



Research article

Knowledge, practice and other correlates of emergency contraception among female undergraduate students of Niger Delta University, Bayelsa state, Nigeria

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ABSTRACT

Women and couples continue to experience unintended pregnancies at high rates. There is a critical role for emergency contraception (EC) in preventing those pregnancies. The study was conducted among randomly selected 217 undergraduate female students in Niger Delta University to evaluate their knowledge, awareness, practice and other correlates of emergency contraception. A cross-sectional study design using a validated questionnaire was employed. Data was analyzed with SPSS Version 27 and Graph Pad. Respondents were aged 15 -25 years (69.2%); single (84.6%); Christians (92.3%); lived off campus (92.3%); drawn from faculties of Arts (23.1%), Nursing (25%), Pharmacy (30.7%) and Science (22%); study levels used were 500 level (38.5%), 400 level (23.1%), 300 level (26.9%), and 200 level (11.5%). All respondents reported to be aware of EC; 46.2% believed that the appropriate time to take EC is 24-48 hrs. After intercourse, majority (84.6%) reported to have used Levonorgestrol; 92.3% reported post-coital EC should be within 72 hours. Regarding effectiveness, 73% opined EC was effective to varying degrees; only 26.9% had experienced side effects; the major side effects experienced were: Menstrual changes/disturbances (60.6%), Headache (38.5%), and Nausea/Vomiting (37.5%); 57.7% of the participants agreed that EC use will lead to potency loss and 46.1% opined that excessive use of EC will lead to drug abuse. There was a statistically significant difference ($p < 0.001$) in the responses from across faculties and study levels regarding the maximum acceptable time for postcoital EC, EC in relation to abortion and STIs. Although awareness about post-coital EC is high, the knowledge about key aspects of EC is poor and misconception is high among these students. There is a need to improve the knowledge and the attitude level of the participants about EC.

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INTRODUCTION

Emergency Contraception (EC) is the use of a drug or copper intrauterine device (Cu-IUD) to prevent pregnancy shortly after unprotected intercourse (Amalba et al., 2014; Shen et al., 2019). This connotes that methods of EC are used after coitus but before pregnancy occurs and that they are intended as a back-up for occasional use rather than a regular form of contraception (Van Look and Herten, 1993). EC can be used in the following situations: unprotected intercourse, concerns about possible contraceptive failure, incorrect use of contraceptives, and sexual assault if without contraception coverage; and especially important for outreach to 4.6 million women at risk of pregnancy but not using a regular method by providing a bridge to use of an ongoing contraceptive method (Trussell and Schwarz, 2011).

EC is widely available in Western Europe and China. However, use of this method is rising rapidly in low- and middle-income countries. For example, the 2008 to 2009 demographic and health survey (DHS) data showed that

22% of unmarried sexually active women in Alban had used EC. In Columbia, Kenya and Nigeria, according to data from DHS, 10% to 16% of unmarried sexually active women used EC (Koyama et al., 2013). This proportion in Peru was 35% in 2010 (INEI, 2012). However, EC is largely underutilized in many other countries. Examining data from 45 countries surveyed between 2000 and 2012, in 16 countries, fewer than 10% of women aged 15 to 49 years had heard of EC; in 36 countries, the rate of use of EC was less than 3% among women who had ever had sex (Pallerma et al., 2014). The low awareness of ECPs and the lack of access to EC may subject women to unwanted abortions, which contribute significantly to maternal mortality and morbidity.

Unwanted pregnancy is a common problem (Rafle et al., 2017). Worldwide, over 40 million pregnancies end in abortion each year (Sedgh et al., 2012; 2014). The World Health Organization estimates that 8 million unwanted pregnancies occur annually worldwide. Around 42 million abortions take place every year, 20 million of them are unsafe. Almost 97% of the overall unsafe abortions take

place in the developing world. Approximately 13% of pregnancy-related mortality worldwide is due to unsafe abortions (WHO, 2012).

The standard approach to this problem has been primary prevention (contraception), backed up by induced abortion. However, for a long time, 'contraception' has generally been understood to mean only anticipatory contraception. Primary prevention of unintended pregnancy ought to include post hoc contraception (Grimes, 1997). This has evolved into the use of EC (Raffle et al., 2017). Nearly all (95%) unintended pregnancies are due to nonuse or incorrect/inconsistent use of contraception (Jones et al., 2002). Despite the availability, safety, and efficacy of the specific emergency contraceptive agents, there is still limited awareness and use of EC among women of reproductive age in sub-Saharan Africa.

Adolescents and young women are at the greatest risk of unintended pregnancy as they tend to avoid family planning clinics before or immediately after the sexual activity. Therefore, preventing unintended pregnancy among them is an important concern. Knowledge about EC is of grave concern because of high rates of unwanted and teenage pregnancy. The present study was undertaken among female undergraduate students of Niger Delta University in Bayelsa State to assess their knowledge, awareness, perceptions and practice of EC.

MATERIALS AND METHODS

Study location/Setting

The study was conducted in Niger Delta University, Bayelsa State, Nigeria.

Study design and sample size

A descriptive cross-sectional study design using a validated questionnaire was employed in this study. The population studied was 217 female students across faculties of Arts, Nursing, Pharmacy, Nursing and Science in Niger Delta University. There was no bias for ethnicity, age, religion, marital status, except for gender.

Sampling technique

A random simple sampling technique was employed with 217 questionnaires distributed among female students. A total of 208 usable questionnaires were retrieved from the participants cutting across 100 level to 500 level female students; 9 questionnaires were rejected due to incompleteness.

Instrument for data collection

Data was collected using a well-structured questionnaire which was given to only female students in the Niger Delta University. The questionnaire comprises of five sections, namely: demographic data, knowledge/awareness of EC use, types of, frequency of use and indications for EC, effectiveness / side effects of EC, and perceptions toward EC.

Method of data collection

The questionnaire was administered to 217 female students from the four faculties selected using random sampling techniques. Some of the respondents did not complete their questionnaire. Most of the respondents did not need much assistance to fill the questionnaire.

Method of data analysis

Retrieved questionnaire was analyzed using SPSS version 27 and Graph pad. The data was represented by percentages, mean as descriptive data with few inferential statistics analyses.

Inclusion criteria

Only female students from the faculties of Arts, Nursing, Pharmacy and Science in Niger Delta University participated.

Ethical approval

Ethical approval was gotten from the Niger Delta Ethics committee.

RESULTS

Demographic data of participants

Female students participated in the study; most of them (69.2%) in the 15-25 years' age group; 84.6% were Single (unmarried); majority (92.3%) were Christians; majority (92.3%) lived Off Campus; respondents were sampled from Pharmacy (30.7%), Nursing (25%), Arts (23.1% and Science (2.2%) faculties; study levels used were 500 level (38.5%), 400 level (23.1%), 300 level (26.9%), and 200 level (11.5%) (Table 1).

Table 1. Demographic data of participants

Variable		Frequency (N)	Percent (%)
Gender	Female	100	208
Age (years)	15-25	69.2	144
	26-35	30.8	64
	36-45	0	0
Marital status	Single	84.6	176
	Married	15.4	32
	Divorced	0	0
	Widowed	0	0
Religion	Christian	92.3	192
	Muslim	3.8	8
	free thinker	0	0
	Traditionalist	5.0	10
Faculty	Arts	23.1	48
	Nursing	25	52
	Pharmacy	30.7	64
	Sciences	21.2	44
Academic level	200	11.5	24
	300	26.9	56
	400	23.1	48
	500	38.5	50
Place of residence	Hostel	7.7	16
	Off campus	92.3	192

Knowledge / awareness of emergency contraception

All respondents (100%) reported to be aware of EC; 46.2% believed that the appropriate time to take EC is 24-48 hrs. after intercourse; 38.5% believed that taking emergency contraceptive pills is a method of early abortion; 73.1% opined that emergency contraceptive pills cannot prevent STI's (Table 2).

Table 2. Knowledge / awareness of emergency contraception among the participants

Variable	Frequency (N)		Percent (%)
Have you heard of emergency contraceptives?	Yes	208	100.0
	No	0	0
	Can't remember	0	0
What is the maximum acceptable time after sex for a woman to take emergency contraceptive pills?	12-18 hours	56	26.9
	24-48 h	96	46.2
	72-120 h	56	26.9
	124-160 h	0	0
Emergency contraceptive pills is a method of early abortion	Yes	80	38.5
	No	128	61.5
	Don't know	0	0
When taken early, emergency contraceptive pills can prevent STI's	Yes	56	26.9
	No	152	73.1
	Don't know	0	0
Emergency contraceptive use may cause infertility in a woman	Yes	128	61.5
	No	80	38.4
	Don't know	0	0

Types of frequency of use and indications for EC

Regarding the type of EC used by the respondents, majority (84.6%) reported to have used oral Levonorgestrol (Postinor); 15.4% claimed they used Ulipristal acetate. No respondent reported the use of IUD and Meloxicam.

Regarding the most common EC in their area, majority (73.1%) reported this to be Levonorgestrol (Postinor) followed by Andrews Liver Salt (26.9%), IUD (19.2%), and Meloxicam (15.4%); 11.5% of respondents reported that the use of Antibiotics, Huda drink and withdrawal method was prevalent in their area.

Regarding the time interval that EC should be taken relative to intercourse, majority (92.3%) reported this to be within 72 hours after sexual intercourse; 3.8% opined that EC should be used an hour before sex or 72 hours after sex. Regarding frequency of use of EC, majority (57.7%) reported this to be 12 hours apart; 15.4% claimed EC could be used at intervals of 24 hours.

The indications given by respondents for EC included prevention of unwanted pregnancy (88.5%), family planning (19.2%) and Lack of trust on ovulation count down (15.4%); 11.5% of respondents reported they use EC to prevent STIs (Table 3).

Table 3. Types of frequency of use and indications for EC

Variable	Frequency (N)	Percent (%)	
What types of emergency contraception do you utilize after intercourse?	IUD copper	0	0
	Meloxicam	0	0
	Ulipristal acetate	32	15.4
	Levonorgestrol (postinor)	176	84.6
Emergency contraception methods common in your area	Meloxicam	32	15.4
	Andrew liver salt	56	26.9
	Postinor-2	152	73.1
	IUD	40	19.2
	Antibiotics	24	11.5
	Withdrawal method	24	11.5
At what time do you think EC should be taken relative to intercourse?	Huda drink	24	11.5
	An hour before sexual intercourse	8	3.8
	After sexual intercourse (within 72 h)	192	92.3
What is the frequency of use of EC?	After 72 h of sexual intercourse	8	3.8
	Twelve hours apart	120	57.7
	Twenty-four hours apart	32	15.4
	seventy-two hours apart	0	0
What are the indications for EC?	I don't know	56	26.9
	To enable perfect child spacing	40	19.2
	Lack of trust on ovulation count down	32	15.4
	To prevent unwanted pregnancy	184	88.5
	Family planning	40	19.2
	To prevent STIs	24	11.5

Effectiveness and side effects of EC use

Regarding effectiveness, 19.2%, 26.9% and 26.9% of respondents were of the opinion that EC is 99% effective, 75% effective and 50% effective respectively; 26.9% of the respondents could not express an opinion about the effectiveness of EC.

Regarding their experience about the effectiveness of EC, 38.5% and 26.9% of the participants reported 99% and 50% effectiveness of EC respectively. Regarding their experience with IUD as EC, 21.2%, 34.6% and 15.4% of respondents reported 99%, 75% and 50% effectiveness respectively; 38.5% did not know. Regarding the opinion of respondents about possibilities of side effects from EC,

65.4% were affirmative; 15.4% did not know. Regarding whether they had ever experienced side effects following EC, only 26.9% had experienced side effects whilst 46.2% had not; 15.4% did not know.

Regarding their knowledge of EC side effects, they reported the following: Prolongs menstrual cycle (26.9%), Distorted/impaired menstrual cycle (23.1%); Stops ovulation (15.4%); Nausea/Vomiting (25.9%); Dizziness (11.5%); Headache (25.9%); Stomach ache (16.3%); Loss of fertility (27.9%) and Weight gain (18.3%). Regarding the side effects that they ever experienced with EC, the following were reported: Menstrual changes/disturbances (60.6%), Headache (38.5%), Nausea/Vomiting (37.5%), Weight gain (27.9%) and Stomach ache (23.1%) (Table 4).

Table 4. Effectiveness and side effects of EC use

Variable		Frequency (N)	Percent (%)
State your views about the effectiveness of EC to prevent unintended pregnancy.	Highly effective (99%)	40	19.2
	Three-fourth (75%)	56	26.9
	Half (50%)	56	26.9
	Don't know	56	26.9
In practice, how effective is emergency contraceptive pills?	Highly effective (99%)	80	38.5
	Three-fourth (75%)	0	0
	Half (50%)	56	26.9
	Don't know	72	34.6
In practice, how effective is Intrauterine device (IUD)?	Highly effective (99%)	44	21.2
	Three-fourth (75%)	72	34.6
	Half (50%)	32	15.4
	Don't know	80	38.5
Are there side effects after the use of emergency contraception?	Yes	136	65.4
	No	40	19.2
	Don't know	32	15.4
Have you experienced Side Effects after EC?	Yes	56	26.9
	No	96	46.2
	Don't know	32	15.4
What are the expected Side effects of EC?	Prolongs menstrual cycle	56	26.9
	Stops Ovulation	32	15.4
	Loss of fertility / potency	58	27.9
	Weight gain	38	18.3
	Distorted/impaired menstrual cycle	48	23.1
	Nausea/Vo	54	25.9

	miting		
	Dizziness	24	11.5
	Headache	54	25.9
	Stomach ache	34	16.3
What were the side effects that you ever experienced with EC use?	Menstrual disturbances /changes	126	60.6
	Nausea/Vomiting	78	37.5
	Headache	80	38.5
	Stomach ache	48	23.1
	Weight gain	58	27.9
	Decreased Libido	22	10.6
	Vaginal discharge	25	12.0

Perceptions of respondents towards EC

A total of 57.7% participants agreed that EC use will lead to loss of potency and 46.1% of the participants opined that excessive use of EC will lead to drug abuse. Meanwhile, 73.1% of the participants opined that frequent use of EC is not part of self-care/ self – medication. Regarding abstinence from unprotected sex, 73.1% agreed that this approach is better than the use of emergency contraception. However, 84.6% of participants believed that provision of emergency contraception after an episode of unprotected sex can prevent unwanted pregnancy. Regarding access, 84.6% were of the opinion that all females should have access to EC. Regarding promiscuity, 65.3% of participants believed that EC does not promote promiscuity; 73.1% disagreed that EC is a sinful act; and 46.2% of participants were of the opinion that EC will affect ongoing regular methods of contraception negatively (Table 5).

Table 5. Perceptions of respondents towards EC

Variables		Frequency (N)	Percent (%)
Do you think excessive use of emergency contraception will lead to loss of potency?	Agree	120	57.7
	Disagree	88	42.3
Do you think excessive use of emergency contraception will lead to drug abuse?	Agree	96	46.1
	Disagree	122	53.8
Do you think frequent use of emergency contraception is part of self-care / self-medication?	Agree	56	26.9
	Disagree	152	73.1
Do you think abstinence from unprotected	Agree	152	73.1
	Disagree	56	26.9

intercourse is better than the use of emergency contraception?			
Provision of emergency contraception after an episode of unprotected sex can prevent unwanted pregnancy	Agree	176	84.6
	Disagree	32	15.4
All females have the right to access emergency contraception	Agree	176	84.6
	Disagree	32	15.4
Emergency contraception promotes promiscuity	Agree	72	34.6
	Disagree	136	65.3
It is sinful act to	Agree	56	26.9

use emergency contraception	Disagree	152	73.1
Emergency contraception will affect ongoing regular methods of contraception negatively	Agree	96	46.2
	Disagree	112	53.8

Different responses regarding the use of EC across the study area

Regarding the respondents' opinion about the acceptable time for post-coital EC, relationships between EC use and Abortion and protection against STIs, there were significant differences ($p < 0.001$) in responses among the faculties and study levels (Table 6).

Table 6. Comparisons of different responses regarding the use of emergency contraceptives pills across the study area (Faculties and study levels)

Faculty/ Level	Variables			Degree of Freedom (df)	Chi Square (χ^2)	p-value
	What is the maximum acceptable time after sex for woman to take emergency contraceptive pills?					
	12-18 hrs	24-48 hrs	72-120 hrs			
Arts	48	0	0	6	230.750	0.001
Nursing	8	0	0			
Pharmacy	0	72	56			
Sciences	0	24	0			
200	24	0	0	6	254.128	0.001
300	24	32	0			
400	0	0	48			
500	8	64	8			
	Are emergency contraceptive pills a method of early abortion?					
	Yes (n)		No (n)			
Arts	48		0	3	125.613	0.001
Nursing	8		0			
Pharmacy	24		104			
Sciences	0		24			
200	24		0	3	68.937	0.001
300	24		32			
400	0		48			
500	32		48			
	When taken early, can emergency contraceptive pills prevent STIs?					
Arts	24		24	3	108.887	0.001
Nursing	0		8			
Pharmacy	8		120			
Sciences	24		0			
200	24		0	3	101.699	0.001
300	24		32			
400	0		48			
500	8		72			

Correlations

There was a statistically significant correlation between faculties and reported knowledge of EC ($p <$

0.005). There was no statistically significant correlation between faculties and reported effectiveness with the use of EC ($p > 0.005$). There was no statistically significant correlation between faculties and attitude toward the use of

EC ($p > 0.005$). There was no statistically significant correlation between faculties and indications for EC ($p > 0.005$).

DISCUSSION

Majority of the respondents were single (unmarried) within the age group of 15 to 25 years (sexually active). Participants were drawn from four faculties of the Niger Delta University (Arts, Nursing, Pharmacy and Science) at 200 to 500 levels of study. Most of them lived off campus.

Knowledge and Awareness about EC

All (100%) of the participants reported that they have heard of EC, suggesting that there is an excellent awareness of its existence among the participants. This is similar to a study among medical undergraduates, interns and postgraduate students where 100% awareness was also reported (Dogra and Wankhede, 2017). Similarly, 100% awareness was reported in a recent Spanish study among undergraduate students (Leon-Larios et al., 2022).

Various studies all over the world have reported diverse levels of awareness of EC. Some studies have reported similar high levels (over 90%) of awareness. A study among female medical students of Andhra Medical College, Visakhapatnam reported 98% awareness level (Lakshmi et al., 2014). A study among female college students in Delhi reported 90% awareness level (Arora et al., 2013). Similarly, a study among medical undergraduate students in HP India reported 94.3% awareness level (Jindal et al., 2019). A study among Ethiopian female graduating students reported 93.5% awareness level (Mishore et al., 2019). An earlier study among undergraduate students of Niger Delta University, Bayelsa, Southern Nigeria reported 94.5% awareness level of contraceptives (Eniojukan et al., 2015).

Some studies, however, have reported lower levels of awareness. A study in Germany revealed that only half of all people aged between 16 and 39 years in Germany are aware of the morning after pill (Kiechle and Neuenfeldt, 2017). A study among university students in Ghana reported 57% awareness level (Darteh and Doku, 2016) similar to 51% level reported in another study among university students also in Ghana (Addo and Tagoe-Darko, 2009); a lower value of 43.2% among undergraduate students also in Ghana was reported (Baiden et al., 2002). Other studies, however, have reported still lower levels of awareness of EC. Two studies carried out in India had reported awareness levels of 23.1% and 24% (Dorairajan et al., 2015). Examining data from 45 countries surveyed between 2000 and 2012, in 16 countries, fewer than 10% of women aged 15 to 49 years had heard of EC (Pallermo et al., 2014).

At the other extreme, awareness about EC was practically nil in a study done in a population of females of age group of 18-49 years attending OPD at a tertiary care center in Himachal Pradesh (Gupta et al., 2017). The low awareness of ECPs may subject women to unwanted abortions, which contribute significantly to maternal mortality and morbidity (Shen et al., 2019). This calls for enhanced awareness.

A critical evaluation of responses by the participants in this study however revealed a shallow knowledge of

EC; there were obvious gaps in their knowledge; their knowledge was incomplete and inaccurate (filled with misconceptions and wrong attitude), similar to reports from another study (Jindal et al., 2019). For example, as high as 38.5% of the respondents believed that EC is a method of early abortion. The literature has also reported similar misconceptions. A study by Davis et al. (2020) reported that 29% of participants agreed that EC is a method of abortion. Also, the study by Arora et al. (2013) reported that almost 10% had the misconception that ECP can be used to induce abortion. However, the Ethiopian study by Shiferaw et al. (2015) showed half of the participants did not know whether the EC leads to abortion or not. On the contrary, there is evidence to show a significant decline in abortion rates due to increased use of EC (Jones et al., 2002).

Further, in the present study, almost a third of the participants (26.9%) opined that, when taken early, EC can prevent Sexually Transmitted Infections (STIs). On the contrary, the study by Arora et al. (2013) reported that 11.2% feared that the use of ECP might have more women suffering from STIs/ HIV. But other studies have demonstrated more positive knowledge in this regard; a study by Jindal et al. (2019) reported that 92.41% were definitive that ECP doesn't protect against STDs and a recent study by Davis et al. (2020) reported that the majority (63.4%) of respondents knew that EC does not prevent STDs. They reported that 35.5% of respondents opined that EC will increase high risk behaviour among adults, insinuating a possible rise in STIs.

Literature reports have consistently emphasized that EC does not offer any protection against STIs (Raine et al., 2005; Leelakanok and Methaneethorn, 2020; Cooper et al., 2022). Another misconception from this study is surrounding the effect of EC on fertility.

An alarming 61.5% of the respondents agreed that EC may cause infertility in a woman. Other studies have also reported future interference with women's fertility (Amengual et al., 2016; Asut et al., 2018) or have consequences in the long term due to repeated use (Raymond et al., 2011; Cleland et al., 2014; Leelakanok and Methaneethorn, 2020). A contrary report was made in a study stipulating that EC does not lead to infertility (Davis et al., 2020). WHO strongly affirms that drugs used for emergency contraception do not harm future fertility and that there is no delay in the return to fertility after taking ECPs (WHO 2021).

Literature studies have reported various levels of knowledge about ECP ranging between 10% and 84%. An Ethiopian study among female College Graduating Students by Mishore et al. (2019) reported 70.0% had good knowledge; Nigerian study by Akani et al. (2008) reported 50.7% had good knowledge; Nigerian study by Eniojukan et al. (2016) reported 84%; Ugandan study by Byamugisha et al. (2006) reported 45%; Cameroun study by Kongnyuy et al. (2007) reported 67%; Ethiopian study by Roberts et al. (2004) reported 56.5%; Iranian study by Najafi-Sharjabad et al. (2014) reported 68.3% whereas another Iranian study by Rahimikian et al. (2006) reported only 10% participants with good knowledge. A fairly recent study reported that the knowledge level about the EC was moderate (60.1%) (Davis et al., 2020).

Deficiencies in knowledge are related with the ECPs, the environment and profiles of the respondents like

educational status, curricular exposure and exposure to health education and enlightenment programmes.

Further, the use pattern is related to its availability and accessibility in combination with individual knowledge and awareness of ECP (do Nascimento Chofakian et al., 2019; Williams et al., 2021). As shown in similar studies, though awareness of EC is significantly high, the students' knowledge on EC requires to be enhanced (Addo and Tagoe-Darko, 2009; Asut et al., 2018). In particular, as regards association between EC and STIs, abortion and fertility. The bottom-line is that it has been observed that knowledge, awareness, attitudes, and beliefs impact contraceptive use (Frost et al., 2012).

Types, frequency of use and indications for EC

Regarding the type of product used for EC, over 80% of respondents reported Levonorgestrol as the commonest agent used and over 70% reported this agent as the most common in their area. An earlier study had also reported the predominant use of Levonorgestrol as EC (Cooper et al., 2022). Levonorgestrol, also known as the morning-after pill, is a first-line oral emergency contraceptive pill with approval from the WHO to prevent pregnancy. It is FDA-approved to be used within 72 hours of unprotected sexual intercourse or when a presumed contraceptive failure has occurred. There have been cases of off-label efficacy for up to 96 hours (WHO, 2021).

For emergency contraceptive use, the recommended dose is 1.5 mg oral tablet within 72 hours. There is also a 0.75 mg oral tablet that can be given with a second 0.75 mg dose if needed 24 hours later (Vrettakos and Bajaj, 2022). Levonorgestrol tablets are believed to act as an emergency contraceptive principally by preventing ovulation or fertilization (by altering tubal transport of sperm and/or ova). In addition, it may inhibit implantation (by altering the endometrium). It is not effective once the process of implantation has begun (Lalitkumar et al., 2013; Drugs.com, 2021).

The effectiveness of Levonorgestrol EC products is reported to be up to 89% and is primarily thought to be due to the suppression of ovulation. Other possible mechanisms of action are reported to include thickening of cervical mucus and prevention of sperm transport but that effectiveness is greater the sooner Levonorgestrol EC is taken after unprotected intercourse and declines with time (Gemzell-Danielsson and Marions, 2004; Brache et al., 2013). Several other interventions are available for EC. These include Yuzpe (estradiol-levonorgestrol combination), Mifepristone, Ulipristal acetate, and Copper Intrauterine Device (Cu-IUD). The other interventions reportedly used by respondents in this study are IUD (19.2%), Andrews Liver Salt (26.9%), Antibiotics (11.5%), Huda drink (11.5%) and Withdrawal method (11.5%). Most of these interventions like the use of Antibiotics, Andrews Liver Salt and Huda drinks are, to say the least, unimaginable and not evidence-based.

Copper intrauterine device (Cu-IUD) is commonly used and is found to be very effective as EC (Shen et al., 2019). Indeed, the Cu-IUD is regarded as the most effective form of EC (Bellows et al., 2018). It has been reported that, if inserted within 120 hours of unprotected intercourse, a copper-bearing IUD is more than 99% effective in preventing pregnancy. It is commonly referred

to as the most effective form of emergency contraception available. Notably, once inserted, women can continue to use the IUD as an ongoing method of contraception, or may choose to change to another contraceptive method (WHO, 2021).

Contraception is effective immediately after IUD placement and the most commonly reported adverse effects are abnormal menstrual bleeding and increased frequency and/or intensity of cramps and pain whilst the benefit of this method of EC is the continued contraception which lasts 10 years or more (Dean and Schwarz, 2011). The emergency contraceptive pill regimens recommended by WHO are Ulipristal acetate, Levonorgestrol, or combined oral contraceptives (COCs) consisting of ethinyl estradiol plus levonorgestrol (WHO, 2021).

The timing of post-coital use of contraceptives is critical to its effectiveness. It is generally recommended that this should be within 72 hours of having intercourse. In this study, over 70% of respondents agreed that the maximum acceptable time after sex for a woman to take emergency contraceptive pills is 12 to 48 hours. Over 90% (92.3%) opined that post-coital EC should be practiced within 72 hours. Data suggest appropriate use of EC by this cohort of respondents. It is reported that effectiveness is greater the sooner Levonorgestrol EC is taken after unprotected intercourse, and declines with time (Piaggio et al., 2011; Trussell and Schwarz, 2011; Leon-Larios et al., 2022). However, it is further advocated that women presenting within 120 hours of unprotected intercourse should be offered EC.

This is one of the dimensions of EC that respondents in this study demonstrated excellent knowledge. This is at variance with a study that reported only 41% correctly knew about the timing when these pills should be taken (Arora et al., 2013). Also, a study among Ghanaian university students reported only 11.3% indicating correctly the recommended time within which emergency contraceptive pills (ECPs) are to be taken after unprotected sex (Baiden et al., 2002). A study, however, reported about 61.6% of the participants were aware about the timing of use of EC (Gupta et al 2016).

Regarding frequency of use of ECP, majority (57.7%) reported this to be 12 hours apart; 15.4% reported that ECP can be used at intervals of 24 hours. Concerns regarding the repeated use of or dependence on EC Pills as a primary method of contraception have been raised. Recent use and safety concerns were reasons proffered for not recommending EC by Jamaican and Barbadian health staff and half respondents believed that use of EC encourages sexual risk taking and leads to increased STI transmission (Yam et al., 2007).

Available current evidence indicates that EC is safe and effective even when used several times (Shelton, 2002). The WHO guidelines state that "repeated use of EC poses no health risks and should never be cited as a reason for denying women access to treatment" (WHO, 1998). Repeat use may expose the need for contraceptive counseling or for supplemental information about continuous methods (Abuabara et al., 2004). There is also no evidence of efficacy loss due to repeated use, but this erroneous belief seems widely spread in some studies (Amengual et al., 2016).

One opposition to making EC more widely available is the concern that women who know they can use EC pills

may become reluctant with their regular contraceptive method. However, evidence has been provided demonstrating that increasing the availability and accessibility of EC pills neither translate to increased risk taking behavior nor adverse effects on regular contraceptive use (Gold et al., 2004; Walsh and Frezieres, 2006).

A survey among health staff in Turkey shared the fears that disseminating information about EC would encourage young people to have unprotected sexual intercourse and this would lead to raising STI because people would stop using barrier methods (Sevil et al., 2006). As a general guideline, EC should be considered as a 'back-up' and something not to be used routinely (there are far more effective methods for regular contraception) but which can still prevent pregnancy if other options have failed or regular contraception was not used (Webb, 1995).

Regarding indications for the use of EC, a large majority (88.5%) rightly reported that EC is used for prevention of unwanted pregnancy. This is the primary purpose for use of EC, to prevent pregnancy after unprotected sexual intercourse. (Arora et al., 2013; Gupta et al., 2016). This is another area that respondents in this study have demonstrated good knowledge. Incidental to this primary EC indication is family planning (WHO, 2012). Only about a fifth (19.2%) of the respondents in this study reported this indication. Lack of trust on ovulation count down (15.4%) was another indication for EC that was reported in this study. About one tenth (11.5%) however erroneously claimed EC can be used to prevent STIs.

In more than half of the cases, the reasons for taking hormonal emergency contraceptives are failure or forgetting of contraceptive precautions (Kiechle and Neuenfeldt, 2017). In a European-wide survey by BVA Healthcare, 39% of the German women interviewed reported condom failure, 34% missed pills, 21% no contraception, 9% other reasons (Nappi et al., 2014).

According to WHO, EC can be used in the following situations: unprotected intercourse, concerns about possible contraceptive failure, incorrect use of contraceptives, and sexual assault if without contraception coverage.

Effectiveness and side effects of EC

In this study, over 70% (73%) of the respondents reported that EC was effective in preventing unwanted pregnancy to varying degrees. In practice, 65.4% of respondents reported that EC was effective at preventing unwanted pregnancy. Similarly, over 70% (71.2%) of respondents reported that IUDs were effective at preventing unwanted pregnancy.

These reports are in consonance with literature studies (Arora et al., 2013; Goldstuck and Cheug, 2019). It has been reported that EC pills are 75% - 95% effective if taken within 72 hours of unprotected intercourse (Trussell et al, 1999) and can prevent physical and psychological consequences of unwanted pregnancy (Westley and Choe, 2007). According to WHO, EC can prevent up to over 95% of pregnancies when taken within 5 days after intercourse (WHO, 2021). The probability of preventing an unintended pregnancy with oral emergency contraceptives is greatest if they are taken quickly (Kiechle and

Neuenfeldt, 2017). However, in assessing the effectiveness of EC, a number of other factors needed to be taken into consideration especially the timing of post-coital intervention.

No doubt, EC can prevent pregnancy after unprotected intercourse but it does not always work effectively as many factors have been reported to affect its effectiveness; similarly, the different methods of EC may elicit varied level of effectiveness. It has been reported that the failure rate for all ECs is related to the cycle day of intercourse. It has been postulated that women that have intercourse the day before estimated ovulation day have four times increased risk of pregnancy compared with women having sex outside the fertile window (Glasier et al., 2010). The other factors to be considered in assessing success of EC are time elapsed since intercourse (coitus-treatment interval) and further acts of intercourse during the same cycle in which EC was used. Further, it is opined that EC may be less effective among obese women (Edelman et al., 2016; Jatlaoui and Curtis, 2016).

Regarding side effects, in this study, 65.4% of the respondents believed that SEs are associated with the use of EC. A study had reported that 39% of women had apprehensions regarding possible health problems with the use of these pills which may limit their use (Arora et al., 2013). The expected SEs of EC as opined by respondents included: loss of fertility/potency (27.9%); prolongs menstrual cycle (26.9%); headache (25.9%); nausea / vomiting (25.9%); distorted/impaired menstrual cycle (23.1%); weight gain (18.3%); stomach ache (16.3%); stops ovulation (15.4%). This spectrum of reported SEs is in consonance with the profile of EC (WHO, 2021; Cooper et al., 2022).

In practice, about a third (26.9%) of the respondents actually had experienced SEs following EC; a little less than half (46.2%) reportedly experienced nil SEs. The reported SEs ever experienced by respondents in this study were: menstrual disturbances /changes (60.6%); headache (38.5%); nausea/vomiting (37.5%); weight gain (27.9%); stomach ache (23.1%); vaginal discharge (12%) and decreased libido (10.6%).

This is similar to the study by Davis et al. (2020) which revealed that the majority of the participants were aware about the side effects of EC and the common side effects of EC as stated by the participants were menstrual irregularities 60.7%, abdominal pain 40.4%, vomiting 38.3% and nausea 31.1%, fever 11.5% while 30.6% of the participants were unaware of the side effects of the EC. Another study reported the most common side effects experienced were nausea and bleeding (Arora et al., 2013). A study by Leon-Larios et al. (2022) reported the most common side effects being nausea/vomiting (34.78%), irregular bleeding (28.26%), general unrest (23.91%), and headache (13.04%).

Clinical trial reports have shown that the most common adverse events (>10%) in the clinical trial for women receiving Levonorgestrol tablets included menstrual changes (26%), nausea (23%), abdominal pain (18%), fatigue (17%), headache (17%), dizziness (11%), and breast tenderness (11%) (Drugs.com, 2021). Some women may experience spotting a few days after taking Levonorgestrol tablets. Menstrual bleeding patterns are often irregular among women using progestin-only oral contraceptives and women using Levonorgestrol for

postcoital and emergency contraception. A meta-analysis revealed that Nausea and vomiting were the main adverse effects associated with EC. Menstrual delay and abdominal pain were also identified as prominent adverse effects (Shen et al., 2019).

According to WHO, side effects from the use of ECPs are similar to those of oral contraceptive pills, such as nausea and vomiting, slight irregular vaginal bleeding, and fatigue. Side effects are not common, they are mild, and will normally resolve without further medications. Frequent use of emergency contraception can result in increased side-effects, such as menstrual irregularities, although their repeated use poses no known health risks (WHO, 2021). It is further reported that while ECs may cause nausea, vomiting, headache, fatigue, abdominal pain, or unexpected bleeding, there are no serious or long term side effects.

Perceptions

Various erroneous and negative perceptions of EC were expressed by the respondents in this study. For example, over half (57.7%) of respondents opined that excessive use of EC will lead to loss of potency. Further, almost half (46.1%) of respondents opined that excessive use of EC will lead to drug abuse. Over 70% (73.1%) disagreed that frequent use of emergency contraception is part of self-care and almost a half (46.2%) opined that EC will affect ongoing regular methods of contraception negatively.

It is however gratifying to note that a number of positive perceptions were recorded; 84.6% of respondents opined that provision of emergency contraception after an episode of unprotected intercourse can prevent unwanted pregnancy; WHO affirms the fact that EC can prevent up to over 95% of pregnancies when taken within 5 days after intercourse (WHO, 2021).

In this study, over 80% (84.6%) of respondents believed that all females have the right to access EC. It is globally opined that any woman or girl of reproductive age may need EC to avoid an unwanted pregnancy. There are no absolute medical contraindications and no age limits for the use of EC. The global recommendations are that all women and girls at risk of an unintended pregnancy have a right to access EC and these methods should be routinely included within all national family planning programmes. Moreover, EC should be integrated into health care services for populations most at risk of exposure to unprotected sex, including post-sexual assault care and services for women and girls living in emergency and humanitarian settings (WHO, 2021).

Some women, however, use EC repeatedly for any of the indications, or as their main method of contraception, warranting further counselling on what other and more regular contraceptive options may be more appropriate and more effective. Further, it is to be noted that ECs have been found to be less effective in obese women (whose body mass index is more than 30 kg/m²), but there are no safety concerns. To this end, obese women should also be given express access to EC at all times required (WHO, 2021).

In this study, over 70% (73.1%) agreed that abstinence from unprotected intercourse is better than the use of EC. This is a natural and logical phenomenon; unintended

pregnancy requires sexual intercourse in whatever form. Also, this study reported that 73.1% of respondents do not believe that EC is a sinful act and 65.3% do not share the view that EC promotes promiscuity; a little over half (53.8%) of the respondents do not believe that EC will affect ongoing regular methods of contraception negatively. These positive attitudes will help to drive the uptake and appropriate EC utilization.

Literature reports have it that EC does not promote promiscuity (Shiferaw et al., 2015) in consonance with this study. However, two other studies showed a neutral response towards promiscuity associated with the use of EC (Singh et al., 2017; Joseph et al., 2016). A study also reported that 71% disagreed that EC is a sinful act (Davis et al., 2020) in agreement with this study. Opinion concerning the sinful nature of EC largely correlates with the religious beliefs and convictions of the individual.

Limitations of the study

As convenience sampling was used in the study, so the sample may not represent the target population. Though the anonymity was ensured, the accuracy of the response provided by participants cannot be guaranteed since the EC is a sensitive issue

CONCLUSION AND RECOMMENDATION

All respondents were Females; majority were aged 15 -25 years; single; Christians; living off campus; drawn from faculties of Arts, Nursing, Pharmacy and Science at study levels 200 to 500. 100% awareness was recorded but knowledge of key components of EC was poor. There were misconceptions about EC reported. Major misconceptions involved the relationship between EC and fertility, abortion and STIs. Levonorgestrel was the most commonly known and used EC intervention and was acclaimed to be highly effective. Knowledge of post-coital EC timing was particularly very good. Only about a third of respondents had experienced side-effects after EC but knowledge of expected side-effects from EC was fairly good. The major side-effects ever experienced were menstrual changes/disturbances, headache nausea and vomiting which were well within expected spectrum. Majority opined that all females should have access to EC as rightly advocated globally. There were significant correlations between perceptions about EC across faculties and study levels.

Notably, although awareness about EC is high, the knowledge about key aspects of EC is poor and misconception is high among these students. However, the study demonstrated the effectiveness of EC and occurrence of nominal side effects. There is a need to improve the knowledge and the attitude level of the participants about EC.

University students, belong to a genre, who are involved specially in the adoption and spread of innovations in many aspects of the society. To this end, they should be leaders in both the knowledge and usage of ECs. However, the great expectations of the role of EC to prevent unintended pregnancies and associated health complications are far from being realized. The deficiencies in the knowledge and utilization of EC among most of the female students in this study is a pointer to probable

development of a much worst situation for the majority of students' inadequate knowledge of EC use. There is, therefore, a dire need to evolve strategies aimed at promoting EC which should be focused on spreading accurate information. Such strategies could involve the development of IEC materials. Additionally, information about EC should be given within institutional curricula and numerous awareness and enlightenment educational programs should be conducted regarding EC among university students.

Summarily, for the prevention of the unwanted, unintended pregnancies and associated abortions, there is a need to promote EC along with the family planning methods in the health care settings. If these factors are addressed through appropriate health education methods, there is a definite hope that associated morbidity and economic burden could be averted.

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AUTHOR CONTRIBUTIONS

Conceptualization, EJF and FJA; Methodology, EJF, OPA, and FJA, Formal analysis, OPA and FJA; Data Collection, Draft Manuscript writing, OPA and FJA; Manuscript review and editing EJF and OPA. All authors have read and agreed to the published version of the manuscript.

CONFLICTS OF INTEREST

The author(s) declare(s) no conflicts of interest.

DECLARATION

The contents of this paper are published after receiving a signed copyright agreement from the corresponding author declaring that the contents of this paper are original. In case of any dispute related to the originality of the contents, editors, reviewers and the publisher will remain neutral.

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