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Over-the-counter procured emergency contraception among undergraduate students in a public University in Ghana

Fred Yao Gbagbo^{1*}

Abstract

Background Emergency Contraception (EC) is more popular among young people today, yet, there is little research on Over-the-counter procured EC among undergraduate students in African universities. This study's primary goal is to fill that gap.

Methods This was an exploratory-cross-sequential study conducted in a public university in Ghana, using 145 purposively sampled sexually active undergraduate students. A structured questionnaire and in-depth interview guide designed by the author were used for data collection during the University's 2021/2022 Academic year. The questionnaire was administered online via students' social media platforms. In contrast, four group discussions were held with 20 female participants (5 each from levels 100, 200, 300, and 400). Quantitative data were analyzed using Stata Version 14.0 to generate the Median, Standard deviation, Chi-square, and Fisher Exact Test scores, Whilst Content analysis was done with the qualitative data to generate verbal quotes.

Results There is demand and abuse of ECs among the students studied with about 99% usage to prevent pregnancy. Friends (81%) played a significant role in providing information about ECs to most participants (96%). About 80% of participants have used an EC at least once during the academic year and upon recommendation by friends (44%) and partners (39%). The most preferred ECs were Postinor-2 (61%) and Lydia post-pills (38%). Pharmacies on campus are the major (86%) suppliers at a cost between ghs5 and ghs15 cedis respectively. There were relationships between gender and choice of ECs (p = 0.001); age group and choice of ECs (p = 0.02); marital status and choice of ECs (p < 0.0001) as well as employment status of students and choice of ECs (p = 0.003). The qualitative findings provided relevant justifications for students'EC choices, sources, dosage, frequency, and motivations for use. The EC pills were taken routinely and soon after sexual intercourse sometimes overdosed for a perceived efficacy to prevent failure, regulate menses, or as an abortifacient. Male partners played a critical role in procuring and supervising the intake soon after sexual intercourse.

Conclusion There is a high demand, usage, and general abuse of over-the-counter procured ECs among undergraduate students in the study area. These findings suggest that sexually active students are concerned about pregnancy prevention and need health education programs on modern contraceptive methods to prevent unwanted pregnancy and possible STIs. From unprotected sex.

Keywords Emergency contraception, Students, University, Ghana

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Background

Globally, it is estimated that each year, approximately one-third (38%) of all pregnancies are unintended [1]. In sub-Saharan Africa, females aged 15-24 years are responsible for 44 percent of unintended births [2]. However, over the years the use of contraceptives in Sub-Saharan Africa has been far lower as compared to those of Latin America, the Caribbean, and Europe. Sub-Saharan African countries including Ghana have a high rate of unintended pregnancies due to inadequate access to women's reproductive health services [3]. This demonstrates restricted access to facilities for family planning and lower reproductive health rights [4]. One of the contraceptives commonly used by young people over the years is the emergency contraceptive which is largely considered to be the most effective method of preventing pregnancy after unprotected sex [5].

Emergency Contraception (EC) has increased among young people in recent times, due to its significant role in preventing unwanted pregnancies particularly among young sexually active people in school [5], yet there is limited literature on EC among undergraduate students in African Universities. EC, also referred to as post-coital contraception or the morning-after pill, has been defined as a method of contraception that can be used to prevent pregnancy after unprotected sexual intercourse [6]. The most common emergency contraceptives (e.g. copperbearing Intrauterine Contraceptive Devices (IUDs) and oral Emergency Contraceptive Pills) have been documented to prevent up to over 95% of pregnancies when taken within 120 h (5 days) after unprotected sexual intercourse, concerns about possible contraceptive failure, incorrect use of contraceptives, misuse of contraceptives, miscalculation of abstinence period and sexual assault where there is no reliable contraceptive backup [6]. Postinor 2, Lydia, Lenor, Levon 2, NorLevo, contra 72, and pregnon are some of the emergency contraceptive pills on the market [7].

In more recent times, the use of emergency contraceptives has increased among young people in developed countries such as the United Kingdom [8] and the United States of America [9]. The situation in the developing world is not too different, particularly among educated young people [10]. A study in 2002 [11] concluded that there was a moderate level of knowledge of EC among university students in Ghana. Another study [12] also identified a considerable knowledge gap in the specifics of EC among students at a university in Ghana. Both studies indicated that students followed directives from friends rather than read instruction leaflets as about 21% of the students who had heard about EC thought it could be used before sexual intercourse. Although EC is reported as an excellent method of avoiding unplanned pregnancies, it is frequently underutilized [13, 14]. More recent studies on ECs among university students [15, 16] have confirmed findings of previous studies but suggested that the trends of EC use have not changed but rather the EC demand has increased with increasing student population in the various universities.

In Ghana, about 14% of women between the ages of 15 and 19 years were pregnant for the first time and these pregnancies were unplanned [17]. The repercussions of unintended pregnancies particularly among young people require that contraceptives should be used efficiently and effectively as a mitigation strategy [18]. The use of emergency contraceptives has hence received much attention from young people in most low and middleincome countries [19], including university students in Ghana [20]. Although there have already been at least 6 studies on the ethos of using EC in Ghana, our current study is unique because 1) previous studies in this area are quite old and there is a need for new ones to report on the current situation. 2) The specific settings of previous studies are different from the current hence the findings are unique. 3) The study designs of the previous studies and the current are entirely different hence the findings. The focus of this current study is therefore to examine EC by students in a public university in Ghana to chart a path forward in meeting current contraceptive needs of students in public universities in Ghana.

Methods

Study design

This was an exploratory and cross-sequential study design using a mix of cross-sectional and longitudinal cohort study designs that employed both quantitative (online questionnaire) and qualitative (interview guide) means of assessing participants during the first and second semesters of the 2021/2022 academic year in the study setting.

Setting and population

The study was conducted in a public university in Ghana. (Identity of the public university is concealed to ensure strict anonymity). The study population comprised one hundred and fifty (150) undergraduate students present at the university as of the 2021/2022 academic year to pursue various programs, and have reported as never used EC prior to their admission into the university.

Sampling/selection of participants

One hundred and fifty (150) sexually active undergraduate students as of the first semester of the 2021/2022 academic year were purposively recruited and followed through to the end of the second semester when the 2021/2022 Academic year ended to examine their use of ECs in the university. Because the population of sexually active students on ECs was unknown, a statistically estimated sample sized was not practical. Using the principles of estimating sample size from unknown populations we based the sample size for this study on snowballing to include as many students who were willing to participate in the study. By the end of the academic year, one hundred and forty-five (145) out of one hundred and fifty (150) undergraduate students initially enrolled for the study responded to the questionnaire administered. Twenty (20) participants, five (5) each from levels 100, 200, 300, and 400, participated separately in the qualitative phase of the study.

Inclusion criteria

Undergraduate students at the various stages in the Academic programmes at the university (*i.e.*

levels 100, 200, 300, and 400) who were present during the first semester of the 2021/2022 academic year, sexually active, have ever used any form of pregnancy prevention method prior to the beginning of the first semester of the academic year and were willing to participate in the study. We purposively selected and involved males who were willing to participate in the study so as to examine the role of male partners in ECs use at the university. All participants were identified through snowballing, word of mouth search as well as call for participation using the student's social media platforms (whatsup groups).

Exclusion criteria

Undergraduate students of the university (levels 100, 200, 300, and 400 students) during the first semester of the 2021/2022 academic year, who have never used any form of EC prior to the beginning of the first semester of the academic year; and students who were not willing to participate in the study were all excluded from the study.

Data collection

An online structured google questionnaire and indepth interview guide designed by the authors were used for data collection in November 2022 soon before the second semester of the 2021/2022 Academic year of the university ended. The questionnaire was distributed online via the various social media platforms used by the students. For the qualitative phase of the study, 20 participants who had been carefully chosen for the in-depth interviews (five each from the level 100, 200, 300, and 400 students) were interviewed in-person using the in-depth interview guide. The collection of qualitative data continued until saturation was attained. Males were involved in the study to examine the role of male partners in EC in the university. The structured google questionnaire was available online through out the period of data collection to enable the participants to complete at their convenience and voluntarily. The in-depth interviews were also granted to willing participants during the entire period as and when a participant was identified. For the qualitative data, two trained female research assistants who were national service persons during the study period collected the data. The qualitative data collection was done on a oneon-one basis using an interview guided. Filed notes were used to capture the response provided from the interviews.

Data processing and analysis

Quantitative and qualitative data were respectively analyzed using Stata Version 14.0 and content analysis to generate tables and verbal quotes respectively. To begin the analysis, the quantitative data was coded and cleaned using Microsoft excel software and was exported to Stata Version 14.0 for the analysis. Continuous variables are summarized as median (interquartile range) and categorical variables are summarized as frequencies and percentages. The independent variables that were investigated during this analysis were gender, age group, marital status, residence, religion, ethnicity, academic year, faculty of study and employment status. The main outcome variable of the study was use of contraceptive. Emergency contraceptive pill users, non-emergency contraceptive pill users and non-users were compared with regard to demographic characteristics using chi square with P < 0.05 for statistically significant variables. Fishers exact test was used instead of a chi square test for cells with observed population below 5. Emergency contraceptive users was defined as respondents who had the history of using any type of emergency contraceptive pill. Nonemergency contraceptive pill users were respondents who used any other means to prevent pregnancy other than emergency contraceptive pills. None users were those who neither used emergency contraceptive pill nor non-emergency contraceptive pill for pregnancy prevention. Manual content analysis was done for the qualitative data and results presented as quotations or paraphrased statements from participants.

Ethical consideration

This research was conducted under the approval of the office of the Dean of Students Affairs of the Study setting (UEW/ODSA/PERSONAL/VOL.1/001). Informed consent was sought from each participant before enrolment into the study. Participants were told about their rights to withdraw from the study at any point without any form of sanctions.

Results

Socio-demographic characteristics of participants

The background characteristics of participants show that the majority of them were females (67%), aged between 18–24 years (71%), Cohabiting (48%), staying off campus (86%), Christians (88%), and in the final year (42%) (Table 1).

Knowledge of emergency contraceptive use

To assess participants' knowledge of ECs, all participants were asked if they have ever heard of EC. The

Table 1 Socio-Demographic Characteristics of participants (n = 145)

Variables	Frequency	Percentage (%)
Gender		
Male	48	33.1
Female	97	66.9
Age of respondents		
18–24	103	71.1
25–31	36	24.8
32 and above	6	4.1
Marital status		
Single	65	44.8
Married	10	6.9
Cohabiting	70	48.3
Place of stay		
On campus	20	13.8
Off campus	125	86.2
Religious affiliation		
Christianity	127	87.5
Islam	14	9.7
Traditional religion	4	2.8
Level		
First year	14	9.7
Second year	22	15.2
Third year	49	33.8
Final year	60	41.4
Faculty		
School of Business Studies	28	19.3
Faculty of Foreign Languages	10	6.9
Faculty of Science	107	73.8
Ethnicity		
Akan	102	70.3
Ewe	13	9.0
Ga- Dangme	9	6.2
Northern	19	13.1
Others	2	1.4
Employment status		
Yes	21	14.5
No	124	85.5

participants were also asked to cite the source of information about ECs and then 81% of them mentioned friends as the main source of information about ECs to the majority (96%) of participants who have ever heard

Findings in Table 2 necessitated further analysis of the data to explore the actual knowledge of participants on ECs. The analysis yielded significant variations in the knowledge on ECs among the participants (Table 3).

Use of ECs

of ECs Table 2.

There is a general demand and abuse of ECs among the students studied with about 99% usage to prevent pregnancy. About 80% of participants have ever

Table 2 Awareness of Emergency Contraception (n = 145)

Variables	Frequency	Percentage (%)	
Have you heard of Emergency Contraceptive before?			
Yes	145	100%	
No	0	0	
Where did you hear of it from?			
Friends			
Yes	113	77.9	
No	32	22.1	
Internet/ social media			
Yes	105	72.4	
No	40	27.6	
Radio			
Yes	39	26.9	
No	106	73.3	
Sexual Partner			
Yes	95	65.5	
No	50	34.5	
Health worker			
Yes	40	27.6	
No	105	72.4`	
Parents			
Yes	14	9.7	
No	131	90.3	
Lecturer			
Yes	31	21.4	
No	114	78.6	
Others			
Yes	7	4.8	
No	138	95.2	

 * In this particular context, Awareness of ECs is perceiving, knowing, feeling, or being conscious of ECs

^{**} 6 participants responded No to the question 'Have you heard of Emergency Contraceptive before?' A careful and further probing in this response in line with the inclusion criteria shows that these participants have actually used a type of EC given to them by their partners to prevent pregnancy without knowing that what they took is actually a type of an EC

Table 3 Knowledge of Emergency Contraceptive (n = 145)

Variables	Frequency	Percentage (%)
Emergency contraceptives cannot protect you from sexually transmitted infections		
Strongly agree	104	71.7
Agree	24	16.6
Neutral	8	5.5
Disagree	6	4.1
Strongly disagree	3	2.1
Emergency contraceptive is effective when taken within 72 h of sexual intercourse		
Strongly agree	62	42.8
Agree	57	39.3
Neutral	18	12.4
Disagree	8	5.5
Strongly disagree	0	0
Emergency contraceptives should be used only once every month		
Strongly agree	30	20.7
Agree	30	20.7
Neutral	74	51.0
Disagree	9	6.2
Strongly disagree	2	1.4
Emergency contraceptive pills can fail		
Strongly agree	55	37.9
Agree	68	46.9
Neutral	19	13.1
Disagree	3	2.1
Strongly disagree	0	0
Emergency contraception cannot be used as a regular Family Planning method		
Strongly agree	42	29.0
Agree	44	30.3
Neutral	51	35.2
Disagree	7	4.8
Strongly disagree	1	0.7
Condoms and Emergency Contraceptives are both regular family planning methods		
Strongly agree	91	62.8
Agree	37	25.5
Neutral	11	7.6
Disagree	6	4.1
Strongly disagree	0	0

'In this particular context, knowledge of ECs has to do with facts, information, and skills acquired through education and experience in using ECs'

used an EC at least once during the academic year and upon recommendation by friends (55%) and partners (69%). The most preferred ECs were Postinor-2 (61%) and Lydia post-pills (38%). Which were predominantly procured from pharmacy shops (74%). There were also many variations in the frequency of ECs usage among the participants (Table 4). **Practices and attitudes towards emergency contraceptives** In Table 5, we presented participants' practices and attitudes towards EC, their reason for using EC, and their intention to use EC. The participants indicated that the availability of ECs (77%) and affordability (75%) will make it easier for them to use EC.

Findings about the cost of ECs on campus using the simple arithmetic means (estimated average cost)

Table 4 Use of Emergency Contraceptives (n = 145)

Variables	Frequency	Percentage (%)
When was the last time you had sexual intercourse		
Just within this month	2	1.4
Last 2 months	109	75.2
Between 3 and 6 months	15	10.3
More than 6 months	19	13.1
Do you frequently use an emergency contraceptive to prevent pregnancy?		
Yes	143	98.6
No	2	1.4
What type of emergency contraceptive method do you frequently use?		
Lydia post pills	55	37.9
Postinor-2	88	60.7
Oral pills	2	1.4
How many times did you use emergency contraceptive pills in the academic year?		
Once	28	19.3
Twice	12	8.3
Thrice	26	17.9
Four times	16	11.0
More than four times	63	43.5
Where is your source of supply of EC from?		
Health facility	7	4.8
Peers	1	0.7
Partner	26	17.9
Pharmacy	107	73.8
Others	4	2.8
Who recommended emergency contraception to you?		
Friend	55	37.9
Partner	69	47.6
Health professional	14	9.7
Others	7	4.8
Were you given information the last time you bought emergency contraceptive pills?		
Yes	53	36.6
No	92	63.4
What side-effects are you aware of?		
Weight gain		
Yes	28	19.3
No	117	80.7
Excessive bleeding		
Yes	37	25.5
No	108	74.5
Painful periods/ cramps		
Yes	46	31.7
No	99	68.3
Nausea and vomiting		
Yes	54	37.2
No	91	62.8
Dizziness		
Yes	56	38.6
No	89	61.4
Irregular cycle		

Variables	Frequency	Percentage (%)
Yes	102	70.3
No	43	29.7
Headache		
Yes	58	40.0
No	87	60.0
How much do you usually spend on a pack of emergency contraceptive pills?		
Less than 5 Cedis	2	1.4
5–10 Cedis	90	62.1
11-15cedis	20	13.8
16–20 Cedis	6	4.1
Above 20 Cedis	27	18.6

 Table 5
 Practices and Attitudes towards Emergency Contraceptives (n = 145)

Variables	Frequency	Percentage (%)
When do you and your partner normally use Emergency Contraception pill?		
Anytime we have sexual intercourse	15	10.3
When we have sexual intercourse during ovulation time	47	32.4
It is our regular family planning method	38	26.2
Once a while when we have sex	45	31.0
Do you and your partner intend to use EC in the future?		
Yes	31	21.4
No	119	82.1
Support from friends will make it easier for you to use an Emergency Contraceptive		
Yes	35	24.1
No	110	75.9
Support from family will make it easier for you to use an Emergency Contraceptive		
Yes	26	17.9
No	119	82.1
Affordability of Emergency Contraceptive pills will make it easy to use		
Yes	131	90.3
No	14	9.7
Availability of Emergency Contraceptive pills will make it easy to use		
Yes	132	91.0
No	13	9.0

shows ghs 5 being the minimum cost and ghs15 being the maximum cost of the most common ECs being procured over-the counter on campus.

In Table 6, students' perceptions of ECs were presented. The majority (57%) disagreed that ECs have significant side effects when used.

Exploring the associations between Student's Demographic Characteristics and their Contraceptive Choices, it was noted that a significant relationship existed between gender and choice of contraceptive method (p=0.001); age group and choice of contraceptive method (p=0.02); marital status and choice of contraceptive method (p < 0.0001) as well as employment status of students and choice of contraceptive method (p = 0.003). No significant relationship was found between residential status, religion, ethnicity academic year and faculty of students, and the choice of emergency contraceptive method (Table 7).

Qualitative findings

The qualitative findings provided relevant justifications for students' EC choices, sources and motivations for use. The EC pills were taken routinely and soon after sexual intercourse sometimes overdosed for a perceived efficacy **Table 6** Students' Perception about Emergency Contraception (n = 145)

Variables	Frequency	Percentage (%)
EC has significant side effects hence I fear to use it regularly		
Agree	62	42.8
Disagree	83	57.2
ECs promote promiscuity hence increases the prevalence of HIV/AIDS and other STIs		
Agree	43	29.7
Disagree	102	70.3
If I have unprotected sexual intercourse, I would use an emergency contraceptive and rec	commend to a friend	
Agree	118	81.4
Disagree	27	18.6
ECs are safe for its users		
Agree	119	82.1
Disagree	26	17.9
I won't use ECs to prevent pregnancy because I value a lot of children		
Agree	31	21.4
Disagree	114	78.6

to prevent failure. Male partners played a critical role in procuring and supervising the intake soon after sexual intercourse.

The background characteristic of participants in the qualitative phase of the study is presented in Table 8.

We identified some themes and subthemes of interest during the FGDs (Table 9).

Frequency of sexual intercourse

Participants shared their experiences on how often they have sex whilst on campus as follows:

"I do have sex almost once every week particularly on weekends. I have been in this university for the past four years and always use an Emergency Contraceptive any time I have sex with my guy when I think I'm not in my safe period" (Participant 1, Level 400).

"I can't count the number of times I have sex, since it's on demand from both sides. My boyfriend and I are in the same place so we have sex as and when we want to...... We always use Lydia post pills to avoid pregnancy anytime we have sex because we are not ready for a baby now" (Participant 2, Level 300)

"It's as if I'm addicted to sex. I can't stay a week without sex since I become restless and sometime loose concentration in class when I try to abstain from sex. I'm just two years old in this university so I always use Emergency Contraceptives, because I don't want to become pregnant now" (Participant 3, Level 200)

Frequency of emergency contraceptive use

It was revealing to note that the frequency of EC pills usage and the high doses were not only, to prevent pregnancy but also for menstrual regulation and sometimes attempts to induce abortion. Some students shared their experiences as follows:

"For me I know ECs are used to prevent unwanted pregnancy after an unprotected sex but to be double sure that it will not fail me, I try to use a double dose frequently hence I have never experienced any failure since I started using it frequently. But some of my friends have said it sometimes failed them and they became pregnant" (Participant 2, Level 200)

"I do have irregular menses. sometimes my menses comes twice in a month. So, I learnt from my boyfriend that, high doses of ECs will correct my menses that is why I use it any time we have sex or sometimes before I even have sex with him" (Participant 3, Level 300)

"I frequently use a combination of EC pills in large doses to ensure that even if I become pregnant after sex, the pregnancy will be aborted with the high doses." (Participant 4, Level 400).

Source of the emergency contraceptive(s) used

There were various sources of the ECs being used, participants reported as follows:

"I don't know the source of the ECs, it's my boyfriend who always supplies me with ECs and makes sure I take them in his presence after each round sex....

Variables	Modern ECs only	Traditional ECs only	Combinations of ECs	p values
Gender				
Male	22(15.2)	15(10.3)	11(7.6)	0.001
Female	49(33.8)	31(21.4)	17(11.7)	
Age group				
18–24	71(49.0)	26(17.9)	6(4.1)	
25–31	17(11.7)	15(10.3)	4(2.8)	0.02
32 & above	4(2.8)	2(1.4)	0(0.0)	
Marital status				
Single	41(28.3)	14(9.7)	10(6.9)	
Married	6(4.1)	3(2.1)	1(0.7)	0.0001
Cohabiting	41(28.3)	26(17.9)	3(2.1)	
Residence				
Off campus	69(47.6)	44(30.3)	11(7.6)	0.113
On campus(hall)	15(10.3)	2(1.4)	3(2.1)	
Religion				
Christianity	71(49.0)	43(29.7)	13(9.0)	
Islam	9(6.2)	4(2.8)	1(0.7)	0.722
Traditional religion	3(2.1)	1(0.7)	0(0.0)	
Ethnicity				
Akan	53(36.6)	32(22.1)	17(11.7)	
Ga/Dangme	4(2.8)	3(2.1)	2(1.4)	0.286
Ewe	4(2.8)	7(4.8)	2(1.4)	
Northern	10(6.9)	7(4.8)	2(1.4)	
Academic year				
First year	9(6.2)	3(2.1)	2(1.4)	
Second year	10(6.9)	8(5.5)	4(2.8)	0.445
Third year	28(19.3)	15(10.3)	6(4.1)	
Final year	26(17.9)	23(15.9)	11(7.9)	
Faculty				
Business	13(9.0)	10(6.9)	5(3.4)	
Science	56(38.6)	32(22.1)	19(13.1)	0.325
Foreign languages	6(4.1)	3(2.1)	1(0.7)	
Employment status				
Employed	4(2.8)	13(9.0)	4(2.8)	0.003
Unemployed	63(43.4)	33(22.8)	28(19.3)	

 Table 7
 Student's Demographic Characteristics and their Contraceptive Choices (n = 145)

sometimes I take 3 doses of Postinor-2 in a day" (Participant 5, Level 400).

"I usually buy Lydia from a particular pharmacy in Accra.... Because I don't trust the shops around campus.... they sell fake drugs which are not effective" (Participant 6, Level 300).

"I only had unprotected sex twice last semester whilst on campus and quickly bought Lydia post pills on each occasion from a pharmacy shop around campus for use" (Participant 7, Level 200). "The man who had sex with me on campus gave me some medication and said it is called an emergency contraceptive that will prevent me from becoming pregnant" (Participant 8, Level 100).

Cost of ECs

When asked about how much is spent on Emergency contraceptive(s) on campus, the majority (15 out of 20) participants could not tell how much they spend on **Table 8** Background characteristic of participants in the qualitative phase of the study

Variables	Frequency
Gender	
Male	5
Female	15
Age of respondents	
18–24	11
25–31	5
32 and above	4
Marital status	
Single	12
Married	3
Cohabiting	5
Place of stay	
On campus	6
Off campus	14
Level	
First year	5
Second year	5
Third year	5
Final year	5
Faculty	
School of Business Studies	4
Faculty of Foreign Languages	3
Faculty of Science	13
Employment status	
Yes	4
No	14

Table 9 Themes and subthemes of interest during the FGDs

Main themes	Sub-themes
Sexual behaviour	Frequency of sexual intercourse
Use of ECs	 Frequency of EC use Source of ECs Cost of ECs
Experiences with ECs	EffectivenessSide effects

contraceptives in general and ECs specifically. Some explained that:

"I really don't budget for ECs because it's not something I use regularly.....so I can't really tell how much it costs mebut what I know is the prices of EC vary depending on the type and where I buy it from.... the last time I bought one on campus was ghs25" (Participant 9, Level 400). "Emergency contraceptives are very expensive on campus compared to Accra.....so I always stock some anytime I'm coming from Accra to campus for use" (Participant 10, Level 300).

Effectiveness

Three (3) out of five (5) participants in each of the four (4) focus groups had at least once experienced an EC failure leading to an unwanted pregnancy majority of which were terminated. Participants shared their experiences as follows:

"Despite taking an overdose of Postinor-2 I still became pregnant surprisingly o two different occasions" (Participant 11, Level 400)

"All the ECs I ever took were very effective in exception of last semester's one that failed me which is the pregnancy I'm currently carrying (Participant 12, Level 300)

Side effects

Each participant reported some form of side effect associated with ECs. The reported side effects include nausea, vomiting, breast heaviness, and irregular menstruations (i.e. delayed or continues menstruation or amenorrhea even though there is a sign of pregnancy) Some participants said:

"I have been bleeding for the past 3 weeks after my last menses after when I took that EC" (Participant 13, Level 400).

"My problem with ECs is that anytime I take them I experience serious nausea with severe abdominal cramps for a week" (Participant 14, Level 300). "I don't know whether to call it a side effect, but the more I take ECs the smoother my skin becomes.... all the pimples on my face are gone since I started using ECs on regular basis" (Participant 15, Level 200).

Male involvement in EC on campus

We purposively involved males in the study to examine their roles in EC at the university. Some of the males interviewed stated that:

"I always ensure that Akua takes Lydia in my presence immediately after we are done having sex..... because I don't want any pregnancy wahala..... I always buy it for her so that she does not give excuses that she did not have money to buy EC or she had forgotten to take it as she did some time back a became pregnant" (Male Participant 1, Level 300). "Because we are not ready for a pregnancy now, we both try to get an emergency contraceptive pill any time we make love...... we go to a nearby pharmacy to buy it and I usually pay for it". (Male Participant 2, Level 300).

"We have been having raw sex since level 100, but I've never even thought about anything like emergency contraceptives..... I usually see her taking some pills soon after sex, but I don't really know what it is and why she does that..... she has never been pregnant before though.....I guess she takes those pills to prevent pregnancy" (Male Participant 2, Level 400).

Discussion

The current study looked at undergraduate students' over-the-counter procurement of ECs at a public university in Ghana to inform policy and program decisions. Building on a similar previous study in Ghana [21] the current study unearthed various issues relating to ECs among undergraduate students in the study area. From the literature reviewed, it was noted that young people's usage of contraceptives is predominantly to avoid unwanted births and this intention has become a major problem due to the rising sexual activity and a lowering average age at first intercourse among young people in developing nations [22].

There is limited literature on the prevalence of contraception among university students in African countries, with a few studies conducted in Nigeria [23], Kenya [24], and Ghana [11, 24]. The core assumption driving this current study is that university students use over-thecounter procured ECs to prevent unwanted pregnancies. This practice was observed to be influenced by the readily availability and affordability of various types ECs in the various pharmaceutical shops on campus. The challenge however observed is that, patrons of ECs are not well informed about the dose and dosage and also the medical implications of its abuse in future. Participants were more concern about pregnancy prevention using ECs hence other adverse situation such as acquiring sexually transmitted diseases that unprotected sexual intercourse could bring were of no significant concern to the participants.

The participants in this study had varied background characteristics but these characteristics were noted not to have significantly influenced their contraceptive preferences and use since there were other factors that were observed to have more influenced students' decisions for contraception at any level in the university. This observation was supported in previous studies [8, 25] which reported that knowledge about contraceptive methods affects choice and usage. Therefore, it is crucial that the growing use of EC among university students in this study is motivated by their understanding of ECs. These findings highlight the urgent need for education and information sharing on modern contraception as well as the provision of contraceptive services on campus.

In another previous study that looked at the knowledge and practices of EC among 476 women of reproductive age in Ghana [26], reported that Knowledge was independent of age (p=0.26), marital status (p=0.14), and level of education (p=0.21). In assessing participants' Knowledge of EC in our study, we observed that friends (81%) were the main source of information about ECs to the majority of participants who have ever heard of ECs (96%). Health workers exist on the university campus yet only about 29% of respondents indicated to have had some information from them. The observation that about 35% of participants remained neutral when asked whether ECs can be used as a regular form of Family Planning to be taken after unprotected sex suggests that there is a knowledge gap of modern contraception among undergraduate students in the study area since this could mean they simply don't know. Consequently, we observed from both the quantitative and the qualitative data analysis that there was a general abuse of ECs among the students studied. This was evident from the source of the ECs, the types that were frequently being used, the dosage and the frequency of use.

The question therefore is, are health workers on the university campus not interested in contraception education during the orientation of fresh students or the periodic health education talks being organized on the university campus? The issue of concern is how professional and factual is the information that friends provide on contraception is medically good. What is the role of the public health unit of the university hospital in relation to contraceptive education of students on campus? These are all questions that require further investigation to chart a path forward in meeting the contraceptive needs of students on campus.

A number of studies have examined EC among university students Concerning participants' use of Emergency Contraceptives, we also observed many variations in the use of ECs among the participants. The majority (80%) of participants have ever used an EC at least once during the academic year and upon recommendation by friends (44%) and partners (39%). The reported most preferred ECs being used are Postinor-2 (50%) and Lydia post pills (37%) which are mostly (86%) procured from Pharmacy shops on campus at a cost of 5 cedis and 10 cedis respectively.

The participants indicated that the availability of emergency contraceptive (77%) and affordability (75%) on campus makes it easier for them to use. Some studies [16, 17, 26, 27], on EC using by university students reported that there is an increase in timely EC use, when comparing Over-the-Counter (OTC) or pharmacy procured EC compared to prescription-only EC. This finding confirms our observation that students using ECs generally resort to OTCs sources than hospital prescriptions. This observation probably justifies the low-level involvement of the university health workers in contraceptive education because there is a perception that students already know where to get an EC when need be.

Students' perceptions about ECs' side effects show that the majority (57%) disagreed that ECs have significant side effects when used. This means respondents do not fear using ECs. About 70% also disagreed with a perception that ECs promote promiscuity among users hence increasing the prevalence of STIs and HIV/AIDS. The majority of participants (79%) therefore attested to the fact that they will continue to use ECs to prevent unwanted pregnancies. The regular use of ECs as a regular family planning method however contradicts the principles of ECs and therefore calls for professional education/orientation of students on the use of ECs to prevent any major cumulative side effects.

Exploring the associations between selected demographics of students and EC, revealed a significant relationship between gender and the choice of contraceptive method (p=0.001); age group and the choice of contraceptive method (p=0.02); marital status and choice of contraceptive method (p<0.0001) as well as employment status of students and the choice of contraceptive method (p=0.003). No significant relationship was found between residential status, religion, ethnicity academic year and faculty of students, and the choice of contraceptive method.

To understand the relationship between the several variables under investigation, both Univariate and multivariate analysis on the dataset were done. The Univariate analysis gave a further understanding of the distribution of values for one variable while the multivariate analysis provided an understanding of the relationship between the several variables in the study. The results of the univariate and multivariate analysis (reference category is an emergency contraceptive method) showed no significant relationship between gender and the choice of emergency contraceptive use (OR = 0.48; 95% CI: 0.23 - 1.01).

The Multivariate Analysis however found a 10% increased chance of females choosing EC over males, despite this difference not being significant. No significant relationship was found between the age group and the choice of an EC in both univariate and multivariate analysis. A 30% higher chance of cohabiting couples using EC as compared to married couples was found in univariate analysis. This difference was significant

(p=0.014). In multivariate analysis, no significant relationship was found between cohabiting and married couples with respect to the choice of EC. Being off campus was found to be protective with regard to the choice of using EC. However, the difference was not significant in both univariate or multivariate analyses. No significant relationship was found between religion, ethnicity, and faculty with regard to the choice of ECP in both univariate analyses.

Unemployed students had an 84% increased chance of using an EC at univariate analysis as compared to employed students. This difference was found to be significant (p=0.002). However, no significant relationship was found between employment status and choice of EC in multivariate analysis No significant relationship was found between the academic year of the student and the choice of an EC in univariate analysis. However, at multivariate analysis, a third-year student had 4 times higher odds of choosing an EC compared to a final-year student. This difference was found to be significant.

It was deduced from the study results that by the third year in the university (Level 300), students might have socialized very well and hence be exposed to the pressure of sexual intimacy, hence acquired knowledge of preventing pregnancy using the most common options (i.e. EC). The sexually active final-year students perhaps might have been in more stable relationships and hence switched to more long-lasting contraception than the emergency ones which have more advantages than the ECs. These deductions were confirmed from the qualitative enquiry as narrated by both the female and male participants.

The results also indicate that the males have at least seen their female partners take some ECs after having sexual intercourse. In most cases, the males played a critical role in procuring and supervising intake of an emergency contraceptive pill by their female partners soon after sexual intercourse. Some male participants also reported seeing their female partners take some tablets after sex hence were convinced that the females did that to prevent an unwanted pregnancy, which they are very comfortable with. A further probe into the qualitative responses on the frequency of EC use and the dosage indicate that students also used EC pills for menstrual regulation and sometimes attempts to induce abortion. These findings were therefore some key reasons why some respondents used combinations of ECs and over doses.

These observations are suggestive that sexually active male university students want to enjoy sexual relationships but are not ready for pregnancy; so, they resort to procuring ECs for their female partners and also ensure that their female partners take time in their presence as prescribed to prevent unwanted pregnancies in school. Others are happy that their partners have an antidote to preventing unwanted pregnancy as they continue enjoying sexual relationships on campus.

Strengths and Limitations.

This study had the strength of choosing a sensitive topic about EC by young people in a tertiary institution; the study design adopted and solicited information from both males and females on EC. Despite the strengths, we acknowledged the following limitations to the study: We conducted this study using a sample of undergraduate university students from a public university in Ghana; hence, the findings cannot be generalized. At the tertiary level of education, the assumption was that the postgraduate university students may have been more knowledgeable about preventing pregnancy using other long-acting and reversible contraceptives than undergraduate students. The inability to include students at all levels in the sample prevented the exploration of this aspect. Due to the cross-sectional nature of the study design, causality and impact relationships regarding EC cannot be proved by the study.

Conclusions

All the participants in the study showed an awareness of EC and, in general, a positive attitude toward contraception education on campus. There is a high demand, usage and general abuse of over-the-counter procured ECs among undergraduate students in the study area. These findings suggest that sexually active students are concerned about pregnancy prevention and need health education programs on modern contraceptive methods to prevent unwanted pregnancy and possible STIs. From unprotected sex. A policy decision is therefore required to enable the University Health Directorate to increase awareness and education on the various types of modern contraceptives during the orientation of fresh students on campus. There is also a need for periodic contraceptive education programs for the entire student body to address the knowledge deficits of contraceptives in general and ECs, in particular. When this is done; it will enhance knowledge of contraceptives and provide better guidance to students on preventing unwanted pregnancies using other regular and effective modern contraceptives.

Abbreviations

- AIDS Acquired Immunodeficiency Syndrome
- EC Emergency Contraception/ Emergency contraceptives
- ECPs Emergency Contraceptive Pills
- FGD Focus Group Discussion
- HIV Human Immunodeficiency Virus
- IDI In-depth Interviews
- IUDs Intrauterine Contraceptive Devices

- OTC Over-the-Counter
- SPSS Statistical Package for Social Sciences
- STIs Sexually Transmitted Infections

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Authors' contributions

F.Y.G Solely authred the paper.

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Availability of data and materials

The raw data collected is available from the author.

Declarations

Ethics approval and consent to participate

I confirm that all aspects of this study were performed in strict accordance with the relevant guidelines and regulations relating to involving humans in this type of research. In this regard, online informed consent was obtained from all participants involved in the study prior to data collection.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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