



# Knowledge and consumption of emergency contraception pills in a tertiary education student population

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## Abstract

**Introduction** According to the World Health Organization (WHO), every year there are 200 million pregnancies, of which 75 million are unintended. Emergency contraception pills (ECPs) are one of the available methods to prevent an unintended pregnancy, after unprotected sexual intercourse or contraceptive failure. The aim of this study was to quantify the consumption, characterize the level of knowledge, and understand the factors that induce the use of ECPs in tertiary students.

**Methods** An observational, cross-sectional, and retrospective survey was conducted at two tertiary education institutions (Coimbra Health School and Coimbra Education School) between January and April 2015. A written survey was applied to a convenience sample of female and male students at these schools. The survey questions comprised three areas: sociodemographic indicators; knowledge of ECPs; and previous consumption of ECPs (females only). Descriptive statistics and chi-square of independence test were used.

**Results** Most of the students had heard about ECPs and used them mainly for “forgetfulness or contraceptive failure” (63.8%) or “sex without using a contraceptive” (22.4%). Students’ main information sources were school, friends, and the internet. There was a higher level of knowledge in female students, students from the Coimbra Health School (vs students from the Coimbra Education School), and students who had received healthcare professional counseling ( $p < 0.01$ ). Regarding consumption, the majority (74.1%) were first-time users of ECPs and almost all ECPs were obtained in the pharmacy (91.4%).

**Conclusions** In Portugal, ECPs are available over the counter, which facilitates their obtainment. There was some knowledge among students, however lack of information about this subject should be taken into account in further studies. Communication with the students to improve their risk perception and knowledge is key to improving the safer use of ECPs.

## Introduction

Sexuality is an area of great importance in human development, and youth are a priority group for intervention within the framework of sexual behavior, due to duration of the relationships, early sexual debut, occasional partners, and inconsistent use of birth control methods [1]. The risk of unintended pregnancy appears to be associated with this sexual behavior [2]. According to the World Health Organization (WHO), every year there are 200 million pregnancies,

and 75 million are unintended [3]. In Portugal, there is a lack of statistical data about this subject, but according to a European study, the prevalence of unplanned pregnancies was up to 44% in Southern Europe [4]. The majority of unintended pregnancies occurred in adolescents, women aged > 34 years, and women who were single, had more than one pregnancy, and had a low educational level [5]. There are also some data indicating that Portugal has a high proportion of teenage mothers (3.55% of all pregnancies in 2015) [6].

The emergency contraception pill (ECP), also called the ‘morning-after pill’, is one of the methods available to prevent an unintended pregnancy after unprotected sexual intercourse or contraceptive failure [7–12]. The first commercialized ECP was known as the ‘Yuzpe Method’; each dose contained ethinylestradiol 100 µg and levonorgestrel 500 µg, which was given in two doses, with the second dose given 12 h after the first dose [13, 14]. This method is associated with a high prevalence of adverse effects [14–16], so

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currently the most used ECPs contain levonorgestrel 1.5 mg [17].

Levonorgestrel is a synthetic progestogen given in a single dose (one 1.5-mg tablet) or two doses (two 0.75-mg tablets), with the second dose given 12 h after the first dose. In Portugal, only the 1.5-mg, single-dose formulation is available. This ECP can be administered within 72 h of unprotected sex [8, 14, 18], with an efficiency rate > 75%, as described in several studies [7–10, 14, 16, 19, 20]; however, its efficiency decreases over that time [7–10]. Levonorgestrel prevents pregnancy by interrupting follicular development and ovulation, not by interfering with the implantation process. Several studies suggest that levonorgestrel affects sperm and egg mobility and corpus luteum function; however, there is no scientific evidence to prove this theory. Therefore, levonorgestrel is ineffective after the ovulation process or in the case of a previously existing pregnancy, since it is not an abortive pill [10, 13, 14, 19–21]. The most frequent adverse effects are dizziness, headache, nausea, lower abdominal pain, bleeding, breast tenderness, delayed menstruation, abundance in menstruation, fatigue, diarrhea, and vomiting [9, 12, 14, 22].

Another ECP containing a single dose of ulipristal acetate 30 mg within 120 h of unprotected intercourse or contraceptive failure [23, 24] has been available in Portugal since June 2015 as an over-the-counter (OTC) drug, however, it is dispensed exclusively in pharmacies. Ulipristal acetate is a selective progesterone receptor modulator that inhibits the ovulation process and so avoids fertilization [24–26]. According to several studies, this molecule is as effective as levonorgestrel in preventing pregnancy when given up to 72 h after unprotected intercourse, and provides better results than levonorgestrel when given between 48 and 72 h after [26]. The most commonly reported adverse reactions were headache, nausea, abdominal pain, and dysmenorrhea [24]. A recent meta-analysis showed that women who used ulipristal acetate had a pregnancy rate of 1.2%, compared with 1.2–2.1% with levonorgestrel [27, 28].

In Portugal, according to Law 12/2001 of May 29, 2001, ECPs are available for free in primary care, at family planning appointments, and in gynecology/obstetrics departments in hospitals. ECPs are also available in pharmacies (levonorgestrel and ulipristal) [29] and OTC stores (levonorgestrel). A study in Portuguese adolescents indicated a prevalence of use of 30% in sexually active adolescents, with the principal source of information about ECPs being television, radio, and the internet [2]. In the same study, the authors found that adolescents had heard about ECPs; however, they showed a lack of knowledge due to incomplete information about ECPs [2].

Several studies in student populations of other countries showed that the majority of students (> 75%) had heard about ECPs; however, there is some confusion between

ECPs and abortive pills [7–9, 15, 19, 30]. The prevalence of ECP use in students varied in these studies, from a low of 12.2% [7], followed by 14.9% [12], 28% [9], and 38.5% [19], and a high of 46.5% [31]. According to Hickey [9], of the 28% who had already taken an ECP, 15% had done it once; 60% received it in the hospital, and 27% purchased it in a pharmacy. Several studies also show that the main information sources in young students are friends, television, and the internet [8, 9]. The most frequent underlying reasons for ECP use were a total absence of contraception measures during sexual intercourse, and condom rupture [7, 12].

The aim of the study was to assess the knowledge and the consumption rate of ECPs in two tertiary student populations, and to analyze the underlying reasons their use.

## Methods

An observational, cross-sectional, and retrospective survey was conducted at the Coimbra Health School and Coimbra Education School between January and April 2015. A convenience sample was selected from the student populations of both of these tertiary schools. There were 1354 and 1814 students registered at the Coimbra Health School and Coimbra Education School, respectively, during the academic year. The sample was calculated using the formula to finite populations (< 100,000 subjects), with a confidence level of 95% and a  $p < 0.05$  [32]. The calculated sample consisted of 344 female and male participants. The sampling technique was accidental, in which subjects were recruited by their presence, in the moment, at collection sites. The questionnaire used was based on a previous study, developed by Amy Downing (2014), and was adapted with author permission [8]. The multiple-choice questions were classified into the following three areas:

- *Sociodemographic characteristics* Collected information on participants' gender, age, school, and parents' education.
- *Knowledge of ECPs* Comprised 13 questions, with each assigned one point for the correct answer. The total points were distributed on a scale created for this study, with the following three degrees of knowledge: insufficient (0–5 points); sufficient (6–9 points); and good (10–13 points).
- *Previous consumption of ECP* Only female participants were surveyed.

A pilot version of the survey was administered to eight student volunteers, which was then revised based on feedback.

In the data analysis, Chi-square of independence test was used. Descriptive analyses were used to provide an overview of the respondent characteristics. All the statistical data

analyses were performed with the Statistical Package for the Social Sciences version 20 (SPSS v. 20).

## Results

### Sociodemographic information

Of the 344 students who participated, 197 (146 females and 51 males) went to the Coimbra Education School, and 147 (124 females and 23 males) to the Coimbra Health School; the majority (270; 78.5%) were female (84.4 and 74.1% at the respective tertiary schools). The age of surveyed students ranged from 18 to 44 years, with 85.2% aged 18–21 years ( $n = 294$ ; mean  $20.06 \pm 2.29$  years). About a quarter of the students' parents had completed high school, 25.6% ( $n = 88$ ) of mothers and 25.3% ( $n = 87$ ) of fathers.

Of the 270 female participants, 217 had already started their sexual life, and were surveyed for the birth control methods used. Results are presented in Table 1.

### Knowledge regarding emergency contraception pills (ECPs)

Respondents indicated that the ECP is something a woman can use to prevent pregnancy, after unprotected sexual intercourse or birth-control failure (99.4%), with only one student never having heard of ECPs. About a third of respondents, 36.4% ( $n = 125$ ) had received counseling about ECPs from a healthcare professional (HCP). Participants selected school as the most common source of information about ECPs (66.5%; Table 2). Other frequently reported sources of information were friends (54.2%) and the internet (43.4%). Students were also asked about the preferred sources of information to know more about ECP, and the most frequent responses were clinics/hospitals (69.8%) and pharmacies (66.0%) [Table 2].

After marking the answers regarding ECP knowledge as correct or incorrect, questions with the highest proportion of incorrect answers were related to the availability of any ECP by medical prescription in Portugal (88.0% incorrect)

**Table 1** Birth control methods previously used by 217 female participants who had started their sexual life

Birth control method used <sup>a</sup>	Participants (%)
Condom	66.4
Contraceptive pills	65.9
Others	3.7
Natural methods	1.8
None	3.7

<sup>a</sup>More than one answer was possible

**Table 2** Sources of information regarding ECPs according to the survey responses of 344 female/male participants

Source	% of participants (no.)
<b>Sources of current knowledge<sup>a</sup></b>	
School	66.5 (228)
Friends	54.2 (186)
Internet	43.4 (149)
Healthcare professionals	36.4 (125)
Print (magazines, journal, flyers)	32.7 (112)
TV	32.1 (110)
Family	27.1 (93)
<b>Sources to obtain further knowledge<sup>a</sup></b>	
Hospitals or clinics	69.8 (240)
Pharmacy	66.0 (227)
Internet	46.5 (160)
Friends	11.9 (41)
Family	8.7 (30)
Print (magazines, journal, flyers)	6.4 (22)
Teachers	4.9 (17)
Spouse	3.8 (13)
TV	2.9 (10)
Library	2.0 (7)

ECPs emergency contraception pills

<sup>a</sup>Multiple answers were possible

and the appropriate time period in which ECPs can be taken (92.9%). There was also a significant percentage of incorrect answers to questions related to differentiating ECPs from abortion pills (58.9% incorrect) and identifying differences between ECPs and normal contraceptive pills (52.5%) [Table 3].

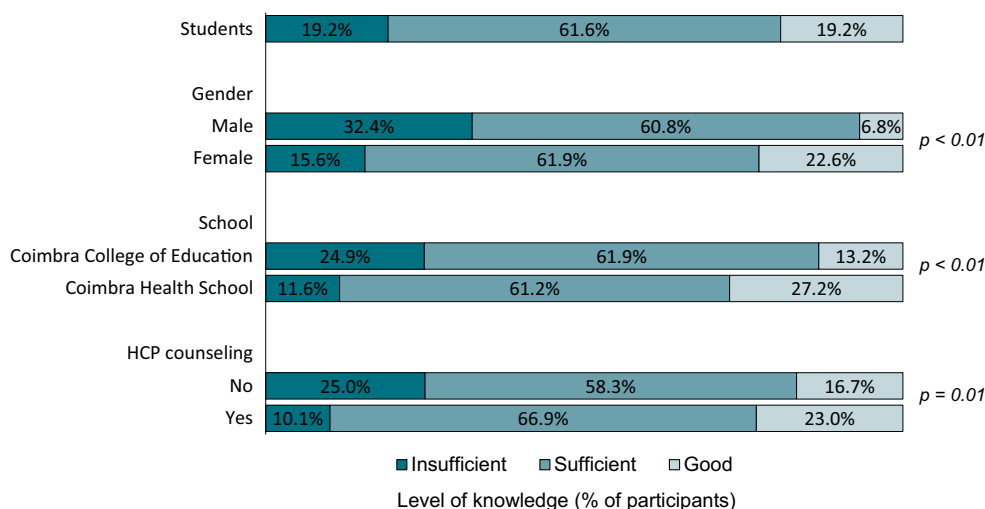
The level of knowledge was calculated according to the score obtained by each student for the questions presented in Table 3. Survey participants have a mean score of  $7.41 \pm 2.24$  points of knowledge and the majority (61.6%) had a 'Sufficient' score. When analyzing students' gender separately, statistically significant differences were found between males and females ( $p < 0.01$ ): males' knowledge mean score was  $6.15 \pm 2.23$  points and 60.8% obtained 'Sufficient' knowledge, but a third had 'Insufficient' knowledge (32.4%). Females' overall knowledge (mean  $7.76 \pm 2.12$  points) was considered 'Sufficient' in 61.9% of students, with 'Good' classification in 22.6% (Fig. 1).

Analyzing the level of knowledge by school, statistically significant differences were found between students from Coimbra Health School and those from the Coimbra Education School ( $p < 0.01$ ; Fig. 1). Most of the students from both schools had a 'Sufficient' level of knowledge: 61.2% of students from the Coimbra Health School and 61.9% from the Coimbra Education School. However, differences were found between the other levels

**Table 3** Knowledge of ECPs according to the survey responses of 344 female/male participants

Questions regarding ECPs	Correct answer (% of participants)	Incorrect answer (% of participants)
After taking ECPs, is there any need to take any contraceptive method until the end of the menstrual cycle?	79.6	20.4
How many ECPs can be taken during the same menstrual cycle, if necessary?	86.0	14.0
Can an ECP prevent a transmitted genital infection?	88.9	11.1
What are the side effects of ECPs?	69.7	30.3
The use of ECPs is most appropriate during which period in the menstrual cycle?	56.0	44.0
For how many hours are ECPs effective in preventing pregnancy?	53.9	46.1
Levonogestrel (Norlevo <sup>®</sup> , Postinor <sup>®</sup> ) can be taken up to ____ hours after unprotected sexual intercourse	49.2	50.8
In Portugal, are ECPs available in pharmacies/over-the-counter stores?	89.5	10.5
Ulipristal (ellaOne <sup>®</sup> ) can be taken up to ____ hours after unprotected sexual intercourse	7.1	92.9
In Portugal, are ECPs available without a medical prescription?	12.0	88.0
How similar are the substances of ECPs and birth control pills?	47.5	52.5
Do ECPs work like an abortion drug?	41.1	58.9
Are ECPs used primarily to prevent pregnancy?	75.2	24.8

ECPs emergency contraceptive pills



**Fig. 1** Level of knowledge regarding emergency contraceptive pills in 344 survey participants. HCP healthcare professionals

of knowledge. In the Coimbra Health and Coimbra Education Schools, 11.6% and 24.9% of students, respectively, displayed 'Insufficient' knowledge, and 27.2% and 13.2% had a 'Good' level of knowledge (Fig. 1).

In this study, statistically significant differences were also found regarding the level of ECP knowledge between females who received HCP counseling and those who had not (mean score  $8.04 \pm 1.92$  vs  $7.01 \pm 2.32$ ;  $p < 0.01$ ; Fig. 1). Parents' education level did not appear to have a significant relationship with the level of knowledge ( $p > 0.01$ ). Age was not tested for significant differences, as most participants were of a similar age level.

When questioned about the adverse effects of ECPs, participants indicated vomiting (48.1%), nausea (45.5%), and abdominal pain (34.4%), among others. Students who had previously used an ECP were also surveyed about the adverse effects experienced after ECP intake. The most common responses included bleeding, nausea, and delayed menstruation (each reported by 17.2%), as well as fatigue (15.5%), breast tenderness (13.8%), and abdominal pain (12.1%); however, almost half experienced no adverse effects (Table 4).

**Table 4** Perception of the risks of ECPs according to the survey responses of 343 participants and adverse effects reported by 58 previous users of ECPs

Adverse effect	% of participants (no.)	
	Risk perception	Adverse effects reported
Vomiting	48.1 (165)	10.3 (6)
Nausea	45.5 (156)	17.2 (10)
Abdominal pain	34.4 (118)	12.1 (7)
Bleeding	31.2 (107)	17.2 (10)
Delayed menstruation	30.9 (106)	17.2 (10)
Headache	20.1 (69)	5.2 (3)
Breast tenderness	15.5 (55)	13.8 (8)
Heavy menstrual bleeding	14.6 (50)	6.9 (4)
Fatigue		15.5 (9)
None	0.9 (3)	48.3 (28)
Don't know	27.1 (93)	8.6 (5)

ECPs emergency contraception pills

**Table 5** Consumption and acquisition of ECPs by 58 female participants who had previously used an ECP

Parameter	Participants (%)
<b>ECP consumption</b>	
1 time	74.1
2 times	15.5
3 or more times	10.3
<b>Reason for using ECP</b>	
Forgetfulness or contraceptive failure	63.8
Sex without using a contraceptive	22.4
Other	13.8
<b>Where ECP was obtained</b>	
Pharmacy	91.4
Healthcare center	5.2
Hospital	1.7
Over-the-counter store	1.7

ECPs emergency contraception pills

## ECP consumption

Of the 270 female participants, 217 had already started their sexual life. The most commonly used birth control methods by sexually active female students in this survey were condoms (66.4%,  $n = 144$ ) and oral contraceptive pills (65.9%,  $n = 143$ ). Of the 217 sexually active students, 58 (26.7%) had already used ECPs, with most of these having used them only once (74.1%,  $n = 43$ ; Table 5). According to this survey, the main reason for using ECPs was forgetfulness or contraceptive failure (63.8%,  $n = 37$ ), and

female students obtained ECPs directly from a pharmacy (91.4%) [Table 5].

There were significant differences in ECP consumption between female students who had received HCP counseling and those who had not (39.6 vs 15.5% of students;  $p < 0.01$ ).

## Discussion

The results of our survey showed that almost all students know that ECPs are something a woman can use to prevent pregnancy after unprotected sexual intercourse or birth control failure, which is reflective of findings by other researchers [2, 7–9]. Students identified their sources of knowledge of ECPs as being school, friends, and the internet. This result is similar to other studies, however, in this case, students had school as a primary source (66.5%), which is markedly higher than in previous studies (37% [8] and 9.4% [by teachers] [2]). For future sources of knowledge about ECPs, survey participants indicated clinics/hospitals and pharmacies, which is consistent with Downing's results (68.2% and 57.0%, respectively) [8]. About 36.4% of the students received counseling about ECPs from an HCP, which is higher than in other studies (21.0% [8] and 17.5% [7]).

Differences were found in relation to the level of knowledge between gender, schools, and consumption related to HCP counseling. In this study, a higher level of knowledge was obtained in female students and those who had received HCP counseling. Students from the Coimbra Health School had a higher level of knowledge than students from Coimbra Education School, which may be explained by the fact that Coimbra Health School offers courses in health areas, allowing their students to obtain more knowledge about this subject.

In general, students had a 'Sufficient' level of knowledge, and knew that ECPs are available OTC in Portugal, the timeframe in which ECPs could be used with efficacy, and that ECPs cannot prevent sexually transmitted diseases. However, the majority of students mistakenly thought that ECPs work as an abortion pill, which is similar to the findings of Downing [8]. Almost all students did not know that, in Portugal, an ECP is available from pharmacies, and can be taken up to 120 h after unprotected sexual intercourse or contraceptive failure. It should be noted that during this study, in June 2015, the prescription status of the ulipristal acetate ECP was changed following the European Medicines Agency's recommendation to switch ulipristal acetate to non-prescription status, with availability exclusively from pharmacies [33].

More than 65% of female students indicated that they use condoms and/or the oral contraceptive pill as their birth control method, which is higher than the values of <50% seen in other studies [7, 12].

Concerning ECP consumption, 26.7% of sexually active female students stated that they had already used this emergency contraceptive method, which is in line with the results of 28% [9] and 30% [2] in other studies. However, there are some studies with a small percentage of consumption, such as Olszewski et al. [12], which reported a value of 14.9%. This finding could be explained by the fact that the study was conducted in young women in Poland, where ECP was only available by medical prescription, and was, therefore, difficult to obtain. The reason most often identified for use of the ECP was forgetfulness or contraceptive failure, which is reflective of findings by Olszewski et al. [12].

Females obtained the ECP most frequently from pharmacies, which could be explained by the proximity and ease of access to pharmacies in Portugal. Regarding this, the study revealed some interesting results about the preferred source of information and the place to get ECPs. The overwhelming majority of the students chose the pharmacy as their preferred site to obtain ECPs, despite the higher number of students that answered 'hospital or clinics', when asked about sources of ECP information. In Portugal, all National Health Service health centers and hospitals that provide gynecology/obstetric services should provide free family planning consultations, which may be the reason why a large number of students chose the 'hospital or clinics' option for obtaining more knowledge about ECPs. As of 2016, Portugal has a great number of community pharmacies, with 2892 pharmacies for  $\approx$  10.3 million inhabitants, which is around one pharmacy for every 3500 inhabitants. The proximity of community pharmacies may contribute to the preference of the students to use pharmacies as their first option to get ECPs.

With regard to adverse effects, almost half of the female students who had previously used ECPs stated that they had not experienced any such effects. The most commonly reported adverse effects included nausea, bleeding, delayed menstruation, and abdominal pain, which is similar to the results in the study by Olszewski et al. [12].

Many studies suggest that women are not receiving adequate information about ECPs from their HCPs, and would be more likely to use ECPs if they were informed by their HCP [9]. In this study, female students who had received HCP counseling had a higher level of ECP consumption than those who did not. Thus, HCP counseling informs women and clarifies some misconceptions, which can lead to more appropriate use of ECPs [9].

This study has some limitations. Coimbra, the city where this study was performed, is best known for its university, the great number of students, and a reference pole of health services in Portugal. This fact could create positive bias concerning educational level and more knowledge regarding health issues, even in institutions that are not directly related to health, such as the Coimbra Education School. It would

be interesting to investigate whether previous knowledge of ECPs is a result of sex education classes.

Further studies should try to identify the best way to provide ECP knowledge to students, in order to improve educational results in the future.

## Conclusions

In this study, we found a satisfactory level of knowledge about ECPs among this tertiary student population; however, there is a lack of knowledge in some areas. Therefore, students should receive more information from their HCP and school, for instance. In Portugal, ECPs are available as OTC products, which facilitates their obtainment and could be the explanation for a higher level of consumption in Portugal than has been reported in other countries. It is necessary to educate students regarding the rational use of ECPs, as this method should only be used in emergency situations and not as a regular birth control method.

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## Compliance with ethical standards

**Ethical approval** The study was approved by the involved institutions. Confidentiality of the participants was assured.

**Informed consent** Informed consent forms were signed by all participants.

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**Conflict of interest** All authors declare to have no conflicts of interest that are directly relevant to the content of this study.

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