1.6)
Evangelical	64.5		0.5 (0.2, 0.9)*
Other <sup>d</sup>	77.1		1.0 (0.3, 2.7)
Type of relationship		<.001	
Steady	80.5		1.0
Casual	66.2		0.6 (0.4, 0.9)*
Socioeconomic status		.747	
A/B	75.2		1.0
C–D/E	76.3		1.1 (0.7, 1.7)
<b>Educational background</b>			
Field of study		.172	
Human sciences	72.3		1.0
Health sciences	78.1		1.4 (0.8, 2.3)
Exact sciences	77.0		1.2 (0.7, 2.1)
Period of study		.038	
Full-time	78.4		1.0
Part-time	72.5		0.8 (0.5, 1.3)
Campus		.182	
São Paulo	74.0		1.0
Outside São Paulo	78.0		1.2 (0.8, 1.9)
<b>Sexual and reproductive behaviour</b>			
Time since first sexual intercourse, years		.286	
≤1	70.2		1.0
2–3	74.8		1.6 (0.8, 2.0)
≥4	77.1		1.9 (0.9, 2.8)
Number of sexual partners in lifetime		.005	
1	83.6		1.0
2–3	74.1		0.5 (0.3, 0.9)*
≥4	72.1		0.4 (0.2, 0.7)*
Previous pregnancy		.084	
No	75.0		1.0
Yes	89.3		1.6 (0.4, 2.5)
Used contraceptive method prior to EC		<.001	
No	40.7		1.0
Yes	92.9		3.0 (1.3, 2.9)*
Total	75.4		
Type of contraceptive method used within 30 days prior to EC ( <i>n</i> = 608)		.933	
Oral contraceptive pill	92.8		
Male condom	93.3		
Other <sup>e</sup>	92.3		
Total	92.9		

<sup>a</sup>Pearson's  $\chi^2$  test.<sup>b</sup>Hosmer–Lemeshow test: *p* = .984.<sup>c</sup>Other race/ethnicity includes Asian origin and indigenous people.<sup>d</sup>Other religions include Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, Islam.<sup>e</sup>Other methods include injectable, withdrawal/fertility awareness patch, intrauterine device, diaphragm, implant, vaginal ring, female condom, spermicide.\**p* ≤ .05.

contraceptive switching patterns around the time of EC use. Our findings showing that most women (75%) used contraception in the 30 days after EC use corroborate other study results in diverse populations and study settings: UK [23,24], France [7], USA [25] and China [4]. They are also consistent with an earlier study conducted in six cities in Brazil, albeit in a different population, which reported that women increased their use of contraception after EC exposure [26].

One notable aspect of our findings was the relative proportion of women (41%) who were not using contraception in the 30 days before EC use but who started using a method afterwards, mainly the oral contraceptive pill. According to some studies, EC can encourage use of

regular contraception [1,2,10]. In the USA [6], UK [24] and Jamaica [27], a relevant proportion of women (49%, 65% and 55%, respectively) who were using no method or a less effective method prior to EC use adopted a more effective method after EC use. These results indicate that the strongest predictor of contraceptive use after EC exposure is contraceptive use before EC exposure. This leaves a significant segment of the student population (25%) at potential, repeated risk of unintended pregnancy.

Efforts to reduce unintended pregnancy rates were initially focused on EC use but have now turned to bridging EC use to uptake of a more effective method of contraception [28]. To this effect, our study demonstrates an increase in use of more effective contraceptive methods after



**Table 3.** Proportion of university students according to contraceptive switching patterns after EC use, by sociodemographic and sexual and reproductive health characteristics.

		Contraceptive switching pattern after EC use			
Variable	Total (n)	No switching (%)	Switching to more effective method (%)	Switching to less effective method (%)	p value <sup>a</sup>
Sociodemographic characteristics					
Age, years					.965
18–19	217	65.0	29.0	6.0	
20–24	699	64.2	29.3	6.5	
Race/ethnicity					.795
White (Caucasian)	713	63.7	29.9	6.4	
Black	141	66.6	28.4	5.0	
Other <sup>b</sup>	62	66.7	24.2	8.1	
Religion					.335
No religion	458	67.0	27.1	5.9	
Roman Catholic	259	59.8	33.6	6.6	
Kardecist spiritualist	102	64.7	27.5	7.8	
Evangelical	62	71.0	25.8	3.2	
Other <sup>c</sup>	35	51.5	37.1	11.4	
Type of relationship					.031
Steady	591	65.0	29.5	5.5	
Casual	325	63.4	28.9	7.7	
Socioeconomic group					.049
A/B	697	64.8	30.6	4.6	
C–D/E	219	63.0	25.1	11.9	
Educational background					
Field of study					.048
Human sciences	383	65.5	26.1	8.4	
Health sciences	333	61.3	32.7	6.0	
Exact sciences	200	67.5	29.5	3.0	
Period of study					.412
Full-time	454	62.5	31.3	6.2	
Part-time	462	66.2	27.3	6.5	
Campus					.161
São Paulo	589	66.5	27.2	6.3	
Outside São Paulo	327	60.6	33.0	6.4	
Sexual, reproductive and contraceptive behaviour					
Time since first sexual intercourse, years					.914
≤1	114	63.2	31.5	5.3	
2–3	313	65.2	29.1	5.7	
≥4	489	64.2	28.8	7.0	
Number of sexual partners in lifetime					.004
1	219	63.9	27.0	9.1	
2–3	278	69.1	25.5	5.4	
≥4	419	61.5	32.9	5.5	
Previous pregnancy					.166
No	888	64.1	29.7	6.2	
Yes	28	75.0	14.3	10.7	
Total	916	64.4	29.3	6.3	

<sup>a</sup>Pearson's  $\chi^2$  test.<sup>b</sup>Other race/ethnicity includes Asian origin and indigenous people.<sup>c</sup>Other religions include Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, Islam.

accessing EC, although most EC users adopt short-acting methods that are less effective than long-acting reversible methods rarely used in the Brazilian context. This concept of bridging [1] is designed to support EC users to adopt regular and more effective contraception to prevent future instances of unprotected intercourse. Bridging sometimes proves challenging, however, as some programmes fail to recognise the diversity of circumstances of EC users, who may not all need or wish to bridge to long-acting contraception because they have infrequent sexual intercourse or because they are satisfied with their current method [29]. In addition, women who obtain EC from pharmacies (pharmacies are the main way to obtain EC in Brazil) rarely receive appropriate advice on other contraceptive methods and reproductive health services.

Consistent with expectations, we found that women in a casual relationship were 40% less likely to use contraception after EC compared with women who were in a stable

relationship. According to a study conducted among young people [30], trust, communication and intimacy between partners are low in casual relationships, which render contraceptive decision-making difficult. In addition, the narratives of young men in that study suggested they did not expect their partners to become pregnant during a casual relationship, and that conversations about contraception were limited in uncommitted relationships. Likewise, women in our study who had had several sexual partners were 60% less likely to use contraception after EC use. Partner switching has been linked to changes of contraceptive methods, which are common events among young people in different contexts [13,31,32]. These findings are particularly concerning since young women engaged in less stable relationships are at greater risk of unintended pregnancy.

In most cases women in our study did not change their contraceptive behaviour after using EC, even after

**Table 4.** Multinomial logistic regression of contraceptive switching patterns after EC use, by sociodemographic and socioeconomic characteristics, educational background, sexual/reproductive and contraceptive behaviour.

Variable	Contraceptive switching pattern after EC use	
	Switching to more effective method Adjusted OR (95% CI) <sup>a</sup>	Switching to less effective method Adjusted OR (95% CI) <sup>a</sup>
<b>Sociodemographic characteristics</b>		
Age, years		
18–19	1.0	1.0
20–24	1.1 (0.7, 1.5)	1.0 (0.5, 2.1)
Race/ethnicity		
White (Caucasian)	1.0	1.0
Black	0.9 (0.6, 1.5)	0.9 (0.4, 2.2)
Other race/ethnicity <sup>b</sup>	0.8 (0.4, 1.6)	1.3 (0.5, 1.6)
Religion		
No religion	1.0	1.0
Roman Catholic	1.3 (0.9, 1.8)	1.5 (0.8, 2.1)
Kardecist spiritualist	1.0 (0.6, 1.6)	1.4 (0.6, 2.2)
Evangelical	0.8 (0.4, 1.6)	0.7 (0.2, 2.1)
Other <sup>c</sup>	1.8 (0.9, 2.0)	2.3 (0.7, 2.4)
Type of relationship		
Steady	1.0	1.0
Casual	0.8 (0.2, 1.0)*	2.3 (0.4, 0.9)*
Socioeconomic status		
A/B	1.0	1.0
C–D/E	0.6 (0.3, 0.9)*	1.7 (0.3, 1.0)*
<b>Educational background</b>		
Field of study		
Human sciences	1.0	1.0
Health sciences	1.2 (0.2, 0.8)*	0.5 (0.3, 1.0)*
Exact sciences	1.0 (0.6, 1.5)	0.2 (0.2, 0.7)*
Period of study		
Full-time	1.0	1.0
Part-time	0.9 (0.6, 1.3)	0.7 (0.4, 1.4)
Campus		
São Paulo	1.0	1.0
Outside São Paulo	1.2 (0.9, 1.8)	1.6 (0.8, 2.0)
<b>Sexual and reproductive behaviour</b>		
Time since first sexual intercourse, years		
≤1	1.0	1.0
2–3	0.9 (0.5, 1.5)	0.7 (0.2, 1.9)
≥4	0.9 (0.5, 1.6)	0.6 (0.2, 1.8)
Number of sexual partners in lifetime		
1	1.0	1.0
2–3	1.7 (0.4, 1.0)*	0.7 (0.2, 0.9)*
≥4	1.9 (0.6, 1.0)*	0.3 (0.4, 1.0)*
Previous pregnancy		
No	1.0	1.0
Yes	0.4 (0.2, 1.4)	1.1 (0.3, 1.9)

<sup>a</sup>Akaike's Information Criterion = 1527.15.<sup>b</sup>Other race/ethnicity includes Asian origin and indigenous people.<sup>c</sup>Other religions include Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, Islam.\* $p \leq .05$ .

experiencing a method failure or incorrect use, suggesting that women rarely reconsider their contraceptive options after such events. Other studies have also suggested that women use EC in the context of regular contraceptive use [13,27,33], with few indicating that women return to the same method after using EC [5]. Among women who switched, we found most adopted a more effective method after using EC (almost 30%) rather than a less effective or no method (6%), corroborating the results of a national cohort study of EC users in France in which 20% of women aged 18–44 switched to highly effective method in the six months following EC use, compared with 8% who switched to a non-highly effective method [5].

In our study, patterns of use varied by sociodemographic group and sexual experience. Women in a higher socioeconomic group and women who were more sexually experienced (more lifetime sexual partners) and in a stable relationship were more likely to switch to a more effective method while women in a lower socioeconomic group and women in a casual relationship were more likely to switch to a less effective method. Other studies in Brazil have

established a link between contraceptive behaviours and partnership type among young people [34,35], while research in other countries has also reported an association between contraceptive behaviours and the number of lifetime partners [31,36].

Few women (7.5%) reported gaps in use of contraception in the month after EC use, which is likely due to the short 30-day period of observation. The few surveys assessing contraception after EC use have similarly suggested consistent use in the immediate period after accessing EC [4,6,24], which is essential to limit EC failures, which increase with more instances of unprotected intercourse [37].

### Strengths and weaknesses of the study

The greatest strength of our study was its focus on contraceptive behaviour during the 30 day period after EC use in a group of women potentially at high risk of unintended pregnancy and induced abortion. Understanding this dynamic may assist in the improvement of youth

**Table 5.** Sociodemographic and sexual and reproductive health characteristics of São Paulo university students according to consistent use of contraception after using EC.

Variable	Gaps after using EC		
	Total (n)	Yes (%)	p value <sup>a</sup>
<b>Sociodemographic characteristics</b>			
Age, years			.312
18–19	160	9.4	
20–24	531	7.0	
Race/ethnicity			.053
White (Caucasian)	531	8.5	
Black	107	1.9	
Other <sup>b</sup>	53	9.4	
Religion			.266
No religion	353	9.0	
Roman Catholic	190	4.2	
Kardecist spiritualist	81	8.6	
Evangelical	40	5.0	
Other <sup>c</sup>	27	11.1	
Type of relationship			.048
Steady	476	7.4	
Casual	215	7.9	
Socioeconomic status			.024
A/B	524	6.9	
C–D/E	167	9.6	
<b>Educational background</b>			
Field of study			.380
Human sciences	277	8.3	
Health sciences	260	5.8	
Exact sciences	154	9.1	
Period of study			.095
Full-time	356	5.9	
Part-time	335	9.3	
Campus			.340
São Paulo	436	8.3	
Outside São Paulo	255	6.3	
<b>Sexual and reproductive behaviour</b>			
Time since first sexual intercourse, years			.580
≤1	80	5.0	
2–3	234	8.6	
≥4	377	7.4	
Number of sexual partners in lifetime			.039
1	183	3.3	
2–3	206	8.7	
≥4	302	9.3	
Previous pregnancy			.496
No	666	7.7	
Yes	25	4.0	
Type of contraceptive method used			.993
Oral contraceptive pill	428	7.5	
Male condom	235	7.7	
Other <sup>d</sup>	28	7.1	
Total	691	7.5	

<sup>a</sup>Pearson's  $\chi^2$  test.<sup>b</sup>Other race/ethnicity includes Asian origin and indigenous people.<sup>c</sup>Other religions include Afro-Brazilian, Buddhism, Jewish, Muslim, Mormon, Islam.<sup>d</sup>Other methods include injectable, withdrawal/fertility awareness patch, intrauterine device, diaphragm, implant, vaginal ring, female condom, spermicide.

programmes in the Brazilian primary health care system, particularly in terms of increasing the availability of EC. Our findings provide further evidence to indicate that EC does not deter young women from using regular contraception. They also indicate opportunities for interventions, such as those proposed in the UK [24], to bridge EC to more effective methods through pharmacy provision of a 1 month supply of regular hormonal contraception and a referral to a clinic for further counselling. We therefore emphasise the potential usefulness of our results in developing programmes to encourage women to use more effective methods of contraception after accessing EC. Such an initiative, however, needs to be included in a broader comprehensive family planning package that includes access to long-term reversible contraception, including intrauterine

contraception and implants, which are rarely provided in this population.

Despite these strengths, our study has a number of limitations, including its limited generalisability and timeframe in which to assess contraceptive use patterns around the time of EC access. While the use of probability sampling and a relatively high response rate for an online survey increased the internal validity of the study among female students at the University of São Paulo (a group of women seeking to delay conception in order to complete their education), our sample is not representative of all Brazilian undergraduate students, such as those at private universities. Likewise the results are not generalisable to less educated women, who may be less likely to use EC or use contraception altogether, and they are unlikely to apply to older women.

The daily EC calendar evaluated behaviours more precisely in the days following EC use. As EC may delay rather than suppress ovulation, this time is associated with a higher risk of pregnancy. The short timeframe of the daily EC calendar limited the ability to explore longer term behaviours that might have revealed more frequent exposure to pregnancy risk. Moreover, the retrospective design of our study limited the ability to extend the timeframe, as women described their last instance of EC use, which might have occurred some time in the past, raising concern about potential recall bias.

### Unanswered questions and future research

We questioned young women about the use of contraception in the month following EC use. As we did not know with accuracy whether they had had any unprotected sexual intercourse during this time, we did not quantify the frequency of unprotected sexual intercourse. Because we were limited to a 30-day interval, we did not think we could get accurate data about the number of instances of unprotected sexual intercourse. Risk of pregnancy and the impact of EC use are certainly related to the frequency of unprotected sexual intercourse. Therefore, we recommend that future research in Brazil addressing contraceptive use after accessing EC considers a longer follow-up period.

### Relevance of the findings: implications for clinicians and policy-makers

The reproductive health programme implications of this study include an important contribution to the literature about contraceptive behaviour after EC use among young women in Brazil. The insights gained from this study may be of assistance to the medical community and the family planning services in addressing contraceptive use among young people, in order to avoid inconsistent use, and consequently, unnecessary use of EC.

Access to contraceptive methods needs to be improved in the primary health care system in Brazil. Clinical counselling and public health education efforts could focus on informing young women about the importance of effective contraception following EC use. We believe that a better understanding of young people's concerns and experiences of using contraception could help primary health care providers reshape counselling strategies to improve contraceptive use.



In addition, as a public health priority, appropriate and effective sexual health measures to support undergraduate students are strongly recommended and may stimulate responsible sexual behaviour.

## Conclusions

This study indicates that most university students in Brazil use EC to reduce the risk of pregnancy after inconsistent use of their regular contraception, and resume use of their regular method after EC use. In some cases, EC may serve as a bridge to a more effective method. A minority of women, however, remain at risk of pregnancy after accessing EC, as they continue without contraception. These findings should encourage Brazilian health care professionals, including pharmacists, nurse-midwives and other primary care professionals, to offer counselling, referrals and regular hormonal contraception at the time of EC delivery to allow women time to reconsider their contraceptive options while receiving ongoing protection to avoid unintended pregnancy.


## Disclosure statement

No potential conflict of interest was reported by the authors.

## Funding

This work was supported by the Conselho Nacional de Desenvolvimento Científico e Tecnológico/CNPq [grant number 202219/2015-1]. This study was financed in part by the Coordenação de Aperfeiçoamento de Pessoal de Nível Superior-Brasil (CAPES) [grant number 001].

## ORCID

Christiane Borges do Nascimento Chofakian  <http://orcid.org/0000-0002-5953-3296>

Ana Luiza Vilela Borges  <http://orcid.org/0000-0002-2807-1762>

Osmara Alves dos Santos  <http://orcid.org/0000-0001-6360-861X>

## References

- Trussell J, Raymond E, Cleland K. Emergency contraception: a last chance to prevent unintended pregnancy. *Contemp Read Law Soc Justice*. 2014;6:7–38.
- Cameron S, Glasier A. The need to take a 'new look' at emergency contraception. *J Fam Plann Reprod Health Care*. 2010;36:3–4.
- Jackson RA, Schwarz EB, Freedman L, et al. Advance supply of emergency contraception. Effect on use and usual contraception—a randomized trial. *Obstet Gynecol*. 2003;102:8–16.
- Lo SS, Fan SYS, Ho PC, et al. Effect of advanced provision of emergency contraception on women's contraceptive behavior: a randomized controlled trial. *Hum Reprod*. 2004;19:2404–2410.
- Moreau C, Trussell J, Michelot F, et al. The effect of access to emergency contraceptive pills on women's use of highly effective contraceptives: results from a French national cohort study. *Am J Public Health*. 2009;99:441–442.
- Sidebottom A, Harrison PA, Donna A, et al. The varied circumstances prompting requests for emergency contraception at school-based clinics. *J School Health*. 2008;78:258–263.
- Moreau C, Trussell J, Bajos N. The determinants and circumstances of use of emergency contraceptive pills in France in the context of direct pharmacy access. *Contraception*. 2006;74:476–482.
- Centers for Disease Control and Prevention (CDC). U.S. selected practice recommendations for contraceptive use, 2013: adapted from the World Health Organization selected practice recommendations for contraceptive use, 2nd edition. *MMWR Recomm Rep*. 2013;62:1–60.
- Ministério da Saúde. Saúde sexual e saúde reprodutiva; 2013 [cited 2018 Sep 4]. Available from: [http://bvsmms.saude.gov.br/bvs/publicacoes/saude\\_sexual\\_saude\\_reprodutiva.pdf](http://bvsmms.saude.gov.br/bvs/publicacoes/saude_sexual_saude_reprodutiva.pdf).
- Ministério da Saúde, Centro Brasileiro de Análise e Planejamento. PNDS: 2006. Pesquisa nacional de demografia e saúde da criança e da mulher; 2009 [cited 2018 Sep 4]. Available from: [http://bvsmms.saude.gov.br/bvs/publicacoes/pnds\\_crianca\\_mulher.pdf](http://bvsmms.saude.gov.br/bvs/publicacoes/pnds_crianca_mulher.pdf).
- Viellas EF, Domingues RMSM, Dias MAB, et al. Assistência pré-natal no Brasil. *Cad Saúde Pública*. 2014;30:S85–S100.
- Ministério da Saúde, Secretaria de Ciência, Tecnologia e Insumos Estratégicos Departamento de Ciência e Tecnologia. 20 anos de pesquisas sobre aborto no Brasil; 2009 [cited 2018 Sep 4]. Available from: <http://bvsmms.saude.gov.br/bvs/publicacoes/livreto.pdf>.
- Borges ALV, Fujimori E, Hoga LAK, et al. Práticas contraceptivas entre jovens universitários: uso da anticoncepção de emergência. *Cad Saúde Pública*. 2010;26:816–826.
- Silva FC, Vitale MSS, Maranhão HS, et al. Diferenças regionais de conhecimento, opinião e uso de contraceptivo de emergência entre universitários brasileiros de cursos da área de saúde. *Cad Saúde Pública*. 2010;26:1821–1831.
- Alano GM, Costa LN, Mirand LR, et al. Conhecimento, consumo e acesso à contracepção de emergência entre mulheres universitárias no sul do Estado de Santa Catarina. *Ciênc Saúde Coletiva*. 2012;17:2397–2404.
- Dessunti EM, Reis AOA. Vulnerabilidade às dst/aids entre estudantes da saúde: estudo comparativo entre primeira e última série. *Ciênc Cuid Saude*. 2012;11:274–283.
- Silva LP, Camargo FC, Iwamoto HH. Comportamento sexual dos acadêmicos ingressantes em cursos da área da saúde de uma universidade pública. *REAS*. 2014;3:39–52.
- Somba MJ, Mbonile M, Obure J, et al. Sexual behaviour, contraceptive knowledge and use among female undergraduates' students of Muhimbili and Dar es Salaam Universities, Tanzania: a cross-sectional study. *BMC Women's Health*. 2014;14:94.
- Bryant KD. Contraceptive use and attitudes among female college students. *ABNF J*. 2009;20:12–16.
- Trieu SL, Shenoy DP, Bratton S, et al. Provision of emergency contraception at student health centers in California community colleges. *Women's Health Issues*. 2011;21:431–437.
- Ersek JL, Brunner Huber LR, Thompson ME, et al. Satisfaction and discontinuation of contraception by contraceptive method among university women. *Matern Child Health J*. 2011;15:497–506.
- Associação Brasileira de Empresas de Pesquisa. Critério de classificação econômica Brasil. Dados com base no levantamento socioeconômico; 2015 [cited 2018 Mar 13]. Available from: [www.abep.org/criterio-brasil](http://www.abep.org/criterio-brasil).
- Michie L, Cameron ST, Glasier A, et al. Pharmacy-based interventions for initiating effective contraception following the use of emergency contraception: a pilot study. *Contraception*. 2014;90:447–453.
- Cameron ST, Glasier A, Johnstone A, et al. Ongoing contraception after use of emergency contraception from a specialist contraceptive service. *Contraception*. 2011;84:368–371.
- MacLean R. Teenagers given advance emergency contraception still use pill and condoms. *Perspect Sexual Reprod Health*. 2004;36:134–135.
- Costa NFP, Ferraz EA, Souza CT, et al. Access to emergency contraception: old barriers and new questions. *Rev Bras Ginecol Obstet*. 2008;30:55–60.
- Sorhaindo A, Becker D, Fletcher H, et al. Emergency contraception among university students in Kingston, Jamaica: a survey of knowledge, attitudes, and practices. *Contraception*. 2002;66:261–268.
- Trussell J, Schwarz EB, Guthrie K, et al. No such thing as an easy (or EC) fix. *Contraception*. 2008;78:351–354.
- Chin-Quee D, Hinson L, L'Engle KL, et al. Bridge over troubled waters: considerations in transitioning emergency contraceptive users to hormonal methods. *Contraception*. 2012;85:363–368.

- [30] Raine TR, Gard JC, Boyer CB, et al. Contraceptive decision-making in sexual relationships: young men's experiences, attitudes and values. *Cult Health Sex*. 2010;12:373–386.
- [31] Manlove J, Welti K, Wildsmith E, et al. Relationship types and contraceptive use within young adult dating relationships. *Perspect Sex Repro H*. 2014;46:41–50.
- [32] Wildsmith E, Manlove J, Steward-Streng N. Relationship characteristics and contraceptive use among dating and cohabiting young adult couples. *Perspect Sex Repro Health*. 2015;47: 27–36.
- [33] Nappi RE, Lobo Abascal P, Mansour D, et al. Use of and attitudes towards emergency contraception: a survey of women in five European countries. *Eur J Contracept Reprod Health Care*. 2014;19:93–101.
- [34] Bastos MR, Borges ALV, Hoga LAK, et al. Práticas contraceptivas entre jovens universitárias: o uso da anticoncepção de emergência. *Texto Contexto – Enferm*. 2008;17:447–456.
- [35] Bataglião EML, Mamede FB. Conhecimento e utilização da contracepção de emergência por acadêmicos de enfermagem. *Esc Anna Nery*. 2011;15:284–290.
- [36] Reed J, England P, Littlejohn K, et al. Consistent and inconsistent contraception among young women: insights from qualitative interviews. *Fam Relat*. 2014;63: 244–258.
- [37] Glasier A, Cameron ST, Blithe D, et al. Can we identify women at risk of pregnancy despite using emergency contraception? Data from randomized trials of ulipristal acetate and levonorgestrel. *Contraception*. 2011;84:363–367.