

# Young Women and Burden of Unsafe Abortion: 2023 Estimates from Two Hospitals in Yaoundé, Cameroon

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## ABSTRACT

**OBJECTIVES:** Adolescent girls and young women (AGYW) are particularly vulnerable to unsafe abortion (UA). The study aimed to describe the distribution of women with complications of abortions, determine the frequency of complications and deaths, and estimate measures of disease burden in 2023 at two hospitals.

**STUDY DESIGN:** The study employed a cross-sectional design, utilizing retrospective hospital record review, and lasted 12 months. We included all recorded cases of abortion complications managed at two referral hospitals of Yaoundé in 2023. Data on all complications of abortion, live births, and maternal deaths were collected and used to make estimates for the incidence of infertility due to UA, based on recognized assumptions in the literature, and to calculate disability adjusted life years (DALYs).

**RESULTS:** We identified 324 cases of complications of abortion in 2023; 235 were declared spontaneous abortions (SAs) and 89 (27.5%) UAs. Adolescents and young women (AGYW) accounted for 60.7% of UAs. There were 15 deaths (Case-fatality 16,900/100,000) in the UA group and none in the SA. The UA mortality ratio (per 100,000 live births) was 174. The proportion of maternal deaths due to UA was 16.0%. DALYs were 738.16 (Equivalence: 8,567/100,000 livebirths).

**CONCLUSION:** UAs were very common, especially among AGYW, and associated mortality was high at the study hospitals in 2023. They contributed to a great proportion of maternal mortality, and the associated DALYs for 2023 are substantial. There is a need for a nationwide assessment and to improve access to contraception to reduce unwanted pregnancies, address stigma to favor timely consultation, and improve the quality of management.

**Keywords:** AGYW; Maternal mortality; Restrictive law; Spontaneous abortion; Unsafe abortion

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## Introduction

Induced abortion done by persons lacking the necessary skills and/or in an environment that does not conform to minimal medical standards is termed unsafe abortion (1,2). Such abortions frequently cause various complications (hemorrhage, infection, and tissue injuries) that can lead to infertility or death of the woman (3). It may also lead to psychological complications. On the other hand, according to the World Health Organization (WHO), spontaneous abortions (SA) and induced abortions done by qualified personnel and under optimal sanitary conditions carry very little risk of complication (1).

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There are about 121 million unintended pregnancies and 73 million induced abortions globally each year, and about 45% of these are UAs (4,5). The significance of the problem posed by unsafe abortion (UA) is exacerbated by the fact that adolescent girls and young women (AGYW) are particularly vulnerable. According to a 2012 report, abortion-related mortality among AGYW accounted for nearly one-third of abortion-related deaths worldwide(6). They have limited access to family planning (because of stigma, suboptimal service quality, and the relatively high cost) and are less likely to afford safe abortion. UA is also a problem strongly associated with underdevelopment. About 97% of cases occur in developing countries (7). The estimated number of resultant deaths in the year 2000, virtually all in these same countries, was 60,000 with disability adjusted life years (DALYs) of about 4,940,000 (8).

UAs remain a major contributor to maternal mortality (MM) in the world, as data up to 2014 reveal that they still cause about 22,800 maternal deaths per year (9). In relative terms, about 4.7-13.2% of maternal deaths are still attributed to UA (10). In countries with restrictive abortion laws, the incidence of UA is even higher, and available estimates could be underestimates (7). In Sub-Saharan Africa (SSA), UAs accounted for about 7% of MM through 2019 (11). In Cameroon, grey data from a major hospital in the capital city, the gynaeco-obstetric and pediatric hospital of Yaoundé (GOPHY), attributed about 17% of maternal deaths to complications of abortion in 2014, making it the second most common cause of maternal death after hypertensive diseases of pregnancy, in that hospital. Furthermore, a 2018 study reported that induced abortion is a major contributor to the MM in Cameroon and affects, especially, adolescent girls and women aged between 20 and 29 years (12).

According to the penal code of Cameroon (law number 2016/007 of 12 July 2016), medical induction of abortion is allowed when pregnancy poses an unacceptable threat to the life of a woman. Induction is also allowed legally when a pregnancy results from incest or rape. To these, clinicians add situations where the fetus shows severe malformations that are not compatible with life. However, the procedures for achieving abortion, in all these circumstances, are sometimes challenging to varying degrees. Family planning services, charged with the provision of contraception for women who do not want a pregnancy or who desire to space out pregnancies, are available, but access and acceptability still pose problems for various reasons.

The reported numbers of deaths due to UA in Cameroon and their contribution to MM are substantial. However, the significance of UAs in Cameroon cannot be fully reflected by case numbers and complication rates alone. A consideration of the age of occurrence of each complication or death gives a better appraisal of the magnitude of the losses due to UAs (be-

cause of deaths and infertility). This can be achieved by assessing DALYs lost due to UAs. We did not find such data for Cameroon in the recent literature. In addition, given that determining the real number of UAs in the community is virtually impossible in our context, we believe that determining the UA ratio (number of UAs/number of deliveries in a setting) from two hospitals that receive cases from all strata of the society can provide a basis for making reasonable estimates, from the number of deliveries, with appropriate adjustments, as required.

The aim of this study was to assess the burden of UAs at the Central Hospital of Yaoundé (CHY) and the GOPHY, using 2023 as a reference year, to provide data for advocacy to improve the health of women, especially AGYW. The specific objectives were to describe the distribution of women with complications of abortions with respect to age, sociodemographic and clinical characteristics, to estimate the UA ratio and the UA mortality ratio, and to calculate measures of disease burden (case-fatality, proportion of MM, and DALYs due to UAs) in 2023 at the CHY and GOPHY. These two teaching hospitals have high patient volume and robust patient records.

## Material and Method

**Study Design:** The study was a cross-sectional analytical study based on a retrospective review of hospital records. This simple, cost-effective design was adequate to provide the baseline data needed to estimate the burden of UAs for 2023.

**Study site:**We collected hospital data on abortions and their complications, maternal deaths, and deliveries at the CHY and GOPHY. These hospitals have high patient flow and a long-standing reputation in the management of complications of abortion. Together, they serve patients from all segments of Yaoundé's population, as well as referrals from other health facilities in the Center Region. The gynecology-obstetrics department of the CHY has a hand-written register for cases of complications of abortion received and managed at the facility, while the GOPHY has a well-developed adolescent health unit.

**Study period and duration:** The study lasted 12 months (September 2024 through August 2025), and the study period was 2023 (January 1 through December 31, 2023).

**Study participants:** We included all cases consulting for complications of abortion, in 2023 at CHY and GOPHY, following termination of pregnancy before 22 completed weeks. Cases of termination of pregnancy after 22 completed weeks, cases received outside 2023, and cases with unclear diagnosis were not included. Sampling was consecutive and exhaustive, as all cases that met our selection criteria were included.

**Data collection:** We obtained ethical clearance from the

National Ethics Committee for Research in Human Health (No. 2024/08/1709/CE/CNERSH/SP, dated 16 August 2024) (Appendix 1), as well as research authorization from the management of each hospital and informed consent from patients for the use of their data. Data collection was done by two medical doctors versed in research data collection, beginning with the registers of abortions, consultations, and deaths at the department of obstetrics and gynecology. Data on cases of abortion were collected using a case form designed for the study and pretested (Appendix 2). For each case of abortion identified, the case form was completed. Missing information was obtained by studying the patient's file.

Variables of interest included age, socio-demographic (occupation, place of residence, level of education, marital status, and religion) and obstetrical (gravidity, parity, and gestational age) parameters of participants, clinical stage of abortion at entry (threatened, inevitable, incomplete, complete, or septic), any complications observed, and overall patient outcome (survival or death). Cases were classified as UA based on patient declaration of voluntary termination (sometimes after a revisit when physical findings contradicted), the absence of an adequate administration and follow-up platform, and the advent of a complication warranting consultation in our services. In contrast, all unintentional terminations were classified as SAs. Any death that occurred within 42 days of termination of pregnancy that was not obviously incidental or accidental was considered a maternal death. Gray data relevant to the study (the number of deliveries and maternal deaths in 2023) were obtained from each hospital's records. Approval to use patient data was obtained, and the study was conducted in accordance with the principles of the Declaration of Helsinki.

Estimation of variables: The standard life expectancy by age for women in Cameroon (not available) was estimated from life expectancy at birth (65.9 years) and at 65 (13.7 years) obtained from "UN Estimates for life expectancy for various ages in 2023" (13). Assuming a linear increase in life expectancy (LE) between both ages, by using the formula below:  $Ex = X ((E65 + 65) - E) / 65 + E0 - X$

Where  $Ex$  is LE at age  $X$ ,  $E0$  is LE at birth (65.9), and  $E65$  is LE at age 65 years (13.7)

The adoption of a linear increase in life expectancy, rather than a geometric curve, was due to the need for additional data and more complex calculations, despite the minimal expected difference, as the curve tends to become linear in adulthood. The years of life lost (YLL) were determined using the formula:  $YLL = \text{number of deaths} \times \text{standard life expectancy at the age at which death occurred}$ , and the years lived with disability (YLD) using the formula:  $YLD = \text{number of incident cases} \times \text{disability weight} \times \text{average duration of the case until remission or death (years)}$ . Only infertility was considered for YLD due to UA, as it integrates most long-term consequences of abortion (trauma, infection, tubal, and intra-uterine scar-

ring), and others were not observed at discharge. Its occurrence was assumed to be 12%, as estimated for the Afro region, following a complication of abortion (8), and disability weight factor used was 0.180 (6), until death (since the infertile woman would face the problem all her life). Lower figures for disability weight proposed more recently are 0.026-0.056; however, in the African context, this may not align with the attachment to childbearing. The DALYs were obtained by using the formula:  $DALYs = YLL + YLD$ . Given variability in published disability weights for infertility, sensitivity analyses were performed using alternative values (0.026 and 0.056) derived from more recent estimates. DALYs were recalculated using these assumptions and compared with those obtained using the original disability weight of 0.18.

Data management and statistical analysis: Before analysis, the data were entered into an Excel sheet (Microsoft Excel version 16.95.4) and cleaned. The dataset was then imported into IBM's Statistical Package for Social Sciences (SPSS) version 26.0. Descriptive statistics were used to summarize participants' characteristics, with results expressed as frequencies and proportions. The number of deliveries and maternal deaths in 2023, obtained from the records, was used as the denominator for calculating the UA ratio and the proportion of MM due to UA. We compared proportions between unsafe and spontaneous abortions, and between the two hospitals, using the Chi-square test, and ran a Mann-Whitney U test to compare the DALYs score distribution between the CHY and the GOPHY because the data were not normally distributed. Microsoft Word (version 16.95.4) was used for compiling the final report.

## Results

We identified 324 cases of complications of abortion managed in 2023 at the obstetrical emergency units of the two study hospitals; 175 (54%) were managed at the CHY and 149 (46%) at GOPHY. In all, there were 235 cases declared spontaneous and 89 (27.5%) unsafe induced abortions.

Sociodemographic and clinical characteristics of women managed for abortion.

The age range was 16 to 43, with a modal age of 20-24 years. However, for the SA group, the modal age group was higher (25-29 years). AGYW (10-24 years) accounted for 29.8% of SA, compared with 60.7% for UAs. The majority (53.1%) of the women were single, with a higher proportion in the UA group (78.6%). The level of formal education showed the highest representation at the extremes, with 42.9% for none and 34.6% for university level. The largest occupational group was private sector employees (32.1%), while the most represented region of origin was the Center Region, accounting for 42.6%. All cases were from an urban area (Table I).

**Table I:** Sociodemographic characteristics of women with complications of abortion at two reference hospitals in Yaoundé, by type of abortion, in 2023

Variable/ Categories	Spontaneous abortion (n=235) n (%)	Unsafe abortion (n=89) n (%)	Total (n=324) n (%)	p
<b>Age</b>				
< 20	15 (6.4)	17 (19.1)	32 (9.9)	<0.001
20-24	55 (23.4)	37 (41.6)	92 (28.4)	
25-29	63 (26.8)	12 (13.5)	75 (23.1)	
30-34	54 (23.0)	17 (19.1)	71 (21.9)	
35-39	33 (14.0)	4 (4.5)	37 (11.4)	
40+	15 (6.4)	2 (2.2)	17 (5.2)	
<b>Marital status</b>				
Single	102 (43.4)	70 (78.6)	172 (53.1)	<0.001
Married	86 (36.6)	7 (7.9)	93 (28.7)	
Cohabiting	33 (14.0)	12 (13.5)	45 (13.9)	
Others	14 (6.0)	0 (0)	14 (4.3)	
<b>Level of education</b>				
No formal	114 (48.5)	25 (28.1)	139 (42.9)	0.00022
Primary	9 (3.8)	0 (0)	9 (2.8)	
Secondary	36 (15.3)	28 (31.5)	64 (19.7)	
University	76 (32.3)	36 (40.4)	112 (34.6)	
<b>Occupation</b>				
Civil service	25 (10.6)	3 (3.4)	28 (8.6)	<0.001
Private sector	81 (34.5)	23 (25.8)	104 (32.1)	
Unemployed	76 (32.3)	15 (16.9)	91 (28.1)	
Student	53 (22.6)	48 (53.9)	101 (31.2)	
<b>Region of origin</b>				
Centre	104 (44.3)	34 (38.2)	138 (42.6)	0.101
West	52 (22.1)	30 (33.7)	82 (25.3)	
Others	79 (33.6)	25 (28.1)	104 (32.1)	

Residence: all urban (n=324)

Clinical profile of participants: Reproductive health history revealed that the majority of women were at their second or third pregnancy (43.8%), had had one to two deliveries

(41.7%), and had one to two living children (38.6%). In 38.6% of cases, the women had had at least one UA before (Table II). The majority of women (60.5%) presented at the incomplete

**Table II:** Obstetric characteristics of women with complications of abortion at two reference hospitals in Yaounde, in 2023

Variable/ Categories	SA n (%)	UA n (%)	Total n (%)	p
<b>Gravidity</b>				
1	40 (17.0)	30 (33.7)	70 (21.6)	0.0034
2-3	106 (45.1)	36 (40.4)	142 (43.8)	
4+	89 (37.9)	23 (25.8)	112 (34.6)	
<b>Parity</b>				
0	61 (26.0)	39 (43.8)	100 (30.9)	0.003
1-2	100 (42.6)	35 (39.3)	135 (41.7)	
3+	74 (31.5)	15 (16.9)	89 (27.4)	
<b>Living children</b>				
0	69 (29.4)	40 (44.9)	109 (33.6)	0.038
1-2	93 (39.6)	32 (36.0)	125 (38.6)	
3-4	54 (23.0)	14 (15.7)	68 (21.0)	
5+	19 (8.1)	3 (3.4)	22 (6.8)	
<b>Previous UA for G2+ (N1=195, N2=59)</b>				
0	122 (62.6)	34 (57.6)	156 (61.4)	0.298
1	49 (25.1)	13 (22.0)	62 (24.4)	
2+	24 (12.3)	12 (20.3)	36 (14.2)	

SA: Spontaneous abortion, UA: Unsafe abortion, G2+: Two or more pregnancies

abortion stage of the abortion spectrum, and the least proportion (3.1%) with a threatened abortion. The most common complication at presentation was severe or non-tolerated anemia in 15.7% (31.5% in the UA group). This was followed by hemorrhagic shock in 7.4% of cases.

Complications and deaths due to abortion: A third of cases (37.3%) were discharged on the same day. This ratio was much lower (10.1%) in the UA group, in which 41.6% of cases required admission for 5 or more days. We recorded 15/89 deaths (16.9%) in the UA group and none in the spontaneous group ( $p < 0.001$ ). Of the 15 deaths, 06 (40%) were AGYW. No other short-term complications were recorded at discharge (Table III).

Providers and methods of UAs: The patient was the most common provider (59.6%), and the most common method used was medication (46.1%). In the latter group, misoprostol use was prominent (39.0%), and in addition, the medication was unspecified in 46.3% of cases (Table IV).

Measures of disease burden: UA ratio, MM, and DALY due to UA in 2023: The UA ratio was 1.03% overall, with a much higher figure for CHY (2.15%). The proportion of MM attributable to UA was 15.96% (15/94), and the DALYs attributable to UA at the two hospitals in 2023 were 738.16 years. This equates to 8,569.1 years/100,000 live births. We ran a Mann-Whitney U test to compare the distributions of DALY scores between the CHY and the GOPHY. The resulting p-value was 0.421 (Table V).

Sensitivity analyses demonstrated that lower disability weights led to lower YLD and total DALY estimates. However, years of life lost (YLL) remained the dominant contributor, accounting for over 90% of total DALYs across all scenarios. Compared to the primary analysis (disability weight=0.18), total DALYs decreased by 8.5% and 6.9% when disability weights of 0.026 and 0.056 were applied, respectively.

**Table III:** Outcome of treatment of abortion and its complications at two reference hospitals in Yaoundé, in 2023

Variable/Categories	Spontaneous abortion n (%)	Unsafe abortion n (%)	Total n (%)	p
<b>Duration of admission</b>				
< 1 day	112 (47.7)	9 (10.1)	121 (37.3)	<0.001
1-2 days	98 (41.7)	21 (23.6)	119 (36.7)	<0.001
3-4 days	18 (7.7)	22 (24.7)	40 (12.3)	<0.001
5+ days	7 (3.0)	37 (41.6)	44 (13.6)	<0.001
<b>Outcome of treatment</b>				
Complete recovery	235 (100.0)	74 (83.1)	309 (95.4)	<0.001
Death	0 (0)	15 (16.9)	15 (4.6)	<0.001
Other complications	0 (0)	0 (0)	0 (0)	<0.001

**Table IV:** Distribution of cases of unsafe abortion by providers and methods at two reference hospitals in Yaoundé, in 2023

Variable/Categories	Number	Proportion (%)
<b>Providers of unsafe abortion (n=89)</b>		
Patient	53	59.6
Family or friend	4	4.5
Health staff	32	36.0
Others	0	0.0
<b>Methods of unsafe abortion (n=89)</b>		
Endo uterine manoeuvre	21	23.6
Injections	12	13.5
Medication	41	46.1
Traditional	15	16.9
<b>Medications used for abortion (n=41)</b>		
Misoprostol	16	39.0
Levonorgestrel	3	7.3
Others	3	7.3
Unspecified	19	46.3

**Table V:** Unsafe abortion ratio, and indicators of burden of UA at CHY and GOPHY, in 2023

Variable	CHY	Gophy	Total	P
Number of live births in 2023	2,046	6,568	8,614	/
Number of unsafe abortions	44	45	89	/
Total MDs	38	56	94	/
Mds due to abortion	6	9	15	/
Mds due to ua	6	9	15	/
Unsafe abortion ratio	2.15%	0.69%	1.03%	<0.001
Proportion of mds due to ua	15.8%	16.1%	16.0%	/
Ua mortality ratio (/100,000 lb)	293	137	174	/
Yld[DW of infertility 0.18] (years)	37.53	36.22	73.75	/
Yll due to ua (years)	263.03	401.38	664.41	/
Daly (years)	300.56	437.60	738.16	0.421

CHY: Central hospital of Yaoundé, GOPHY: Gyneco-obstetrics and pediatrics hospital of Yaoundé, Md: Maternal death, Ua: Unsafe abortion, yld: Years lived with disability, Yll: Years of life lost, Daly: Disability adjusted life years, LB: Live birth, DW: Disability weight

## Discussion

This study was hospital-based and aimed to assess the burden of UA. The two hospitals of the study receive referrals from other health facilities as well as cases that come directly to them for care. These hospitals do not, at least officially, do voluntary abortions but readily manage the complications of all abortion types, with no reports of legal implications for a woman because she had an UA. This is expected to facilitate the disclosure of UAs and improve their appropriate management. The results showed that 324 cases of complications of abortion were managed, 89 of them classified as UA, based on patient declaration of voluntary termination (sometimes after a revisit when physical findings contradicted), and the absence of an adequate administration and follow-up platform. More than half (60.7%) of cases were aged below 25 (AGYW), and we recorded 15 deaths out of 89 cases in the UA group and none in the SA group. UA contributed to 16% of maternal deaths, and the estimated DALYs were 738.16 years.

Out of 324 cases of complications of abortion, 175 (54%) were managed at the CHY, a purely public hospital, even though this hospital does fewer deliveries than the para-public GOPHY. This may be due to a relationship between low socio-economic status and abortion complications, as suggested by other studies (14). The 27.5% UA proportion based on declaration is similar to the 25.0% reported recently in the same setting, among women consulting for gynecological emergencies, but much lower than the 65.4% reported in 2018 among cases seeking care for abortion complications (15,16). This difference could be due to differences in case definition methods, as some cases registered as SAs may be undisclosed UAs. It may also be due to advances in UA methods, given the increased availability of the safer misoprostol and mifepristone. UAs declared as SA could also account for the differences, making our figure an underestimate.

The modal age range for the UA group (20-24 years,

41.6%) is lower than that of the 25-29 years for the SA group, but is similar to the 20-25 years reported at CHY in 2018, with 41.9% of UAs (16). This may reflect a combination of factors, including child marriages, sex abuse, unemployment, and poorer access to contraception and relatively safe clandestine abortion services at this age bracket (17). Concordantly, AGYW accounted for 60,7% of UAs. This is slightly greater than the 55.4% observed for women seeking post abortion care in the same setting in 2018 (16), and their 40% contribution to UA deaths is slightly higher than the one-third contribution reported globally in 2012 (6).

The higher proportion of single status and students in the UA group and the conspicuous representation of university level of education were also reported by earlier studies in 2018 and 2024 (16,18), and may also reflect a link with low socio-economic level, as well as the high level of education and unemployment in the Capital city of Yaoundé. The high proportion of women from the Center and West regions reflects the demographic weight of these groups in Yaoundé. However, there is a disproportionate representation of women from the West in favor of UA that could associate them with the predisposing factors discussed above.

Women at their second or third pregnancy (43.8%) were most represented in both groups, which is in line with the 53.5% reported earlier among cases of UA among women gravida 2-4 (16). However, the proportions of women with no delivery and no living child are higher in the UA group. This is consistent with an earlier study, in which 37.6% of women with UAs had no children, while a slightly higher proportion (48.1%) had 1-3 children. In our study, 36.0% of women had 1-2 children (16). The reproductive health history revealed that the majority of women were at their second or third pregnancy (43.8%), had had one to two deliveries (41.7%), and had one to two living children (38.6%). In up to 38.6% of cases, women had a history of at least 1 prior UA, and this was represented in both groups. This concurs with the 2023 report,

with a prevalence of past UA of 30.5%, which also reports a modest acceptance of modern contraception of 31.7% after post-abortion counseling (15). This poor uptake of contraception after UA may be due to inadequate counseling and concerns about the side effects of modern contraception.

The majority of women (61.5%) presented at the incomplete abortion stage of the abortion spectrum. This is only slightly lower than the 72% reported in the same setting in 2018 (16). The proportions with septic abortion were 28.1% and 1.7% in the UA and SA groups, respectively. This is because UA often involves intrauterine maneuvers that may lead to more severe bleeding and infection (19).

The most common complication at presentation was severe or poorly tolerated anemia, accounting for 15.7% of cases (31.5% in the UA group). This ties with earlier studies, where the proportion of cases of severe anemia in women with UA were 24.5%-31.4% (16,20), and a recent meta-analysis in Yaoundé that reported severe bleeding in 40% (21). The 2023 report also revealed bleeding was the presenting complaint in 70.7% (15). The proportions of cases with shock and septic abortion (incomplete abortion with signs of infection of uterine content) were also higher in the UA group compared to the spontaneous abortion group. These are probably the effects of intrauterine manipulation involved in some UAs (19). In 7.9% of cases, laparotomy was required for generalized peritonitis; a figure close to the 9% reported by another recent study. Many other complications reported earlier were not observed in our study (21). This may be due to a shift toward the use of misoprostol for UAs (22).

A high proportion of cases (37.3%) were discharged on day one, though this ratio was much smaller (10.1%) in the UA group, where 41.6% of cases required admission for 5 or more days. We recorded 15/89 deaths (16.9%), which equates to a case-fatality rate of 16,900/100,000, in the UA group, and none in the spontaneous group. This is more than 3-fold the average UA mortality of 5% reported in a 2023 meta-analysis in the country (21). Sub-Saharan Africa (SSA) is reported to have the highest abortion case-fatality rates in the world (185/100,000), with great disparities within sub-regions (23). The worst figures are recorded in our sub-region, central Africa (260/100,000), and the least in southern Africa (30/100,000). The reasons advanced for lower figures in southern Africa include the legalization of abortion in most countries, improved management of abortion complications, and an increased clandestine use of misoprostol for abortion (22). The strain of the COVID-19 pandemic on the health system up to 2023 may have contributed to the high mortality in 2023, as many resources were devoted to the pandemic response (24), and patients tended to seek care later due to rumors of obligatory COVID-19 testing. No other short- and mid-term complications were recorded before discharge.

Self-administration of abortion in our study (59.6%) con-

trasts with the 1.8% reported in 2018 in the same setting (16). In the latter study and another 2014 report, paramedics accounted for at least 62% of UA cases managed (16,20). In another 2015 report, health staff provided UA in 84.7% (urban) and 77.2% (rural), and 83% of AUs were performed in health facilities (25). The involvement of health staff was lower (36%) in our study. Another recent study reported 39.5% involvement of physicians in UA (18). These figures suggest a progressive shift to medication abortion by the women themselves, with the progressive recognition of their safety and efficacy (26). The increased availability of internet content and social media may be contributing to this trend.

In line with the above, the most common method was medication (46.1%), with misoprostol being prominent in this subgroup (at least 39.0%), while in many cases (46.3%), the medication used was unspecified. This concurs with a recent report of 58.5% for medical abortion (15). Furthermore, the intrauterine manipulation proportion of 23.6% in our study contrasts with 69.3% reported in 2014 (20). Misoprostol is increasingly available in pharmacies and on the black market in urban areas of Cameroon and is relatively cheap. However, traditional abortion methods prevailed in 16.8% of cases.

The UA ratio was 1.03% overall, with a much higher figure for CHY (2.15%), suggesting a preference for this hospital for the management of UAs rather than deliveries. The proportion of maternal deaths due to UA (15.96%) is within the range of 14.2% - 25% reported earlier in the country (21,27), but much higher than the 9% average reported for SSA (10). The UA mortality rate was 174 per 100,000 live births, more than double the WHO threshold of 80 estimated in 2008 for the Middle Africa region (28). This could be because these hospitals are referral hospitals and tend to receive and manage more complicated cases. A related argument is that these hospitals have seen a decline in simple deliveries due to the opening of numerous small private health facilities in the city over the past few years.

The DALYs due to UA at the two hospitals (with 8,614 births) in 2023 were 738.16 years. This equates to 8,567/100,000 livebirths. The Eastern SSA had its highest DALY rate due to abortion in 2019, amounting to 208.42 per 100,000 (29). Even though the arguments suggested for a high UA mortality ratio also apply to the DALYs to livebirth ratio, the figure observed here is substantial and probably reflects the involvement of younger women. According to a 2006 report, UAs cause an estimated 5 million DALY losses each year (30). There has been a decline in abortion related morbidity and mortality globally since then, even though progress has been slow in SSA. This study demonstrates that the estimated burden of disease is robust to variations in disability weight assumptions. While lower disability weights, as reported in more recent studies, reduced YLDs and overall DALYs, the total burden remained largely driven by YLL.

This finding suggests that, in this setting, mortality contributes more substantially to disease burden than morbidity. Consequently, although the choice of disability weight influences absolute estimates, it does not materially affect the overall interpretation of the results.

However, the interpretation of the UA ratio and DALY reported here should take into account that these are referral hospital-based estimates, likely reflecting the selection of complicated cases, and that some basic statistical data may be estimated based on assumptions.

**Strengths and limitations of this study:** In this study, we provide a more comprehensive assessment of the consequences of UA by using measures that account for the ages at which complications occur. We worked at two health facilities with high patient flow for referrals and with good records for abortions and maternal deaths.

As a hospital-based study, our findings may not accurately reflect what occurs in the community or lower-level health facilities. Furthermore, this study was conducted in two of the five major referral health facilities, and no clearly defined catchment areas exist for each facility. This made it difficult to determine a clear denominator, necessitating reliance on ratios. The retrospective nature of the study made it liable to missing and record-related errors. These factors may have influenced our findings.

The classification of cases as UA was based on declaration. Even though efforts are made to reassure these women, some statements may not be entirely accurate due to the stigma attached to UA in our context. The estimation of standardized life expectancy by age and disability due to infertility was based on recognized assumptions, as exact figures could not be obtained.

## Conclusion

Unsafe abortions remain highly prevalent, especially among AGYW and single women, with a high mortality from complications at the CHY and GOPHY. In most cases, unsafe abortion was self-induced, most commonly using medication, notably misoprostol. Complications contribute substantially to maternal mortality and to the overall burden of disease, as reflected by the high disability-adjusted life years' estimates recorded at two referral hospitals (CHY and GOPHY).

These findings underscore the need for a national evaluation and strengthened adolescent reproductive health services, including expanded access to sexuality education and contraception, especially reversible methods for AGYW not intending pregnancy. Efforts should focus on adolescent-friendly care, stigma reduction, and improved quality of management of abortion-related complications through standardized protocols, provider training, and adequate resource availability.

## Declarations

*Ethics approval and consent to participate:* All participants provided written informed consent before enrollment in the study. The study was reviewed and approved by the National Ethics Committee of Cameroon (Ethics approval reference number: 2024/08/1709/CE/CNERSH/SP, date 25.06.2024). All procedures were performed in accordance with the Declaration of Helsinki.

*Availability of data and materials:* The data supporting this study are available through the corresponding author upon reasonable request.

*Competing interests:* The authors declare that they have no competing interests.

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*Authors' contributions:* Dr. EBONG, Pr. DOHBIT, and Pr. BEDIANG raised the presented idea and designed the study. Dr. EBONG, Dr. AKELEKEH, and Dr. ATECHI conducted the data collection and analyses. Dr. EBONG and Dr. TOMPEEN developed the first draft of the manuscript. Dr. MBOUA and Dr. NGO DINGOM participated in data collection and interpretation of results. Pr. ESSIBEN, Dr. ASAH, and Dr. NJOUMEMI critically revised the manuscript. Pr. FOUEDJIO and Dr. EBONG obtained the financial support for the project. All authors contributed to the writing of the paper, and have read and approved the final manuscript.

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