

# Vitamin D Deficiency and the Pathophysiology of Skin Disorders

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## Abstract

**Background:** Emergency contraception pills (ECPs) also called morning-after pills refers to methods of contraception that can be used to prevent pregnancy after sexual intercourse. These are recommended for use within 5 days but are more effective when used immediately after intercourse. The problem is that females who use ECPs are not aware that emergency contraceptive pills are not regular family planning methods, may not know their side effects, how they work, their availability and the general education about these pills. This study seeks to assess the prevalence and knowledge level of emergency contraceptive pills and its association with sexually transmitted infections (STIs) among female students.

**Methods:** The design for this study is a cross sectional study targeting female students at Kumasi Technical University. Structured questionnaire was used to obtain information from 517 respondents.

**Results:** The prevalence rate of emergency contraceptive pills use among female students is 48% with about 98% awareness level. More than half of the people believe ECPs as early abortion. Many ECPs users do not apply them appropriately and are also not abreast with the side effects which may include headache, tummy pains, changes to their next period or feeling of being sick. The use of ECPs is statistically significant to acquiring STIs.

**Conclusion:** There is a high association between ECPs use and contracting STIs. The choice of contraceptives use by respondents is highly associated with source of knowledge, marital status and life time sexual partners. There should be continuous education among our female students regarding the use, the function and the effects of ECPs use. Awareness must also be created among students about the risk between ECPs use and STIs.

**Keywords:** emergency contraceptive pills, knowledge, sexually transmitted infections

## 1. Background

Emergency contraception pills [ECPs] also called morning-after pills refers to methods of contraception that can be used to prevent pregnancy after sexual intercourse. These are recommended for use within 5 days but are more effective when used immediately after intercourse [20]. ECPs is grouped into three types: emergency contraceptive pills [ECPs], combined oral contraceptive pills and copper-bearing intrauterine devices [IUDs]. Women are more likely to use ECPs if they already have them when needed. Also, the availability of ECPs enable women to take them as soon as possible after unprotected sex, when they will be most effective [1]. Over 100 million sexual intercourse acts take place daily in the world, which contribute to about 3 million conceptions, of which 50% are unplanned and 25% definitely unwanted [2]. Unintended pregnancy is a

global concern with far-reaching implications. An estimated 26% global pregnancies are terminated by induced abortions both in developed and developing regions. Of the estimated 76 million unintended pregnancies that occur annually in developing countries, 34 million results in unplanned births. An estimated 10 million of the rest end in miscarriages, while 32million are interrupted by induced abortion [3]. Most young women desire to avoid the ordeal of induced abortion hence the need for emergency contraceptive use. Women who normally use condoms for contraception know they can easily access emergency contraception to protect against pregnancy, they may be less likely to use condoms. However, there are potential theoretical reasons to expect that some risky activities might fall if men bargain for unprotected sex and women bargain for protected sex; in that case, easier access to ECPs may weaken

women's bargaining position and induce them to opt for unprotected sexual encounters [4]. For women at high risk for Human immune deficiency virus [HIV] acquisition and do not wish to become pregnant, contraceptives choice is a crucial issue. According to statistics reported by the United Nations Population Division [2019], 49% of reproductive age women use modern contraceptive methods. Oral contraceptives are the third most common contraceptive method used worldwide, and the most common modern method used in sub-Saharan African [5]. Emergency contraceptives are contraception administered after unprotected intercourse to prevent pregnancy. It is also known as "post-coital contraception", and is less effective than regular contraception. Emergency contraceptive pills [ECPs] are intended for occasional or emergency use only and not as a regular contraception. It is associated with a failure rate of 0.2% to 3% [5]. In many geographic areas with a high prevalence of STIs, hormonal contraceptive methods are commonly used [6]. Reproductive health issues have been a global concern since the past decade, yet, efforts to achieve the millennium development goals [MDGs] only made adolescent reproductive health issues only more prominent, without achieving remarkable global results. However, the sustainable development goal three [SDG] has emphasized the crucial role of adolescent reproductive health research towards achieving the tenants of the sustainable development goal three [SDG] since reproductive health [RH] affects the total well-being of young people as they grow into adulthood. Empirical evidence in recent times has shown that more than half of the world population is under the age of twenty-five years and there is the likelihood of rampant risky sexual behaviour [7]. Studies have also shown that clinicians as well as pharmacists-and users are concerned about impact of increased access to ECPs on sexual risk taking behaviour and STIs. [8]. Questions have been raised regarding whether emergency contraceptives may increase a woman's risk of acquiring STIs especially among tertiary students who are assumed to have multiple sexual partners therefore the need for this study. The effects of unintended pregnancies require that emergency contraception be used efficiently and effectively. There is a rising concern in the probable impact that ECPs could have on unplanned pregnancies and unsafe abortions in Ghana and Sub-Saharan Africa as a whole [9]. Unintended

pregnancy poses a major challenge to the reproductive health of young adults in developing countries [10]. Pregnancy unplanned, is one of the biggest issues a young female student can encounter and early childbearing has a negative impact on female academic opportunities by forcing them to quit school, which could jeopardize the academic advancement of the student and future careers [9]. This is due to the fact that most students are not ready to take up parental responsibility. Again, unwanted pregnancy is highly stigmatized in most African societies and Ghana especially among college and tertiary students who are not married. For these reasons therefore, many who wish to avoid this societal stigmatization will either resort to Emergency Contraceptive pills use or will conduct an induced abortion under unhygienic conditions. Emergency contraceptive pills [ECPs] provide the last opportunity of preventing pregnancy but there are females who also use emergency oral contraceptives as a family planning method each time they have unprotected sex. The question however is; are these females aware that emergency contraceptive pills are not regular family planning methods, or whether they know the side effects of ECPs, how they work, their availability and what education is given to them and by who? This study therefore seeks to assess the prevalence of emergency contraceptive pills use and its association with sexually transmitted infections among female students to inform policy on contraceptives use.

## 2. Method

### Study design and Setting

The study adopted a quantitative research approach. Cross sectional study design was adopted. The focus of this study was on the socio-demographic characteristics of students, sexual and reproductive characters of the students as well as their attitude towards the use of ECPs and their level of knowledge. The study setting was Kumasi Technical University central campus at Amakom, in the Ashanti region of Ghana. The institution currently has seven Faculties and twenty-six Departments. The study design is shown in figure 1.

### Schematic diagram

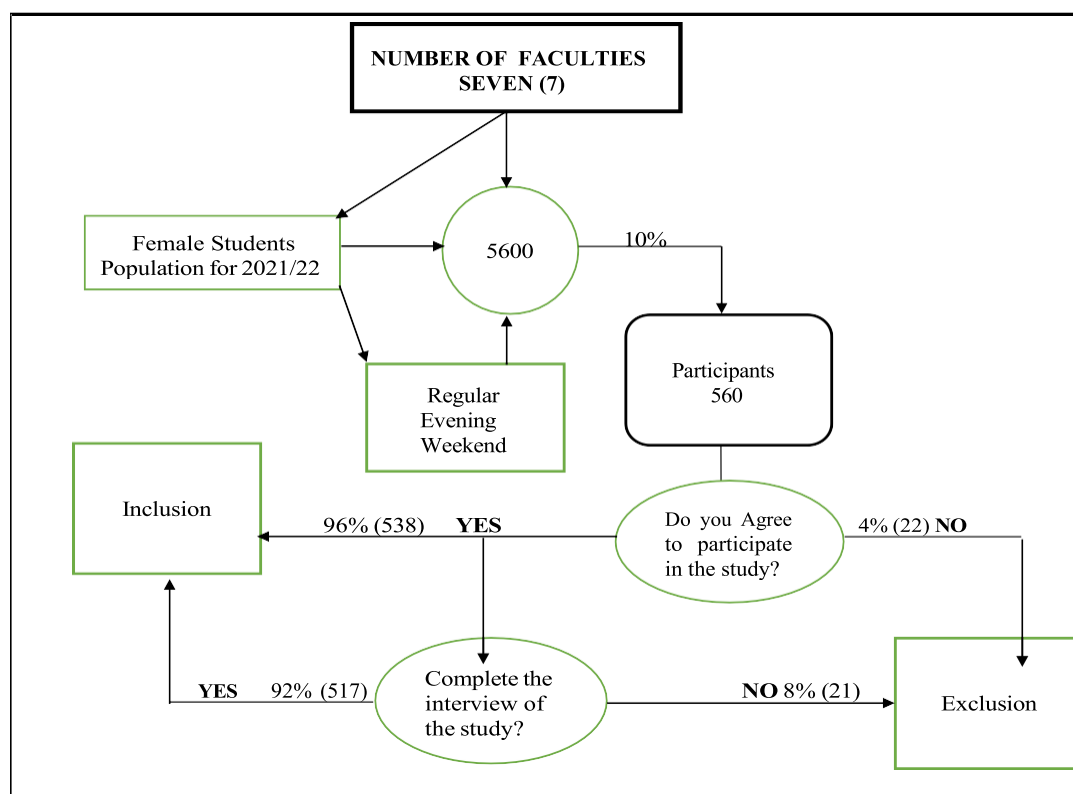


Figure 1: Schematic Diagram of the Study Design

## Data Collection

Questionnaire was used as the instrument of data collection for this study. This method was deployed to allow for comparability and scalability of responses. Data collection started spanning a period of three weeks between 3<sup>RD</sup> and 24<sup>TH</sup> July 2022, when the students were having the mid semester examinations. During this period there were not much academic activity so students who consented after the briefing were handed the questionnaires as soon as they were done with their examinations and are allowed enough time to complete them. The questionnaire had four broad sections. They are; socio-demographic characteristics, knowledge about ECPs, prior experience with ECPs and associated risk factors and finally attitude towards ECPs use.

## 3. Results

### Demographic characteristics of respondents

A total number of 560 female students from Kumasi Technical University were involved in the study. Out of this, 538 agreed to participate in the study whilst 22 did not agree to participate. However, out of 538 who agreed to partake in the study, 21 of them did not complete the interview

whilst 517 successfully completed the interview giving a response rate of about 92%. The results show that in all, about 48 % of the respondents have used ECPs before.

Table 1 shows that majority (70.41%) of the participants falls between 20-24 years. The age group with the least percentage (0.39%) was 35-39 years. About 80% of the respondents reported being single whilst about 14% were into consensual relationship with 6% married. Most (58.22%) of the respondents experienced their menarche at the ages ranging between 13-15 years and close to 1% (0.97%) experiencing it before attaining age 10. A good number of the respondents, about 40% (40.23%) experienced their first sexual intercourse between 15-19 years, about 32% (31.51%) of them had it between 20 -24 years whilst 23% of them have never had sex before. Thus, respondents who have no life time sexual partners are about 23 %. This means that less than a quarter of the participants have not had sex before. Those who have single sex partners were about 35%, whilst those having between 2 to 3 sex partners are about 31% and those who have had at least 4 life time sex partners are about 11%. This is very serious due to the health implications associated with such practice. Eighteen percent of the respondents have also been pregnant before.

Variables	Frequencies	Percentages
<b>Age-Group</b>		
15-19	79	15.28
20-24	364	70.41
25-29	54	10.44
30-34	12	2.32
35-39	2	0.39
40+	6	1.16
<b>Level</b>		
100	272	52.61
200	142	27.47
300	82	15.86
400	21	4.06
<b>Marital Status</b>		
Single	411	79.50
Married	31	6.00
consensual relationship	74	14.31
Divorced	1	0.190
<b>Age at Menarche (years)</b>		
<10	5	0.97
10 -12	136	26.31
13-15	301	58.22
16+	75	14.51
<b>Age at first sex</b>		
Never	119	23.02
<10	4	0.77
11-14	12	2.32
15-19	208	40.23
20-24	163	31.53
25-29	8	1.55
30+	3	0.58
<b>Type of SHS attended</b>		
single sex	116	22.44
Mixed	401	77.56
<b>Religion</b>		
Christian	443	85.69
Islam	69	13.35
Traditional	4	0.77
Atheist	1	0.19
<b>Ethnicity</b>		
Akan	376	72.73
Ga Dangme	24	4.64
<b>Variables</b>		
Ewe	35	6.77
Guan	1	0.19
Gruma	2	0.39
Mole Dagbani	26	5.03
Grusi	1	0.19
Kassina	7	1.35
Gonja	15	2.9
Moshie	3	0.58
Frafara	6	1.16
Dagare	8	1.55
Others	13	2.51
<b>Ever Pregnant</b>		
Yes	93	17.99
No	424	82.01

**Table 1:** Demographic characteristics of respondents

<i>Life time number of sex partners</i>		
0	119	23.02
1	183	35.4
2-3	159	30.75
4-6	34	6.58
7+	22	4.26

### Knowledge about emergency contraceptives

The level of knowledge about emergency contraceptive pills (ECPs) was assessed. From Table 2, it can be seen that, majority (98.07%) of the participants have heard about ECP before, with only 1.93% of them having no knowledge about ECPs. Regarding the source of knowledge, a little over 35% of the respondents heard it from health personnel, about 31% from friends, 19% from audio/visual media and the rest coming from family members and partners. Close to 95% of the respondents did not know Norlevo as a type of ECPs. Regarding the maximum acceptable time after sex for which a woman could take ECP; 43.13% of the participants admitted that they don't know, 26.69% said between 24-48

hours, 18.18% thought between 12-18 hours whereas 11.41% and 0.58% said 72-120 hours and 124-160 hours respectively. Majority (51.26%) of the participants believed that ECPs is a method of early abortion. About 52.61% of the participants noted that ECPs cannot prevent sexually transmitted infections (STIs) when taken early. On how the drug works, 45.65% of the participant said it kills the sperm, 31.72% said they don't know it works whilst 11.22% and 11.41% said it delays ovulation and thickens cervical mucus respectively. About 11% of the respondents agreed that ECPs can be used as many times as the individual can tolerate, 20% believe it could be used once a month whilst close to 10% think about twice a year with the remaining 59% don't seem to have an idea about how often ECPs should be used.

**Table 2: Level of Knowledge about ECPs**

Indicator	Frequencies	Percentages
<b><i>Have you heard of ECP before?</i></b>		
Yes	507	98.07
No	10	1.93
<b><i>Source of knowledge of ECPs</i></b>		
Friends	155	30.57
Family Members	29	5.72
Health Personnel	179	35.31
Audio/Visual Media	96	18.93
Partner	48	9.47
<b><i>Which of these is an ECP?</i></b>		
Syneron	22	4.26
Norlevo	27	5.22
Orgametril	5	0.97
Duphaston	5	0.97
Don't know	458	88.59
<b><i>What is the maximum acceptable time after sex for a woman to take the ECP?</i></b>		
12-18Hrs	94	18.18
24-4Hrs	138	26.69
72-120Hrs	59	11.41
124-160Hrs	3	0.58
Don't know	223	43.13
<b><i>ECP is a method of early abortion</i></b>		
Yes	265	51.26
No	252	48.74
<b><i>When taken early, ECPs can prevent sexually transmitted infections (STIs)</i></b>		
Yes	48	9.28

No	272	52.61
Don't know	197	38.1
<b><i>How does the drug work?</i></b>		
Delays Ovulation	58	11.22
Thickens Cervical Mucus	59	11.41
Kills the Sperms	236	45.65
Don't Know	164	31.72
<b><i>How often should ECP be used?</i></b>		
Once a Month	104	20.12
As many as The Individual can Tolerate	56	10.83
Twice a year	49	9.48
Don't Know	274	53.00
Others Specify	34	6.58

### Experience with ECPs and Associated Risk Factors

Tables 3 and Table 4 present participants experience with ECPs and associated risk factors. The results show that about 48% of the respondents have used ECPs before compared with 52% who have never used it. Almost 50% of the participants started using ECPs between the ages of 20-24 years, followed by about 42% using ECPs between 15-19 years with close to 4% using ECPs before attaining age 15. Among the ECPs users, about 59% of them use Lydia whilst about 23% use Postino2, about 11% use Levon, 2% use post pills whilst the remaining 5% could not classify the types they use. The results further show that among students who use ECPs, the types are usually recommended by partners and friends (about 72%) whilst 24% are recommended by health personnel and the remaining 4% coming from family members. This shows that partners and friends mostly recommend the type of ECPs that one can use. Meanwhile among those who use ECPs, only 40% of them use it anytime they have sex. The remaining 60% do not use ECPs

frequently. The main reason why they fail to use the pills always is the fact that they have sex during safe period (29.25%). Majority (93.9%) cited prevention of pregnancy as their main reason for using ECP whereas 3.25% believe it prevents STIs that is why they use them. But 10.83% of the study participants have ever contracted STIs in the past and there is a high correlation between ECPs use and STIs (Table 4). With respect to whom participants will confide should they contract STIs, close to 62% of them said health personnel, 20% said partners, with the remaining 18% choosing between family members and friends. More than half (54.35%) of the participants or their partners use condom contraceptive to prevent STIs. Those who engaged in abstinence were 19% and surprisingly those who believe in taking birth control pills as a means of preventing STIs were 6%. About 37% of the respondents have had at least 3 sexual partners during the past three months, 5% had at most 2 sexual partners whilst over 58% never had any sexual partner during the past three months.

**Table 3:** Prior Experience with ECPs and Associated Risk Factors

Factors	Frequencies	Percentages
<b><i>Have you used ECP before?</i></b>		
Yes	246	47.58
No	271	52.42
<b><i>At what age did you start using ECP?</i></b>		
<10	3	1.22
11-14	6	2.44
15-19	103	41.87
20-24	122	49.59
25-29	11	4.47
30+	1	0.41
<b><i>What type of ECPs do you often use?</i></b>		
Lydia	144	58.54
Postinor2	57	23.17
Levon	28	11.38
Post pills	5	2.03
Others	12	4.88
<b><i>Who recommended this type for you?</i></b>		
Friends	83	33.74
Family Members	9	3.66
Health Personnel	60	24.39
Partner	94	38.21
<b><i>Do you use it anytime you have sexual intercourse?</i></b>		
Yes	99	40.24
No	147	59.76

<b><i>If No, what is the reason?</i></b>		
Have sex during safe period	43	29.25
Partner withdraws	8	5.44
Have sex during ovulation	6	4.08
Because it affects my menstrual cycle	20	13.61
Side effects	19	12.93
Use condoms sometimes	17	11.56
Others	34	23.13
<b><i>What is the main reason for you using ECPs?</i></b>		
Prevent pregnancy	231	93.9
Prevent STI	8	3.25
Don't Know	5	2.03
Other specify	2	0.81
<b><i>Have you ever contracted any STIs in the past?</i></b>		
Yes	56	10.83
No	461	89.17
<b><i>Who will you confide should you contract any STI?</i></b>		
Friend	40	7.74
family member	54	10.44

health personnel	318	61.51
Partner	105	20.31
<b>What contraceptive method did you or partner use to prevent contracting STI?</b>		
condom	281	54.35
Abstinence	96	18.57
birth control pills	33	6.38
other specify	107	20.7
<b>Number of sex partners during the past three months</b>		
0	301	58.22
1-2	27	5.22
3-4	186	35.98
5+	3	0.58

Table 4: Prevalence of ECPs use and associated Risk factors

	Have you used ECP before?		Chi-square	P-value
	Yes	No		
<i>Have you contracted any STIs in the past?</i>				
Yes	8.7	2.13	27.048	0.000
No	38.88	50.29		
<i>Who will you confide in should you contract any STI?</i>				
Friend	4.45	3.29	32.355	0.000
family member	2.51	7.93		
health personnel	26.89	34.62		
Partner	13.73	6.58		
<i>What contraceptive method did you or partner use to prevent contracting STI?</i>				
condom	37.33	17.02	148.996	0.000
Abstinence	2.32	16.25		
birth control pills	4.64	1.74		
other specify	3.29	17.41		
<i>Number of sex partners during the past three months?</i>				
0	38.30	19.92	129.347	0.000
1-2	3.87	1.35		
3-4	5.22	30.75		
5+	0.19	0.39		

#### 4. Discussion

The results show that 48 % of the respondents have used emergency contraceptive pills before. This is very serious in that about half of the female student population use ECPs. This result compares that of a study conducted in Ethiopia in 2018 to assess the prevalence of ECPs.

Most [98.07%] respondents in this study are aware of emergency contraceptive pills. This is not surprising since the study was carried out in an academic environment with its target population being students. This results falls outside an awareness range reported in a study on the use and awareness of ECPs among women of reproductive ages in Sub-Saharan Africa by [11]. In their study they reported that the rate of ECPs awareness in Ethiopia is between 10.1% and 93.5%. Our result is however consistent with a study conducted among female senior high students in Ho Municipality of the Volta Region of Ghana by [12]. Their study found that, about 98.8% of female senior high students were aware of

emergency contraceptive pills. In another research, by [13], about 96.15% of women in their reproductive age in Kwadaso Municipality, Ghana is also aware of ECPs. Our results contradicts that of similar studies conducted in Nairobi which found 74% of women being aware of emergency contraceptives pills [14] and [15], reporting only 34.1% of Ethiopian women seeking induced abortion in public Hospital at Eastern Tigray are aware of emergency contraceptives. The results from this study indicate that 35.35% of the respondents' source of knowledge about ECPs were from health personnel, which corroborates the results of [15]. [15], further enquired about the knowledge and found that 40.4% of the women are knowledgeable about ECPs. [15] noted 56.3% women from Eastern Tigray of Ethiopia source of information about ECPs were from health workers. This however contradicts with the findings in Ghana reported by [12] who found that 41.6% on awareness of ECPs were derived from the mass media. In this current study, Audio/Visual media reported 18.93% regarding the source of knowledge on ECPs. In a sharp contrast, in



Nairobi, the major source of information about ECPs is from family and friends [14]. Interestingly, this study along with Konlan et al., (2020) noted keenly that friends were the second leading source that create awareness of emergency contraceptives [30.57% in this study and 39.6% from [12]. Moreover, (88.59%) of the respondents did not know the type of ECPs. This may be dangerous to one's health if they are probably using ECPs but do not know the type, how to use it or the possible side effects. Because emergency contraceptive pills are good for preventing unwanted pregnancies but are taken within a recommended dose and time interval after having unprotected sex [13,15]. More than half of the respondents believe that ECPs usage is a method of early abortion. This corroborates the findings by Abraha et al., in Ethiopia [15]. Attesting to this majority, [51.26%] of the participants in this study confirmed that ECPs is a method of early abortion. [13], hinted that emergency contraceptives have 99% likelihood of preventing unwanted pregnancy when taken correctly. In our study, regarding the maximum acceptable time after sex for a woman to take ECPs; 26.69% said it was between 24 and 48 hours, 43.13% did not know and only 11.41% said, between 72 and 120 hours. This stands to reason that a lot of these young ladies are using ECPs at the wrong times. The study by [12], found that [57.9%] of their respondents agreed the required time for taking ECPs was immediately after sex; 1.2% of them said 24 hours and 30.6% did not know which contradicts the results of our study. In addition [16], also observed that in Nigeria ECPs can effectively be used within 24 hours [49.4%]. About 68% of women in a study by Yeboah et al., claimed that the recommended duration for taking ECPs should be within 72 hours [13]. The prevalence usage of ECPs in this study was 47.58%. This was lower than a similar findings of 76.9% reported from a study conducted in Kwadaso in the Ashanti Region by [13]. This is however, higher than the 33.9% of women together who had used ECPs in Denmark, Norway and Sweden [17]. According to [17], the prevalence use of ECPs in Denmark is 32.3%, Norway is 35.1% and Sweden is 34.6%. Based on these findings this study could say that there is high usage of ECPs among KsTU female students. In Nigeria, the prevalence use of ECP is 54.1% [11]. Surprisingly, the prevalence among female sex workers in Swaziland is 27.5% [18], which is 20.08% lower compared with the rate of 47.58% in this study. The study results show that about 50% of females start using emergency contraceptives between the ages of 20 and 24 years. The type of emergency contraceptive pills frequently used by respondents in this study was Lydia [58.54%], but Lydia was not found among the commonly use ECPs such as postinor2 as reported by [11]. About 93.6% of the respondents said they use ECPs mainly for the prevention of pregnancy. Previous studies noted that emergency contraceptives are mainly used for the prevention of unintended pregnancies [12,14,18,19]. However, the common method that participants use to avoid contracting sexually transmitted diseases was condom [54.35%]. Condoms are used for prevention HIV and even more effective to prevent both HIV/STIs and pregnancy [18]. The results show a significant association between ECPs use STIs.

## 5. Conclusion

The prevalence rate of emergency contraceptive pills use among female students is 48% with close to 98% awareness level. More than half of the people believe ECPs as early method of prevention abortion. Many ECPs users do not apply them appropriately and are also not abreast with the side effects which may include headache, tommy pains, changes to their next period or feeling of being sick. About 94% of the respondents who use ECPs are aware about how they work, which is for prevention or delaying ovulation. There is a positive correlation between emergency contraceptive pills use and sexually transmitted infections among students.

## Limitations and Recommendation

Inadequate finance to compare two or more schools limited comparative analysis of the study. Secondly, because majority of the questions were closed-ended, limited respondents to express their views fully. There should be continuous education among female students regarding the use, function and effects of ECPs. Awareness must be created among students

about the risk between ECPs use and STIs. Further study is recommended for scholars, public health and academia to expand this study.

## Declarations

**Ethics Approval and consent to participate:** All methods were performed in accordance with the University (KsTU) ethics and guidelines. This was approved by KsTU Research Ethics Committee. Informed consent was obtained from all participants who took part in the study.

**Consent for publication:** Not applicable

**Availability of data and materials:** The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

**Competing interests:** The authors have decalred that no competing interests exist.

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**Authors Contributions:** Author M.F.O and D.N developed the idea, designed the study, run the statistical analysis and drafted the first report; author A.A.A and E.K.N reviewed the literature and proofread the first draft. Authors D.N and A.A.A collected the data cleaned it and also contributed in the data analysis. All the three authors reviewed the final manuscript and agreed to its current state.

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