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Exploring knowledge, attitudes, practices, and determinants regarding emergency contraception use among female university students in Goma, Democratic Republic of the Congo: a cross-sectional study

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Abstract

Introduction Emergency contraception is an essential method for preventing unintended pregnancies, especially after unprotected sexual intercourse. However, knowledge, attitudes, and practices related to emergency contraception among university students remain underexplored, particularly in low-resource settings such as Goma, Democratic Republic of the Congo. The objective of this study is to assess the knowledge, attitudes, practices, and determinants influencing the use of emergency contraception among female students in Goma.

Methods A cross-sectional survey was conducted with 677 female students from two universities in Goma who were selected via a cluster sampling method. Data were collected via a preestablished questionnaire, and participants were interviewed after providing consent. The data were analysed via STATA 16, with chi-square tests to compare variables, considering a significance threshold of 5%.

Results A total of 625 (92.32%) students reported being aware of emergency contraception, and 80.32% demonstrated good knowledge of it. In terms of attitudes, 533 (85.28%) students had positive attitudes towards emergency contraception. Among the 625 students who were familiar with emergency contraception, 416 had engaged in sexual intercourse, with 294 (70.67%) having utilized emergency contraception. Factors significantly linked to emergency contraception use included being single (adjusted OR = 1.9 [95% CI: 1.1–3.2]), possessing good knowledge (adjusted OR = 3.0 [95% CI: 1.6–5.8]), and having a positive attitude (adjusted OR = 2.4 [95% CI: 1.1–4.9]).

Conclusion Although the students demonstrated good awareness of emergency contraception and its utilization, the high frequency of emergency contraception use underscores the importance of promoting knowledge about conventional contraceptive methods. It is crucial to enhance educational campaigns within universities to mitigate the elevated risk of unsafe abortions.

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Introduction

Many young women are at high risk of unintended pregnancies, often lacking access to family planning services or feeling uncomfortable using them [1]. Emergency contraception (EC) provides a critical option to prevent unintended pregnancies, particularly for adolescents, thereby reducing health risks associated with early pregnancies [2]. Teenage pregnancies can lead to severe social stigma and health complications for both mothers and children. In many developing countries, pregnancy significantly limits adolescents' education and future economic opportunities [2]. According to the World Health Organization (WHO), approximately 73 million induced abortions occur worldwide each year. Six out of ten (61%) unintended pregnancies and three out of ten (29%) total pregnancies resulted in induced abortion. Preventing unintended pregnancies plays a key role in reducing the occurrence of unsafe abortions [3].

In 2020, nearly 800 women died every day from preventable causes related to pregnancy and childbirth, with one maternal death occurring almost every two minutes [4]. Approximately 95% of these deaths occurred in low- and lower-middle-income countries. Unsafe abortions are among the major complications contributing to maternal mortality and include severe bleeding, infections, high blood pressure during pregnancy, and complications during delivery [4]. These conditions account for nearly 75% of all maternal deaths, which remain preventable with proper care from skilled health professionals (HCPs) before, during, and after childbirth [4]. In developed regions, 30 women die every 100,000 unsafe abortions, while 220 deaths in developing countries and 520 deaths in sub-Saharan Africa have occurred [5]. Most of these deaths and disabilities due to unsafe abortions can be avoided through sexual education, effective contraceptive use, legal access to safe abortions, and timely medical care for complications [5].

The majority of maternal deaths occur in countries where abortion is legally restricted, leading to procedures performed under dangerous conditions [6]. Approximately 7 million women are hospitalized annually due to unsafe abortions in developing countries [6], and the annual cost of treating major complications from unsafe abortions is estimated at 553 million USD [7]. To address this, the WHO has recommended the use of emergency contraceptive pills (ECPs) and their integration into national health programs. ECP is a postcoital method used to prevent pregnancy after unprotected sex, condom failure, or missed oral contraceptive pills [8, 9]. ECP is effective when it is used within five days of unprotected sex, with the highest effectiveness when it is used sooner [10]. A study conducted at the University of Parakou in Benin revealed that only 51% of respondents had heard of EC [10]. Similarly, a study in Botswana reported 95% awareness of EC, but only 22% had used it at least once [11].

Adolescent girls and young women face significant sexual and reproductive health threats, including unintended pregnancies, sexually transmitted infections, sexual violence, and exploitation. These issues, especially teenage pregnancies, have substantial health impacts [12]. Unsafe abortions resulting from unplanned pregnancies are a leading cause of maternal morbidity and mortality [13], with the highest risks in Africa, where nearly half of all unsafe abortions occur. Africa accounts for 62% of maternal deaths due to unsafe abortions, despite representing only 29% of such abortions globally [5].

Improving knowledge about contraceptive use is crucial for reducing unintended pregnancies. If ECs are more widely used, unintended pregnancies and the need for induced abortions could be significantly reduced [14]. In many low-income countries, a lack of knowledge and access to ECs results in young women resorting to unsafe abortions, contributing significantly to maternal mortality [13]. Studies from Ethiopia, Uganda, Ghana, and Kenya have shown that awareness of EC is approximately 50%, with usage rates below 20% [15–18]. The variables influencing EC use include previous EC use, attitudes towards EC use and pregnancy, subjective norms regarding EC use and pregnancy, perceived behavioral control, literacy, religiosity, resources, and barriers [19]. Those with positive attitudes and adequate knowledge about EC are more likely to use it [20, 21]. However, there is a lack of research exploring how these factors specifically influence emergency contraception use among adolescents in resource-limited settings, such as Goma, Democratic Republic of the Congo (DRC), where sociocultural and educational barriers may significantly shape knowledge, attitudes, and practices. The objective of this study is to assess the knowledge, attitudes, practices, and determinants influencing the use of emergency contraception among female students in Goma.

Materials and methods

Study setting

Goma is located in the eastern region of the DRC and is nestled at an altitude of approximately 1,500 m within the Rift Valley. Serving as the administrative center of North Kivu Province, Goma spans an area of 66.45 km^2 and is

characterized by hilly volcanic landscapes near the base of Nyiragongo Volcano (Fig. 1). Positioning along the shores of Lake Kivu, Goma's geographical coordinates are 29°14' East longitude and 1°45' South latitude. The city borders with the Nyiragongo Territory to the north, Lake Kivu to the south, the Republic of Rwanda to the east, and the Masisi Territory to the west [22]. From a demographic and public health standpoint, Goma boasts a high population density, with more than 2333 individuals residing per km^2. It comprises two complete health zones (Goma and Karisimbi) and an urban–rural sector of Nyiragongo. The urban section of the Karisimbi health zone has experienced recent urbanization in response to the increasing demographic demands in Goma [22].

Administratively, Goma is divided into two communes: the Commune of Goma and the Commune of Karisimbi, separated by the main road running from Petite Barrière to Sake. The city, known as a tourist destination, is situated on ancient lava flows from the Virunga volcanic chain, specifically those of Nyiragongo Volcano, which is located approximately 14 km north. This volcano towers nearly 2,000 m above the city. The eruption in 2002 resulted in lava flowing down the slopes, leading to extensive damage in Goma [22].

Study type, period, and population

This is a cross-sectional study conducted from May 1 to May 31, 2023, among female students at the University of Goma and the Université Libre des Grands Lacs (ULPGL), two of the largest universities in the North Kivu province of the DRC.

The study population consisted of all female students enrolled in these two institutions during the academic year. These universities formed two strata for sampling purposes, with a total of 5,240 female students officially registered. A random sample of 768 students was selected, with an equal allocation of 384 participants from each university to ensure representativeness within the two strata.

To be included in this study, participants had to meet the following criteria: they had to be officially enrolled as female students at either the University of Goma or the ULPGL during the academic year of the study. Additionally, participants were required to provide informed consent, either verbally or verbally, after receiving detailed information about the study's objectives, procedures, and right to withdraw at any time without any consequences. Finally, they needed to be present and available during the data collection period.

The sample size was calculated via the formula for finite population sampling, which adjusts for the total population size:

$$n_{adjusted} = \frac{n}{1 + \frac{n-1}{N}}$$

where n= $\frac{Z^2pq}{d^2}$ is the sample size for an infinite population, and N represents the total population size of 5,240 individuals (the total number of female students enrolled

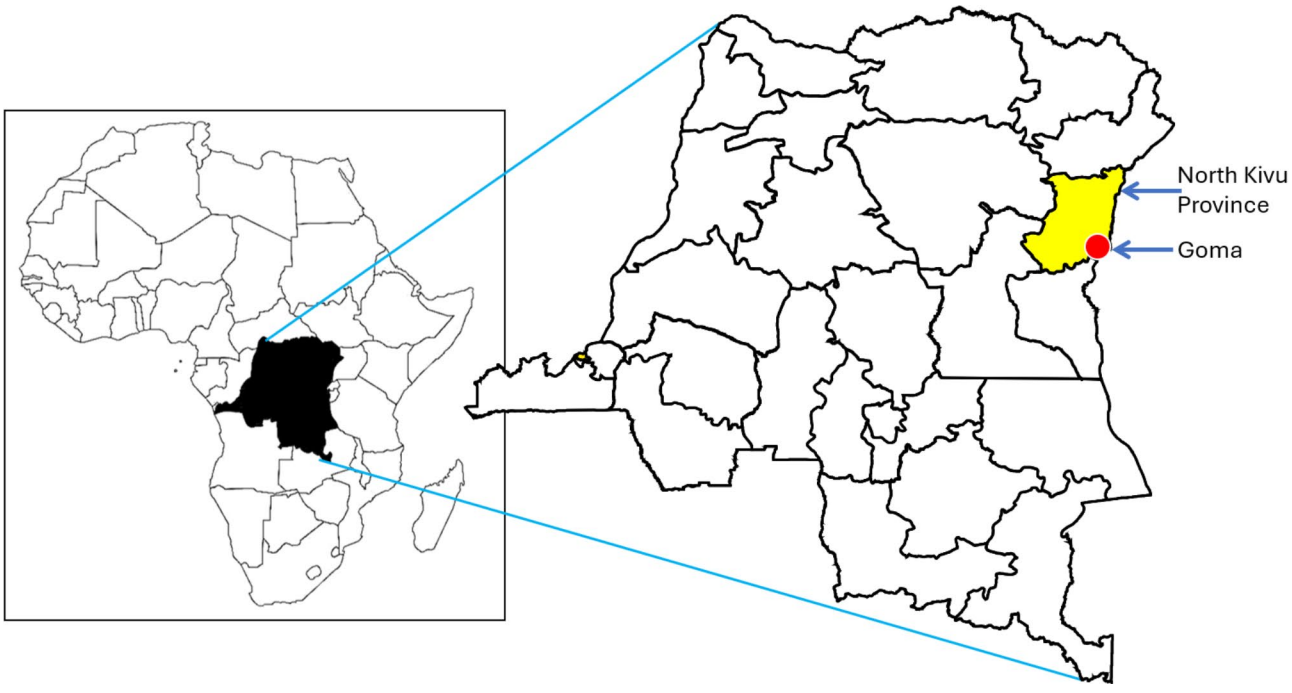

Fig. 1 Geographic location of the Democratic Republic of the Congo, highlighting North Kivu Province (yellow) and the city of Goma (red dot)

during the study period at both universities). The parameters used in the calculation were as follows:

- Z = 1.96, the critical value of the normal distribution for a 95% confidence level.
- $p = 0.5$ and $q = 1 - p = 0.5$, assuming equal proportions of EC use and nonuse due to the absence of specific data.
- d = 0.05, representing a margin of error of 5%.

Using these values, the sample size for an infinite population was calculated as n=384. The finite population adjustment was then applied to account for the total population of 5,240 individuals: $n_{adjusted}$ = 358. Thus, the final required sample size for this study is 358 participants, ensuring a 95% confidence level and a 5% margin of error. To ensure adequate representation and mitigate potential nonresponses, the sample size was increased, resulting in a final total of 768 female students across both universities. This adjustment was made to enhance the reliability of the study and account for possible dropouts, ensuring a more robust and representative sample.

Data collection

Data on students' knowledge of emergency hormonal contraception were collected via a structured research questionnaire. This tool guaranteed anonymity and enabled the assessment of a significant number of participants. The questionnaire comprises eight closed-ended questions aimed at evaluating three main aspects: knowledge, attitudes, and use of EC methods.

The questionnaires were distributed in person at the beginning of each survey day, accompanied by a brief explanation of the study's objectives and a reminder of confidentiality. The students were allotted 15 to 20 min to complete the questionnaire, after which the completed questionnaires were collected.

Prior to the main data collection, the questionnaire was pilot tested in March 2023 among students from both the University of Goma and ULPGL. This pretest allowed for necessary adjustments and finalization of the questionnaire format to ensure clarity and relevance.

A two-day training session was conducted for 20 survey enumerators to familiarize them with the study objectives, ethical considerations, and administration of the questionnaire. The final questionnaire included variables related to the respondents' sociodemographic profiles, knowledge levels, attitudes, and practices regarding EC.

Knowledge was assessed on the basis of participants' self-reported understanding of EC, whereas attitudes were evaluated through questions exploring emotional responses, trust, perceived reliability, and rumours associated with EC use.

Study variables

The questionnaire covered several areas related to sociodemographic factors, knowledge, attitudes, and the use of ECs.

Sociodemographic details included age, level of education, marital status, religion, parental status, and sources of information about EC. Knowledge and attitudes about EC were also considered independent variables in our study.

Knowledge was assessed via a 7-item questionnaire adapted from Abate et al. [18] and modified to suit the respondents. Each correct answer was worth 1 point, and incorrect answers were scored as 0. Attitudes were assessed via eight Likert-type questions adapted from Abate et al. [20]. The responses ranged from 'strongly disagree' to 'strongly agree', with each positive statement being weighted from 1 to 5. In our study, we assigned a score of -2 for 'strongly disagree', -1 for 'disagree', 0 for 'neutral', 1 for 'agree', and 2 for 'strongly agree'.

Practices were evaluated based on participants' self-reported use of EC, which was considered the dependent variable. It was defined as participants reporting having used it at least once in their lifetime. The participants were asked whether they had ever used EC, with response options of 'yes' or 'no'. The numerator consisted of participants who answered 'yes' to the question, 'Have you ever used emergency contraception?' The denominator was the total number of participants surveyed.

Data processing and analysis

The data were entered into a Microsoft Excel sheet and analysed via STATA 16 software. The data analysis comprised two parts: a descriptive section and an analytical section. Frequencies were computed for the descriptive outcomes. For quantitative variables, means with standard deviations were determined. To evaluate knowledge of EC, individuals received one (1) point for correct responses and zero (0) points for incorrect responses. Knowledge of EC was gauged by generating a knowledge score, where a score exceeding 60% was deemed satisfactory. Attitudes towards EC were evaluated via a scale ranging from 0 to 16 for positive attitudes and from – 16 to 0 for negative attitudes.

For the analytical results, both bivariate and multivariate analyses were performed to assess the relationships between variables. Bivariate analysis was initially conducted to examine associations through cross-tabulations, with proportions compared via the chi-square test or Fisher's exact test, depending on the distribution and nature of the variables. For the multivariate analysis, logistic regression was employed to evaluate the independent effects of selected sociodemographic variables, knowledge, and attitudes on the outcome of EC use. Variables that exhibited a p value greater than 0.2 in the

Table 1 Distribution of respondents by sociodemographic characteristics

Variable	Number ($n=677$)	Percentage
Age		
< 20 years	127	18.76
20–24 years	412	60.86
25–29 years	124	18.32
≥ 30 years	14	2.07
Marital status		
Married	77	11.37
Single	600	88.63
Educational level		
Undergraduate level (1st to 3rd year)	431	63.66
Graduate level (4th to 6th year)	246	36.34
Parental status		
Parents living together	515	76.07
Divorced parents	60	8.86
Deceased father and/or mother	102	15.07
Housing situation		
Lives with parents	496	73.26
Lives with friends	31	4.58
Lives with spouse	71	10.49
Lives alone	79	11.67
Religion		
Catholic	283	41.80
Protestant/Pentecostal	272	40.18
Muslim	47	6.94
Methodist	15	2.22
Others	60	8.86

bivariate analysis were included in the logistic regression model via the block entry method. This method allowed us to account for potential confounders and ensure the robustness of the associations identified. A significance level of $p<0.05$ was considered for all tests, ensuring that the results were statistically significant. The adjusted odds ratio (aOR), along with its 95% confidence interval (95% CI), was calculated to quantify the strength and direction of the associations between sociodemographic variables, knowledge, attitudes, and EC use.

Ethical considerations

Ethical approval for this study was granted by the Medical Ethics Committee of the University of Goma (authorization number UNIGOM/CEM/004/2023). Prior to data collection, verbal informed consent was obtained from all participants. They were provided with detailed information about the study's objectives, procedures, and the voluntary nature of their participation. The participants were informed of their right to withdraw at any time without any consequences.

The research adhered to the ethical principles outlined in the Declaration of Helsinki and followed the guidelines for the Ethical Review of Research Involving Human Subjects in the DRC, ensuring the protection, dignity, and confidentiality of all participants. To maintain anonymity, participants were assigned unique codes instead of using their names, preventing any identification of individuals. Additionally, all completed data collection tools were securely stored in a locked location, with access restricted to the principal investigator, ensuring the confidentiality of the information.

Table 2 Distribution of respondents according to history of sexual activity

Variable	Number ($n=421$)	Percentage
Age at first sexual intercourse		
< 15 years	65	15.44
15–19 years	243	57.72
≥ 20 years	113	26.84
Pregnancy history		
Yes	129	30.64
No	292	69.36
History of abortion		
Yes	89	21.14
No	332	78.86
Number of sexual partners in the last 6 months		
1	259	61.52
≥ 2	162	38.48

Results

Sociodemographic characteristics

Among the 768 students surveyed, 677 agreed to participate in the study, resulting in a response rate of 88.15%. Table 1 illustrates the breakdown of the participants based on their sociodemographic characteristics. Among the 677 female students who participated in the survey, 79.62% were under the age of 25, with the youngest being 16 and the oldest 33. The mean age was 22.2 ± 2.9 years. Most of the women were single (88.63%). In terms of religious affiliation, over 41% identified as Catholic, 40.18% as Protestant, 6.94% as Muslim, and 11.08% as other faiths. Additionally, almost three quarters of the students resided with their parents, and 63.66% were enrolled as undergraduates.

History of sexual activity

Among the 677 respondents, 421 (62.2%) reported having engaged in sexual intercourse, whereas 256 (37.8%) stated that they had not. The distribution of the 421 respondents based on their history of sexual activity is presented in Table 2. The age at first sexual intercourse was between 15 and 19 years for 57.72% of the respondents; 30.64% of them had already been pregnant at least once, and 21.14% had a history of abortion. Additionally, more than one-third (38.48%) of the respondents had two or more partners in the last 6 months.

Knowledge of emergency contraception

Among the 677 students surveyed, 625 (92.32%) said they had heard of EC, and 52 (7.68%) had never heard of it. Most respondents (372/625; 59.52%) reported that HCPs were their primary source of information. Friends were the second most common source, with 156 (24.96%) participants indicating that they learned about EC through them. Media channels, such as television or radio, accounted for 4.64% of the responses, whereas social media platforms and family members were cited by 7.84% and 3.04% of the respondents, respectively.

Table 3 Respondents' answers to knowledge-related items

Knowledge-related items	Number ($n=625$)	Percentage
What to do after unprotected sex		
Use emergency contraceptive pills	516	82.56
No alternative	18	2.88
Abortion	4	0.64
I don't know	87	13.92
Types of emergency contraception		
Emergency contraceptive pills (oral contraception)	512	81.92
Intrauterine contraceptive device	9	1.44
Depo-provera	6	0.96
I don't know	98	15.68
Time limit for taking emergency oral contraceptives		
At any time	24	3.84
Before sexual intercourse	39	6.24
24 h after sexual intercourse	280	44.80
72 h after sexual intercourse	174	27.84
120 h after sexual intercourse	7	1.12
I don't know	101	16.16
Dose of emergency contraceptive pills		
One dose	241	38.56
Two doses	232	37.12
Three doses	10	1.60
I don't know	142	22.72
Time interval between doses		
12 h	283	45.28
24 h	45	7.20
I don't know	297	47.52
Advantages of emergency contraception		
Preventing pregnancy	550	88.00
Regular contraception	5	0.80
Regulation of the menstrual cycle	9	1.44
Abortion	3	0.48
I don't know	58	9.28
Situations of use for emergency contraception to prevent unwanted pregnancies		
Rape/Forced sex	124	19.84
Condom breakage (condom torn during sexual intercourse)	29	4.64
When ordinary contraceptive pills are not taken	21	3.36
When a person does not use contraceptives	10	1.60
In all the above situations	377	60.32
I don't know	64	10.24
Mean knowledge score (range)	4.5 ± 1.6	(0–7)

Table 3 displays the participants' responses to the questions regarding their understanding of EC. The computed knowledge scores varied from 0 to 7, with a mean score of 4.5 ± 1.6. A total of 80.32% (502 out of 625) of the respondents reported good knowledge, whereas 19.68% (123 out of 625) reported poor knowledge.

When queried about the available options to prevent unwanted pregnancies, 516 (82.56%) indicated that they utilized EC, whereas 87 (13.92%) admitted that they had no knowledge about it. In terms of EC methods, most respondents (81.92%) highlighted emergency contraceptive pills (ECPs), with only nine (1.44%) mentioning the intrauterine contraceptive device (IUCD). Concerning the correct timing and dosage of ECPs, 174 (27.84%) students mentioned taking them within 72 h; 232 (37.12%) stated that the appropriate dosage of ECPs involved taking them twice. Similarly, 283 (45.28%) participants indicated 12 h as the time interval for ECP intake. Regarding the benefits of EC, 550 (88%) acknowledged its ability to prevent pregnancy (Table 3).

Attitudes towards emergency contraception

The calculated attitude scores ranged from − 14 to 18, with a mean of 4.7 ± 4.3. An evaluation of the attitudes towards EC revealed that 533 (85.28%) respondents had positive attitudes towards EC (Table 4).

Practices related to emergency contraception

Of the 625 respondents who were aware of EC, 416 had engaged in sexual intercourse, among whom 294 (70.67%) reported using EC, whereas 122 (29.33%) had not utilized it.

Among the 294 respondents who reported using ECs, the primary source of recommendation was friends (56.12%), followed by HCPs (20.07%) and partners (17.69%). A small percentage (6.12%) did not specify the source of the recommendation. Regarding the frequency of use, the majority of respondents (52.72%) had used EC only once, suggesting occasional use in specific situations. However, 9.18% had used it twice, and 14.97% had used it three or more times, indicating that some students used EC repeatedly. However, 23.13% of the respondents did not specify the frequency of use.

Determinants of the use of emergency contraception

Marital status significantly influenced EC use ($p=0.014$), with single women being more likely to use EC than married women were (aOR = 1.9 [95% CI: 1.1–3.2]). According to the bivariate analysis, the level of education was

Table 4 Respondents' answers to attitude-related items

Items relating to attitudes	Strongly agree	Agree	Neutral	Disagree	Strongly disagree
• I would use emergency contraceptive pills if I had unprotected sex	23.7%	46.7%	22.1%	3.8%	3.7%
• Emergency contraception methods are safe	12.2%	14.9%	63.2%	7.4%	2.4%
• I would recommend emergency contraception to a friend	12.3%	20.6%	56.5%	6.1%	4.5%
• Increased availability of emergency contraception leads to irresponsible sexual behaviour	53.4%	12.8%	22.7%	6.4%	4.6%
• My partner has a positive attitude towards emergency contraception	9.1%	13.0%	72.6%	3.2%	2.1%
• If the male partner is aware of emergency contraception, he may be less likely to use condoms	14.7%	17.1%	59.0%	5.8%	3.4%
• Increased availability of emergency contraception is causing women to stop using other forms of contraception.	13.6%	46.9%	29.3%	7.5%	2.7%
• Emergency contraception could have an effect on future fertility	56.0%	16.3%	21.8%	3.5%	2.4%
• Emergency contraception is safe for most women	17.4%	0.0%	57.8%	0.0%	24.8%
Mean attitude score	4.7 ± 4.3 (-14 et 18)				

significantly associated with EC use, indicating that female postgraduate students were less likely to use EC than female undergraduates were (unadjusted OR = 0.6 [95% CI: 0.4–0.9]). However, this association was not significant in the multivariate analysis. The likelihood of EC use increased with the level of knowledge among the study subjects. Compared with those with poor EC knowledge, those with good EC knowledge were more likely to use EC (aOR = 3.0 [95% CI: 1.6–5.8]). A significant association was found between respondents' attitudes towards EC and its use ($p = 0.021$). The results indicated that EC use was more likely among respondents with a positive attitude (aOR = 2.4 [95% CI: 1.1–4.9]) (Table 5).

Discussion

In this study, 80.32% of the participants demonstrated good knowledge of EC. Moreover, 85.28% of the respondents exhibited a positive attitude towards EC, with 70.67% stating that they had used it. The use of EC was significantly linked to being single, possessing good knowledge of EC, and maintaining a positive attitude towards EC. These results are consistent with the literature, reinforcing the critical role that both knowledge and attitudes play in influencing EC use. The majority (79.62%) of the respondents were under 25 years old. These findings align with those of Mishore et al.'s study [19], where 94% of participants were 24 years or younger, a demographic considered sexually active [23]. These findings are in line with similar studies conducted in Nigeria [24], further reinforcing the importance of focusing on younger populations in sexual health education and family planning interventions.

In our study, over 90% of the students had heard of EC, with more than 80% demonstrating good knowledge about it. These findings are consistent with studies conducted in Ghana, Nigeria [15, 25, 26], and several Asian countries [27, 28], although some variations in proportions exist. These differences can likely be attributed to the varying levels of availability and dissemination of EC information across health systems in these countries.

The most common source of information on EC in our study was HCPs (59.52%), followed by peers who had used EC and media sources, especially the internet. These results align with studies from other countries, where healthcare facilities were the primary source of EC information [29–32]. Similar to our findings, these studies indicate that peer networks and online platforms play an increasingly significant role in shaping individuals' knowledge and attitudes toward EC. While educational campaigns remain important, our findings suggest that personal interactions, particularly with HCPs and peers, are crucial in disseminating knowledge about EC. This highlights the need for interventions to target these personal networks to improve EC awareness and access.

The study revealed that only a small proportion of students received EC information from family members, likely due to sociocultural and religious barriers that prevent parents or guardians from discussing contraceptive methods. This reluctance to address sexual and reproductive health issues within families can contribute to risky behaviors, such as opting for abortion, especially when young women fear judgment from their parents. These findings emphasize the critical need for open communication between parents and children about sexual health, which can play a key role in promoting safer reproductive practices [18].

The relationship between marital status and the use of EC in our study reveals that unmarried women were more likely to use EC than their married counterparts were. This finding is consistent with Abate et al. [20], who reported that unmarried women were more likely to utilize EC than married women were. The lower use of EC among married women may reflect cultural or social barriers that discourage contraceptive use within marriage,

Table 5 Determinants of the use of emergency contraception among female university students in Goma

Variable	Total (*N* = 416)	Use of emergency contraception				Unadjusted odds ratio [95% confidence interval]	Adjusted odds ratio [95% confidence interval]	*p*-value
		Yes (*n* = 294)		No (*n* = 122)				
Age								
< 20 years	54	39	72.22%	15	27.78%	1.2 [0.2-5.0]	0.3 [0.1–1.5]	0.138
20–24 years	247	174	70.45%	73	29.55%	1.1 [0.2–3.9]	0.4 [0.1–1.6]	0.195
25–29 years	102	72	70.59%	30	29.41%	1.1 [0.2–4.2]	0.8 [0.2–3.5]	0.813
≥ 30 years	13	9	69.23%	4	30.77%	1.0	1.0	
Educational level								
Undergraduate	238	179	75.21%	59	24.79%	1.0	1.0	
Graduate	178	115	64.61%	63	35.39%	**0.6 [0.4–0.9]**	2.0 [0.7–5.5]	0.184
Marital status								
Married	74	40	54.05%	34	45.95%	1.0	1.0	
Single	342	254	74.27%	88	25.73%	2.5 [1.5–4.1]	**1.9 [1.1–3.2]**	0.014
Housing situation								
Lives with parents	253	192	75.89%	61	24.11%	1.0	1.0	
Lives with friends	26	18	69.23%	8	30.77%	0.7 [0.3–1.7]	0.8 [0.3–2.1]	0.650
Lives with spouse	69	38	55.07%	31	44.93%	**0.4 [0.2–0.7]**	0.6 [0.2–1.6]	0.276
Lives alone	68	46	67.65%	22	32.35%	0.7 [0.4–1.2]	0.6 [0.3–1.1]	0.080
Parental status								
Parents living together	302	218	72.19%	84	27.81%	1.0	1.0	
Divorced parents	45	31	68.89%	14	31.11%	0.8 [0.4–1.7]	0.9 [0.4–1.8]	0.698
Deceased father and/or mother	69	45	65.22%	24	34.78%	0.7 [0.4–1.3]	0.8 [0.4–1.4]	0.419
Religion								
Catholic	172	122	70.93%	50	29.07%	1.0	1.0	
Protestant/Pentecostal	163	114	69.94%	49	30.06%	0.9 [0.6–1.5]	0.9 [0.5–1.4]	0.543
Muslim	32	23	71.88%	9	28.13%	1.0 [0.5–2.4]	0.9 [0.4–2.2]	0.768
Others	49	35	71.43%	14	28.57%	1.0 [0.5–2.1]	1.0 [0.5–2.2]	0.912
Knowledge								
Poor	54	26	48.15%	28	51.85%	1.0	1.0	
Good	362	268	74.03%	94	25.97%	3.1 [1.7–5.5]	**3.0 [1.6–5.8]**	0.001
Attitudes								
Negative	40	19	47.50%	21	52.50%	1.0	1.0	
Positive	376	275	73.14%	101	26.86%	3.0 [1.6–5.8]	**2.4 [1.1–4.9]**	0.021

where there may be greater societal expectations of having children. Interestingly, our results contrast with those of Alemtu et al. [33], who reported that married students had higher rates of EC use. This discrepancy could be attributed to varying access to family planning resources, differing societal norms about contraception in marriage, or differences in the perceived need for EC based on marital status. Understanding the complex relationship between marital status and contraceptive use requires further exploration of the cultural and socioeconomic factors that influence decision-making about family planning.

The results of this study indicate a significant association between respondents' knowledge of EC and their likelihood of using it. Women with better knowledge of EC were more likely to report having used it, which aligns with the findings of previous studies [20, 33], which also revealed a positive relationship between knowledge and EC use. These findings suggest that increasing awareness of EC can play a critical role in enhancing its use among women. Women who are well informed about EC options are more likely to make use of them when needed, as they are better equipped to navigate available contraceptive methods. These findings underscore the importance of educational interventions to improve knowledge, particularly in regions where awareness of EC may be limited.

This study revealed a significant association between a positive attitude toward EC and its use. Although previous studies [20, 33] have reported no direct link between attitudes and EC use, our findings suggest that women with positive attitudes are more likely to use ECs. This distinction may reflect the unique role of EC as an EC rather than a regular method. EC is used primarily after unprotected sex and has time-sensitive implications for its effectiveness, making timely access and awareness critical. Understanding the nature of EC use—as a

backup option in preventing unintended pregnancies—emphasizes the need for targeted educational efforts. The findings of this study underscore the importance of improving knowledge and awareness about EC, especially in regions where understanding of its role may be limited, and for women who may be unfamiliar with the benefits of prompt use in emergency situations [34, 35].

Despite the awareness and use of ECs among many participants, certain barriers persist. Religious beliefs and concerns about potential side effects were cited as reasons for refraining from EC use, a challenge also noted in Nigerian studies [36, 37]. These cultural and social factors play crucial roles in shaping women's contraceptive choices and must be addressed in any public health intervention aimed at improving EC accessibility and use.

Interestingly, most respondents (73.81%) reported using ECs on the basis of recommendations from friends or partners. This highlights the influence of social networks in shaping contraceptive behaviors, aligning with findings from recent studies that emphasize the role of male sexual partners in encouraging the use of ECs, often to prevent unintended pregnancies. This underscores the need for comprehensive sexual health education that empowers both women and men with accurate knowledge about contraception and EC.

However, while EC can serve as a critical backup method, its use should not replace regular contraceptive practices. The notion that EC should be reserved for emergencies, rather than being a regular method, has been emphasized in studies advocating for its responsible use [35, 36]. Despite this, in many African countries, limited information about EC is available, and some HCPs hesitate to offer it, fearing that it may encourage risky sexual behavior or reduce reliance on traditional contraceptive methods [10]. These concerns contrast with studies suggesting that EC, when used correctly and responsibly, does not increase risky behavior but rather provides a necessary safety net for women, especially adolescents, who may otherwise face the stark choice between unwanted pregnancies and unsafe abortion practices [37, 38].

The findings of this study highlight the importance of improving education and access to ECs, particularly in educational settings where information is often insufficient. Given the relatively low risk associated with EC use and its potential to prevent unwanted pregnancies, it is essential to encourage all women, particularly students, to seek out and use EC when necessary while also promoting the use of regular contraceptive methods.

Although the results of this study provide valuable insights, it is important to recognize several limitations, particularly regarding the study design and the accuracy of participants' self-reported data. This was a cross-sectional study, offering a snapshot of participants' knowledge, attitudes, and behaviors at a specific point in time. As such, it does not allow conclusions about causality or long-term trends to be drawn. A potential source of bias is information bias, as participants may have provided socially desirable responses or overstated their knowledge and use of ECs. Although the study aimed to mitigate this risk by ensuring anonymity, some participants might have altered their responses due to social pressure or a desire to present themselves positively. Additionally, the reliance on self-reported data raises concerns about recall bias, as participants may not accurately remember or report their experiences with EC. Finally, this study was conducted in a specific university context, which may not fully reflect the broader population of young women. This limits the external validity of the findings and their generalizability to other groups.

On the other hand, the strength of this study lies in its high participation rate of 88.15%, which demonstrates a strong willingness among respondents to engage with the research. This high level of participation enhances the reliability of the data and strengthens the robustness of the findings. Additionally, the use of a structured questionnaire, along with the assurance of anonymity, helped minimize response bias and contributed to the validity of the results. Despite the limitations discussed earlier, the study provides valuable insights into the knowledge, attitudes, and practices surrounding EC among university students, offering important implications for public health interventions and educational programs.

Conclusion

This study revealed a substantial level of awareness and favourable attitudes toward EC among female university students in Goma, with most sexually active respondents reporting prior EC use. It was observed that possessing good knowledge and a positive attitude substantially heightened the probability of EC utilization.

To reduce unintended pregnancies, we recommend enhancing access to ECs through subsidized costs and improved distribution in health facilities. Furthermore, it is crucial to integrate comprehensive sexual education and family planning courses into secondary and university curricula. Finally, policymakers should establish clear policies promoting EC use, with parents playing a crucial role in educating their children on reproductive health and contraceptive options.

Abbreviations

95% CI	95% confidence interval
DRC	Democratic Republic of the Congo
EC	Emergency contraception
ECP	Emergency contraceptive pill
IUCD	Intrauterine contraceptive device
HCPs	Healthcare professionals
OR	Odds ratio
ULPGL	Université Libre des Grands Lacs

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Author contributions
P.L.M., O.M., and S.O.W. conceptualized the study and designed the methodology; P.L.M., O.M., and A.K. developed the software; P.L.M., K.G., and A.K.M. conducted the validation. O.M. and A.K. performed the formal analysis; P.L.M., A.K., and S.O.W. collected the data; P.L.M., O.M., and A.K. prepared the original draft of the manuscript; K.G., A.K.M., and S.O.W. provided supervision and contributed to the review and editing. All the authors reviewed and approved the final version of the manuscript for publication.

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Data availability
The datasets used and/or analysed during the current study are available from the corresponding author upon reasonable request.

Declarations

Ethics approval and consent to participate
Ethical approval for this study was granted by the Medical Ethics Committee of the University of Goma (authorization number UNIGOM/CEM/004/2023). Prior to data collection, verbal informed consent was obtained from all participants. They were provided with detailed information about the study's objectives, procedures, and the voluntary nature of their participation. The participants were also informed of their right to withdraw at any time without facing any consequences. The research adhered to the ethical principles outlined in the Declaration of Helsinki and followed the guidelines for the Ethical Review of Research Involving Human Subjects in the DRC, ensuring the protection, dignity, and confidentiality of all participants. To maintain anonymity, participants were assigned unique codes instead of using their names, preventing any identification of individuals. Additionally, all completed data collection tools were securely stored in a locked location, with access restricted to the principal investigator, ensuring the confidentiality of the information.

Competing interests
The authors declare no competing interests.

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References

1. Bellizzi S, Mannava P, Nagai M, Sobel HL. Reasons for discontinuation of contraception among women with a current unintended pregnancy in 36 low and middle-income countries. Contraception. 2020;101(1):26–33.
2. Bearak J, Popinchalk A, Ganatra B, Moller A-B, Tunçalp Ö, Beavin C, Kwok L, Alkema L. Unintended pregnancy and abortion by income, region, and the legal status of abortion: estimates from a comprehensive model for 1990–2019. Lancet Glob Health. 2020;8(9):e1152–61.
3. World Health Organization. Abortion [Internet], Geneva. WHO; May 2024 [cited 2025 Jan 17]. Available from: https://www.who.int/news-room/fact-sheets/detail/abortion
4. World Health Organization. Maternal Mortality [Internet], Geneva. WHO; April 2024 [cited 2025 Jan 17]. Available from: https://www.who.int/news-room/fact-sheets/detail/maternal-mortality
5. Ganatra B, Gerdts C, Rossier C, Johnson BR Jr, Tunçalp Ö, et al. Global, regional, and subregional classification of abortions by safety, 2010–14: estimates from a bayesian hierarchical model. Lancet. 2017;390(10110):2372–81.
6. Singh S, Maddow-Zimet I. Facility-based treatment for medical complications resulting from unsafe pregnancy termination in the developing world, 2012: a review of evidence from 26 countries. BJOG: Int J Obstet Gynecol. 2016;123(9):1489–98.
7. Vlassoff M, Shearer J, Walker D, Lucas H. Economic impact of unsafe abortion-related morbidity and mortality: evidence and estimation challenges. IDS Research Report 59, 2008; ISBN 1 85864 539 5, 94 pp.
8. Hang Bhs, Moneyham L. Utilization de la pilule d'urgence et du préservatif par les collégiens. Revue Internat d'Études en Soins Infirmiers. 2008;45(5):775–83.
9. Goyaux N, Alihonou E, Diadhou F, Leke R, Thonneau PF. Complications of induced abortion and miscarriage in three African countries: a hospital-based study among WHO collaborating centers. Acta Obstet Gynecol Scand. 2001;80(6):568–73.
10. Fourn N, Aguemon B, Kabibou S, Hounkponou F, Lafia I, Fourn L. Connaissances, attitudes et pratiques de la contraception d'urgence chez les étudiantes à l'Université De Parakou (Bénin). Santé Publique. 2014;26(4):541–6.
11. Kgosiemang B, Blitz J. Emergency contraceptive knowledge, attitudes and practices among female students at the University of Botswana: a descriptive survey. Afr J Prim Health Care Family Med. 2018;10(1):1–6.
12. World Health Organization. Adolescent pregnancy [Internet]. Geneva: WHO; April 2024 [cited 2025 Jan 17]. Available from: https://www.who.int/news-room/fact-sheets/detail/adolescent-pregnancy
13. Berhan Y, Berhan A. Causes of maternal mortality in Ethiopia: a significant decline in abortion related death. Ethiop J Health Sci. 2014;24:15–28.
14. World Health Organization. Regional Office for the Western Pacific, United Nations Population Fund and United Nations International Children's Emergency Fund. Investing in our future: a framework for accelerating action for the sexual and reproductive health of young people. Manila: WHO Regional Office for the Western Pacific; 2006.
15. Addo VN, Dede E, Darko T. Knowledge, practices ab attitude regarding emergency contraception among students at a university in Ghana. Int J Gynaecol Obstet. 2009;105(3):206–9.
16. Nworah JO, Sunday UM, Joseph OU, Monday OO, Josephat CA. Knowledge, attitude and practice of emergency contraception among students in tertiary schools in Anambra State Southeast Nigeria. Int J Med Med Sci. 2010;2(1):1–4.
17. Tajure N. Knowledge, attitude and practice of emergency contraception among graduating female students of Jimma University, Southwest Ethiopia. Ethiop J Health Sci. 2010;20(2):91–7.
18. Byamugisha JK, Mirembe FM, Faxelid E, Gemzell-Danielsson K. Emergency contraception and fertility awareness among university students in Kampala. Uganda Afr Health Sci. 2006;6(4):194–200.
19. Mollen CJ, Barg FK, Hayes KL, Gotcsik M, Blades NM, Schwarz DF. Assessing attitudes about emergency contraception among urban, minority adolescent girls: an in-depth interview study. Pediatrics. 2008;122(2):e395–401.
20. Abate M, Assefa N, Alemayehu T. Knowledge, attitude, practice, and determinants emergency contraceptive use among women seeking abortion services in Dire Dawa, Ethiopia. PLoS ONE. 2014;9(10):e110008.
21. Mishore KM, Woldemariam AD, Huluka SA. Emergency Contraceptives: Knowledge and Practice towards Its Use among Ethiopian Female College Graduating Students. International Journal of Reproductive Medicine. 2019; 2019.
22. Kiakuvue YN, Kanyere FS, Mukubu DM, Ruhindiza BM, Mukuku O. Sexual violence among female survivors in Goma, in the Democratic Republic of the Congo: epidemiology, clinical features, and circumstances of occurrence. Sci Rep. 2024;14(1):14863.
23. Richard AC, Ralph JD, Gina MW, et al. Angela: oral contraceptive use may not preclude condom use: a study of nonpregnant African-American adolescent females. Sex Transm Infect. 2007;83:216–8.
24. Ajayi AI, Nwokocha EE, Adeniyi OV, Ter Goon D, Akpan W. Unplanned pregnancy-risks and use of emergency contraception: a survey of two Nigerian universities. BMC Health Serv Res. 2017;17(1):382.
25. Ebuehi OM, Ekanem EE, Ebuehi OA. Knowledge and practice of emergency contraception among female undergraduates in the University of Lagos. Nigeria East Afr Med J. 2006;83(3):90–5.

26. Baiden AE, Clerk C. Perception of university students in Ghana about emergency contraception. Contraception. 2002;66(1):23–6.
27. Naz S, Tayyab S, Ali L, Yasir R. Emergency contraception: knowledge and attitude among females: gynecology unit, Lyari General hospital, Karachi. J Surg Pakistan. 2009;14(2):89–92.
28. Adhikari R. Factors affecting awareness of emergency contraception among college students in Kathmandu, Nepal. BMC Womens Health. 2009;9:27–32.
29. Myer L, Mlobell R, Cooper D, Smit J, Morroni C. Knowledge and use of emergency contraception among women in the Western Cape province of South Africa: a cross-sectional study. BMC Womens Health. 2007;7:14–7.
30. Ahmed F, Moussa K, Ahmed FA, Moussa KM, Petterson KO, Asamoah BO, et al. Assessing knowledge, attitude, and practice of emergency contraception: a cross- sectional study among Ethiopian undergraduate female students. BMC Public Health. 2012;12:110.
31. Kongnyuy E, Ngassa P, Kongnyuy EJ, Ngassa P, Fomulu N, Wiysonge CS, et al. A survey of knowledge, attitudes and practice of emergency contraception among university students in Cameroun. BMC Emerg Med. 2007;7:1–7.
32. Amorha KC, Adayi PI, Ayogu EE, Ukwe CV. Knowledge, attitudes and Use of Emergency Contraceptives among female students of the University of Nigeria, Nsukka. IOSR J Pharm Biol Sci. 2017;12(2):56–63.
33. Alemtu W. Knowledge, attitude and practice of emergency contraceptives among female college students in Arba Minch Town, Southern Ethiopia. Ethiop J Health Dev Addis Ababa Ethiopia. 2011;25(3):176–83.
34. Melkam W, Teklemariam G, Abrha S, Kahsu A. Knowledge and practice on emergency contraceptives among females who came for abortion at Mekelle General Hospital. Mekelle Ethiopia IJMN. 2015;2(2):234–9.
35. Meng CX, Gemzell-Danielsson K, Stephansson O, Kang JZ, Chen QF, Cheng LN. Emergency contraceptive use among 5677 women seeking abortion in Shanghai, China. Hum Reprod. 2009;24(7):1612–8.
36. Teixeira M, Guillaume A, Ferrand M, Adjamabgo A, Bajos N. Perception and practice of emergency contraception by postsecondary school students in southwest Nigeria. Soc Sci Med. 2012;75(1):148–55.
37. Arowojolu AO, Adekunle AO. Perception and practice of emergency contraception by postsecondary school students in southwest Nigeria. Afr J Reprod Health. 2000;4(1):56–65.
38. Marions L, Cekan SZ, Bygdeman M, Gemzell-Danielsson K. Effect of emergency contraception with levonorgestrel or mifepristone on ovarian function. Contraception. 2004;69(5):373–7.

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