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Title: An assessment of post-abortion care in the Douala Gyneco-Obstetric and Pediatric Hospital, Cameroon.

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3. **Abstract**

Unsafe abortion contributes to 13% maternal deaths worldwide and 25% in Cameroon (MMR = 782). Post abortion care (PAC) components include; emergency treatment, counselling, contraception, linkage and community partnership. In order to characterize abortion and predictors of severity and PAC contraception uptake, we conducted this cross-sectionalstudy in the Douala Gyneco-Obstetric and Pediatric Hospital (DGOPH)from January to December 2017.The results were analyzed using epi info software with p-value < 0.05 considered statistically significant.A total of 142 patients were studied with a mean ageof31.4years,and over 65%were married,educated, multiparousas well as those in first trimester.Misoprostol alone was used in 52%cases with 30% having complications out of which 79% werefrom hemorrhage. Uptake of contraception was 49% with intrauterine devices, condoms and implants as main choices. There were significant associations between; seeking care early and multiparity (OR = 25, p-value = 0.012), incurring complications and young age, uneducated, unmarried, primiparity and seeking care late (p-value < 0.05), as well as contraception uptake and younger maternal age (OR = 5, p-value = 0.000).We recommend the integration of PAC services, provide a specific room for aspiration, reduce costand reinforce advocacy for safe abortion in Cameroon.

4. **Keywords:**Unsafe abortion, post abortion care (PAC), misoprostol, contraception, DGOPH
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Introduction

The termination of apregnancy before the age of viability of the fetus is considered an abortion. This corresponds to a gestational age of less than 28 weeks or a birth weight of less than 1000g in developing countries such as Cameroon. Abortion can be spontaneous or induced.[1,2] It can equally be classified as early (less than 13weeks gestational age) or late (more than 12 weeks) abortions. Finally, abortion can be safe or unsafe. The World Health Organization (WHO) defines unsafe abortion as one done either by an individual lacking the necessary training or in an environment not conforming to minimal medical standards or both.[3]

Abortion is a major public health problem especially in developing countries, resulting in severe complications including maternal death.[4] Globally, it is estimated that one in every five (20%) pregnancies ends up in an abortion.[4] According to WHO, in 2018, about 56 million abortions occurred worldwide each year, with over 25 million (45%) of them being unsafe.[4,5]Of the13% of maternal deaths attributed to unsafe abortions, 62% are from sub-Saharan Africa.[6,7] Worldwide, an estimated 7 million complications result from unsafe abortions.[5] These alarming figures reported in developing countries aredue to three major factors; 1) low uptake of modern contraceptive methods resulting in unintended pregnancies 2) restrictive laws leading to high unsafe abortions, and 3) inadequate access to quality post-abortion care (PAC) with ensuing complications and ultimately maternal death.

Post abortion care is a package of five activities directed at women suffering from incomplete abortion. These include: 1) the emergency management of complications related to abortions such as bleeding and infection; 2) offer family planning and birth spacing counselling as well as the emotional and physical needs of the patient; 3) the provision of modern methods of contraception; 4) linkage to other reproductive health care services such as screening for sexually transmissible infections and gynecological cancers; and 5) facilitate her social reinsertion and prevent future unsafe abortion cases via provider-community partnership.[8]PAC through manual vacuum aspiration (MVA) of retained products of conception is one of the seven signal functions of basic emergency obstetric and newborn care (BEmONC).[9]

According to DHS-MICS 2011, the maternal mortality rate (MMR)of Cameroon which stands at 782 maternal deaths per 100.000 live births has been on the rise for over two decades now.[10]Abortion and its complications account for about 30% of total maternal deaths.[11,12,13] About 40% of pregnancies are unwanted, thus increasing the need for abortions.[16]Abortion laws in Cameroon are very restrictive. The termination of pregnancy is legal only in cases of rape and to save the life of a pregnant woman.[14] These women thus seek for clandestine abortions which are unsafe.[13,15] This strict legislation against voluntary abortion coupled with the low uptake of modern contraceptive methods contribute to the high level of unsafe abortions in the country.[7] All these slow down the arrival of these cases of abortion to the hospital, increase the cost of their care and hospital stay and exposes them to more complications such as severe bleeding, sepsis, peritonitis, genital tract trauma, secondary infertility, psychological trauma and death.[11,16,17] Since committing to the family planning (FP) 2020 initiative in 2014, the modern contraceptive prevalence rate (CPR) of Cameroon has risen from 14% in 2011 to 19.3% in 2017 while the unmet needs of family planning increased from 18% in 2011 to 33.8% in 2017.[10,18]It is known that one of the pillars to successfully reducing maternal mortality is through the reduction of unwanted pregnancies.[19,20] In a country like Cameroon, where all previous measures implemented over the decades have failed to curb the MMR, ignoring a determinant factor such as contraception, can only render the fight more difficult to win. Another strategy to fight maternal deaths is to offer comprehensive abortion care where possible. It entails providing safe abortion, where country laws permit and quality PAC.

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The Douala Gyneco-Obstetric and Pediatric Hospital (DGOPH) is a tertiary level,university teaching hospital, located in the Japoma health district of Cameroon.[21] It was created in 2015 to offer state of the art mother and child healthcare in the country and thus contribute effectively in curbing the high maternal and neonatal mortality rates. As a referral health facility (HF) in reproductive health, the DGOPH offers amongst other services, a complete package of post abortion care. Nonetheless, and despite the high quality and quantity of its reproductive health personnel and equipment, users have forwarded several reasons why they prefer attending less-qualified surrounding health facilities for care. These include; the long distances (more than 10km) covered to reach the hospital, the relatively high cost of hospital care and the slow and tiring administrative procedures to be fulfilled prior to getting care. With a family planning unit in outpatient and modern contraceptives not available at the inpatient emergency care units, the continuum of PAC is not guaranteed. More often, the patients are given a two weeks appointment for post abortion contraception, unlike per current recommendations that contraception should be offered before the client leaves the health facility. This increases the chances of loss to follow up.

Several studies have been conducted in major hospitals in Cameroon on induced and incomplete abortions and their complications.[7,13,22,23] However, none of such studies has been conducted at the DGOPH. Although a number of these studies carried out in Cameroon have brought interesting and relevant evidence, they haveseldom assessed post abortion contraception uptake or its predictors.[7,13,22]We therefore aimed at assessing PAC as practiced at the DGOPH. Our specific objectives were; 1) to describe the socio-demographic characteristics of patients consulted for abortion at the hospital, 2) to list the complications incurred, as well as the methods used to manage abortions in this facility and 3) to analyze the predictors of seeking care, developing severe post abortion complications and uptake of post abortion contraception. It is hoped that our findings will permit us understand PAC and make evidence-informed recommendations to the management, clinicians and researchers of the DGOPH and Japoma health district. In so doing, we will be contributing to reduce maternal mortality in Cameroon.

Methods:

Study design and population

We conducted a cross sectional study at the Douala Gyneco-Obstetric and Pediatric Hospital (DGOPH) for a period of one year, from January 1st to December 31st 2017. The study population included all patients who consulted for post abortion care at the hospitalduring that period.

Sample size estimation was gotten by using the Lorentz formula:

$n = (Z^2)P(1-P)/d^2$

Where n = minimum sample size, Z = statistic for 95% confidence interval (1.96), P = expected prevalence of abortions in Cameroon (16%) and d = degree of precision (5)

$n = (1.96)^2(16)(100-16)/(5)^2 = 207$

Data collection

A pre-tested anonymous questionnaire, on which routine data was filled by Gynecologist-Obstetriciansusing patients physical and electronic files as well as family planning and post abortion care registers. This data was entered into an excel spreadsheet made for that purpose prior to analyses.

Inclusion and exclusion criteria

Included in the study wereall patients consulted at the DGOPH with a diagnosis of abortion, for whom complete files were found during the study period. However, we excluded all those with incomplete files and patients who refused care. Eligible cases were systematically and continuously enrolled into the study.

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Study variables

The following three groups of variables were studied in univariate analysis: 1) Baseline socio-demographic characteristics of the women which included; maternal age in years, marital status (single, married or divorced), level of education (none, primary, secondary or university) and occupation (working class, house wives, students or none). 2) Obstetric characteristics of the patients comprisedof parity (primigravidae, secundigravidae and multigravidae) and gestational age of the indexed pregnancy (first trimester < 13weeks or second trimester ≥ 13 weeks).3) Clinical characteristics and management outcomes at the DGOPH, was composed of; the chief complaints of the patients (vaginal bleeding, pelvic pain, discharge or others), the time to seek care at the DGOPH (early if less than 1 week, late if after 2 weeks and very late if more than 2 weeks), working diagnosis after confirmatory ultrasound which could either be complete or incomplete abortion, technique used for uterine evacuation (surgical alone using either manual or electric vacuum aspiration, medical alone using misoprostol 600mg tablets orally or in combination), antibiotics prescribed (oral, injectable or combined) or not, blood transfusion received or not, early complications incurred (anemia, shock, infection, fistula and maternal death), uptake and choice of post abortion contraceptive method (none, male condoms, oral pills, injectables, implants, intrauterine devices and tubal sterilization) and finally, the length of stay in the hospital after PAC.

Baseline exposure variables were used to test for four possible associations using bivariate analyses. These outcome variables included; 1) time taken from onset of symptoms to seeking PAC at the DGOPH, 2) post abortion complications incurred at the time of PAC or after it, 3) average length of stay (ALOS) in hospital as well as post abortion complications incurred, and 4) uptake of post abortion contraception.

Data analyses

The data collected was entered into an excel 97-2003 spreadsheet. The results were analyzed using the epi info software 2012, version 3.5.3. **Univariate analysis**of proportions was done for each study variable. However, associations between exposure and outcome variables were assessed by running **bivariate analyses** using 2x2 tables and unconditional logistic regressions. Strengths of associations were assessed using the odds ratios (OR) while the chi squared test and Fisher exact test were used to derive p values. A p-value < 0.05 was considered statistically significant.

Ethical Considerations

Administrative authorization to carry out this study was obtained from the management of the DGOPH. Anonymity and confidentiality were respected by coding all files. Ethical clearance was gotten from the Institutional Review Board (IRB) of the Institute of Tropical Medicine (ITM), Antwerp in Belgium.

Results

A total of 900 patients were consulted for conditions related to pregnancy at the DGOPH during the study period. From these, 15.8% (n=142) were managed for PAC.

Univariate analyses

The age range was 19 – 44years with a mean age of 31.4years and a standard deviation of 6.6. Amongst these patients, 62% were in the 30-39years age group, 69% were married, 44% belonged to the working class and51% had university education (Table 1).

Table 1.Socio demographic characteristics of patients.

Characteristics	**n (%)**
All patients managed for PAC	142 (100)
Age group, years: mean = 31.4 years, SD = 6.6	
≤ 19	9 (6.3)
20-29	35 (24.6)
30-39	88 (62.0)
≥ 40	10 (7.1)
Marital status	
Single	44 (31)
Married	98 (69)
Divorced	0
Occupation	
Working Class	69 (43.7)
House wife only	46 (32.4)
Student	25 (17.6)
None	9 (6.3%)
Level of education	
Primary	21 (14.8)
Secondary	49 (34.5)
University	72 (50.7)

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Table 2: Obstetrical and outcome characteristics.

Characteristics	n (%)
All patients managed for abortion care (PAC)	142 (100)
Parity	
0	24 (16.9)
1-4	106 (74.6)
>4	12 (8.5)
Gestational age, weeks	
< 13	98 (69)
≥ 13	44 (31)
Time from onset of symptoms to DGOPH, days	
0-6	93 (65.5)
7-14	29 (20.4)
>14	20 (14.1)
Chief complaints	
Bleeding	109 (76.8)
Pelvic pain	10 (7)
Vaginal discharge	9 (6.3)
Other symptoms	14 (9.9)
Working diagnosis	
Incomplete abortion	107 (75.4)
Complete abortion	11 (7.7)
Septic abortion	9 (6.3)
Missed abortion	5 (3.5)
Blighted ovum	10 (7)
Genital tract trauma	0

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Close to 17% of the patients were in their first pregnancies with the majority being multiparous. Concerning the indexed pregnancies, 69% of the abortions occurred in the first trimester. Over 34.5% of the patients arrived the DGOPH more than a week after the symptoms had started. Per vaginal bleeding (76.8%) represented the most common symptom, followed by pelvic pains and vaginal discharge. Incomplete abortion was the working diagnosis in 75% of cases. It is worth noting that septic abortions, blighted ovum and missed abortion were all managed in the same way as incomplete abortions(Table 2).

Method used for uterine evacuation

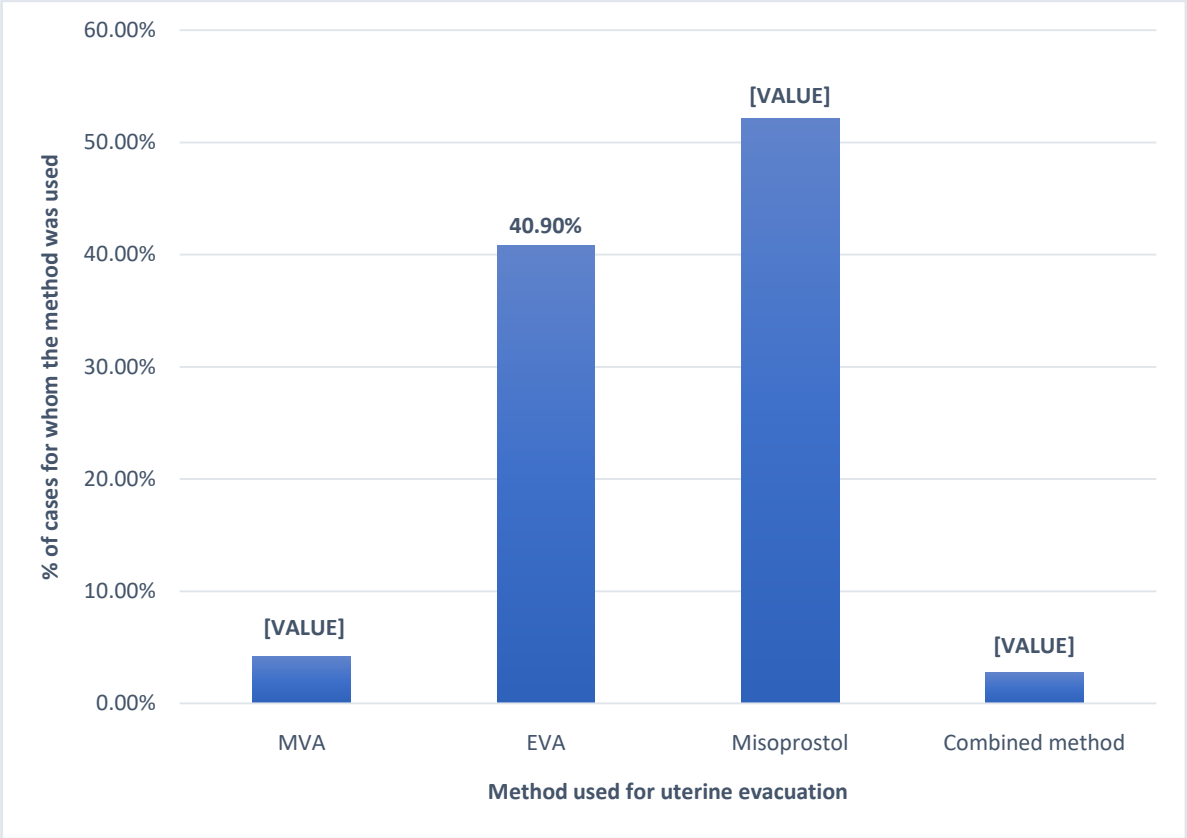

Figure 1. Types of methods used for uterine evacuation of abortion cases at the DGOPH in 2017

Misoprostol alone was the most applied method of uterine evacuation (52.1%), while surgical methods were used in 47.9% cases (Figure 1). During and after management, 96.5% of the patients received oral or injectable antibiotics while only 9.2% of them benefited from blood transfusion. (Table 3).

Complications incurred

Over 30% (n = 43) of the patients presented with early complications resulting from these abortions. Hemorrhage represented about 79% of the complications, followed by pelvic infection (21%). No abortion related maternal deaths were recorded. Meanwhile, the average length of stay (ALOS) in hospital was 2.1 days (Table 3).

Uptake of post abortion contraception

Uptake of modern contraception was 49.3% (n = 70) in 2017. The intrauterine device was the most preferred method (30%), followed by male condoms and intradermal implants(Table 3).

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Table 3:Management and outcome characteristics.

Characteristics	n (%)
Method of uterine evacuation	
Manual vacuum aspiration (MVA)	6 (4.2)
Electric vacuum aspiration (EVA)	58 (40.8)
Misoprostol	74 (52.1)
Combined method	4 (2.8)
Antibiotics prescribed	
Oral	77 (54.2)
Injectable	21 (14.8)
Combined	39 (27.5)
None	5 (3.5)
Blood transfusion	
Yes	13 (9.2)
No	129 (90.8)
Early complications present	
None	99 (69.7)
Anemia	26 (18.3)
Hemorrhagic shock	8 (5.6)
Sepsis	9 (6.3)
Maternal death	0
Duration of hospital stay, days	
0	8 (5.6)
1-3	124 (87.3)
>3	10 (7.1)
Choice of post abortion contraception	
Condom	15 (10.6)
Oral contraceptive pill (OCP)	13 (9.2)
Injectable contraceptive pill	6 (4.2)
Implant	15 (10.6)
Intrauterine device (IUD)	21 (14.8)
None	72 (50.7)

Bivariate analyses for predictors

The odds of arriving the DGOPH early was 25 times more if the woman was multiparous than if she was primiparous, and this association was statistically significant (95% CI: 0.0 – 0.5, p value = 0.012). However, though the chances of arriving early in the hospital were 1.52 times higher for educated women than for the uneducated (95% CI: 0.59 – 3.90), this association was not statistically significant (p value = 0.383).

Table 4: Associations between baseline characteristics and early post abortion complications.

Characteristics		Crude OR (95% CI)	P value
Age group:	< 25 years	13.4 (1.8 – 102.8)	0.012
Level of education:	At most primary	10.6 (1.4 – 82.0)	0.023
Marital status:	Single	15.1 (3.5 – 66.0)	0.000
Occupation:	Unemployed	1.1 (0.2 – 6.4)	0.778
Parity:	Primiparous	10.7 (2.4 – 47.0)	0.002
Gestational age:	Second trimester	0.5 (0.2 – 1.0)	0.056
Time to seek care:	Early < 1 week	0.4 (0.2 – 0.9)	0.019

The odds of presenting with early post abortion complications were significantly higher if the woman had any of the following characteristics; being younger than 25years, uneducated, single, primiparous and seeking care at DGOPH more than one week after onset of symptoms ($p < 0.05$). There was equally a statistically significant association between having a complication and the duration of stay in the hospital ($p = 0.023$). (Table 4).

Table 5: Bivariate analysis of associations between baseline factors and post abortion contraception.

Characteristics	No post abortion contraception uptake. N (%)	Post abortion contraception uptake. N (%)	Crude OR [95% CI]	P value
Age group (years)				
< 25	5 (6.9)	20 (28.6)	5.4 [1.9 – 15.3]	0.000
≥ 25	67 (93.1)	50 (71.4)	1.0	
Level of education				
At most Primary	12 (16.7)	9 (12.9)	0.7 [0.3 – 1.9]	0.523
At least Secondary	60 (83.3)	61 (87.1)	1.0	
Marital status				
Single	17 (23.6)	27 (38.6)	2.0 [1.0 – 4.2]	0.050
Married	55 (76.4)	43 (61.4)	1.0	
Occupation				
Unemployed	18 (25)	16 (22.9)	0.9 [0.4 – 1.9]	0.765
Employed	54 (75)	54 (77.1)	1.0	
Parity				
0 - 1	14 (19.4)	22 (31.4)	1.9 [0.9 – 4.1]	0.101
≥ 2	58 (80.6)	48 (68.6)	1.0	
Gestational age				
< 13 weeks	48 (66.7)	50 (71.4)	1.3 [0.6 – 2.6]	0.540
≥ 13 weeks	24 (33.3)	20 (28.6)	1.0	

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There was a statistically significant association between age group and taking up a modern method of contraception. Younger women (< 25years) were 5.4 times more likely to take up modern post abortion contraception than their older counterparts (95% CI: 1.9 – 15.3, p value < 0.05,). There were no significant associations between the other baseline and obstetrical characteristics and uptake of post abortion contraception. (Table 5).

Discussion

During the 12 months of 2017, a total of 142 patients were consulted for PAC at the DGOPH. This represents 15.8% of all pregnancy-related consultations (N=900). This abortion rate was comparable to those reported in two tertiary hospitals in Yaounde, Cameroon (16-26.3%).[7,13]

Analysis of certain baseline characteristics showed that more than two thirds of the patients were older than 30 years, married, educated up tosecondary level, employed, multiparous and in the first trimester. These findings corroborate those reported in Yaounde, except for the predominant age group which was 20 – 29 years.[7,24,25] This discrepancy is because patients consulting this health facility are of the working class and have a higher socio-economic level that permits them to afford the higher PAC fees.

More than one third of the cases arrived the hospital more than a week after the onset of symptoms. These is because most often, these patients first consult lower health facilities or are referred late to the DGOPH.The determinants for these late arrivals are lack of awareness, high cost of care and geographical inaccessibility of this hospital. Multiparous women sought care more rapidly than the primiparous. This could be due to their higher awareness level on health issues as reported by a big national study in Kenya on factors associated with delays in seeking PAC among women.[26]

There were 30% abortion-related complications, with 79% due to severe bleeding. This complication rate is higher than those reported in Yaounde (20%) and in urban Ghana (18%).[7,25] The main reason is the late arrival of the patients in the hospital. The absence of maternal death could either be attributed to the high quality of care offered in this specialized health facility or to the fact that more severe cases did not arrive the DGOPH. This was not the case in Nigeria where case fatality rates of 9-11.5% have been reported.[27,28] The significant association between having complications and being single, young and uneducated could be due to their late arrival in the hospital for economic and awareness reasons. However, developing severe complications were rather associated with being married and seeking lower level care in Ethiopia.[29]

We found a modern post-abortion contraception uptake of 49.3%. Our results are below those reported in urban Ghana (56%), in rural Kenya (76%) and in two multicentered studies involving several African and Asian countries, which found post abortion FP uptakes of between 73-77%.[24,25,30,31] This low contraception uptake can be explained by the non-integration of PAC, the high cost of family planning and non-delivery of contraception before the patient leaves the hospital. The first three preferred methods of contraception were; IUD, male condoms and implant, while in all the above three studies, OCP, injectables and male condoms were the methods of choice by the women. Women of advanced ages tend to prefer long acting reversible contraception since in most cases, they would have already attained their desired family sizes as was the case in our study.[24,25,31]

From our results, women aged atleast 25years had a 5 times higher chance of not taking up FP methods. This could be due to the small sample size of our study. These findings do not corroborate with those found in Ghana, where adolescent girls had six times higher odds of not choosing a modern method of post abortion contraception.[25]The WHO recommends that first trimester uncomplicated incomplete abortions can be well managed by trained midwives and nurses, but also, some studies have shown that women are more likely to receive a post abortion family planning method if the PAC was provided by midwives compared to physicians.[24,32,33]

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Some gaps exist in the practice of PAC at the DGOPH which therefore make the utilization of these services by the needy population inadequate. These deficiencies include; difficulties in geographical and financial access, no task shifting as PAC is offered exclusively by gynecologists, lack of specific room for holistic PAC, insufficient linkage to other RH services and complete lack of community mobilization and partnership.

Some limitations of our study include; the relatively small sample sizeof our study population due to the low utilization of the hospital, the short study period of one year, selection bias by working only with hospital data and not the general population, the possibility of information bias through incomplete routine data. Finally, by not including data on PAC from neighboring health facilities, makes it difficult for us to better understand and explain our findings.

Conclusions:

Unsafe abortion remains a major health problem in Cameroon resulting in severe maternal complications. Our study sought to explore the burden of abortions as well as predictors to severity and contraception uptake at the DGOPH. Though the burden was lower than national average, more severe complications were registered and these were found to be more frequent in the less privileged, uneducated and single clients. However, younger women opted more for modern contraception. We recommend that the hospital management should constantly avail PAC commodities, reduce the cost, sensitize and capacitate its providers on PAC, provide for specific room for uterine evacuation and method mix contraception as well as organizing outreach activities in communities and surrounding health facilities aimed at encouraging early referrals. Despite the numerous efforts made by the hospital administration and Cameroon government towards quality PAC, advocacy for less restrictive abortion laws should be pursued.

Conflict of interest: All authors declare no conflict of interest in carrying out and publishing this research.

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References:

1. World Health Organization. Clinical practice handbook for safe abortion. Geneva: WHO; 2014. 72 p.
2. Grimes DA, Benson J, Singh S, Romero M, Ganatra B, Okonofua FE, and Shah IH.Unsafe abortion: the preventablepandemic. Lancet. 2006;368:1908-19.
3. Ganatra B, Gerdts C, Rossier C, Johnson Jr BR, Tunçalp O, Assifi A, Sedgh G, Singh S, Bankole A, Popinchalk A, Bearak J, Kang Z, and Alkema L. Global, regional, and sub regional classification of abortions by safety, 2010–14: estimates from a Bayesian hierarchical model. Lancet. 2017;390:2372-81.
4. Sedgh G, Bearak J, Singh S, Bankole A, Popinchalk A, Ganatra B, Rossier C, Gerdts C, Tunçalp O, Johnson Jr BR, Johnston HB and Alkema L. Abortion incidence between 1990 and 2014: global, regional, and sub regional levels and trends. Lancet. 2016;388:258-67.
5. World Health Organization [Internet]. Geneva: Preventing unsafe abortion, Fact sheet; c2018 – [cited 2018 Mar 25]. Available from: http://www.srhr.org/abortion-policies.
6. World Health Organization. Safe abortion: technical and policy guidance for health systems, Geneva: WHO; 2012. 134 p.
7. KemfangNgowa JD, Neng HT, Fokom JD, Nsahlai CJ, andKasia JM. Voluntary induced abortion in Cameroon: Prevalence, reasons and complications. Open Journal of Obstetrics and Gynaecology. 2015;5:475-80.
8. Post abortion care (PAC) Consortium task force. Essential elements of post abortion care: Service delivery, barriers and resources. New York: Post abortion care Consortium. 2014; 11 p.

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9. Tiruneh GT, Karim AM, Avan BI, Zemichael NF, Wereta TG, Wickremasinghe D, Keweti ZN, Kebede Z, and Betemariam WA. The effect of implementation strength of basic emergency obstetric and newborn care (BEmONC) on facility deliveries and the met need for BEmONC at the primary health care level in Ethiopia. BMC Pregnancy Childbirth. 2018;18:123. doi: 10.1186/s12884-018-1751-z. PubMed PMID: 29720108; PubMed Central PMCID: PMC5932776.
10. National Institute of Statistics. 4th Demographic and Health Survey (DHS - MICS) – Cameroon. Yaounde: Cameroon Ministry of Economy Planning and Territorial Development; 2011. 576 p.
11. Kamga DVT, Nana PN, Fouelifack FY, andFouedjio JH. Contribution of abortions and ectopic pregnancies in the maternal mortality of three university teaching hospitals in Yaounde. Pan Afr Med J. 2017;27:248. doi: 10.11604/pamj.2017.27.248.12942. PubMed PMID: 28979649; PubMed Central PMCID: PMC5622819.
12. Foumane P, Chiabi A, Kamdem C, Monebenimp F, Dohbit JS, andMbu RE. Sexual activity of adolescent school girls in an urban secondary school in Cameroon. J ReprodInfert. 2013;14:85-9.
13. Nkwabong E, Bechem E, andFomulu JN. Outcome of clandestine abortions in two university teaching hospitals in Yaounde, Cameroon. Health Sci Dis. 2014;15:1-4.
14. Cameroon penal code of 2016, Law Nº 2016/007, Chapter IV, Sections 337 and 339. 129-130 (July 12, 2016).
15. Tameh TY, Fouelifack YF, andFomulu JN. Modern contraceptive choices among patients seen at the "Cameroon National Planning Association for Family Welfare" Yaounde - Cameroon. Clin Med Insights Reprod Health. 2017;11:1177-9.
16. Udoh A, Effa EE, Oduwole O, Okusanya BO, andOkafo O. Antibiotics for treating septic abortion: systematic review. Cochrane DatabaseSystRev. 2016;7. doi: 10.1002/14651858.CD011528.pub2.
17. Ngandji A, Ngo Um EJ, Fokom J, Wandji B, andFoumane P. Incidental laparoscopic discovery of an intraperitoneal plastic catheter 16 years after an unsafe abortion: A case report from the gynecologic, obstetric, and pediatric hospital of Yaounde (Cameroon). Case Rep Obstet Gynecol. 2017; doi.org/10.1155/2017/7130479. PubMed PMID 7130479.
18. Family Planning 2020 Initiative [Internet]. Yaounde: Cameroon government commitment; c2017 [cited 2018 May 15]. Available from: http://www.familyplanning2020.org/countries.
19. Gemzell-Danielsson K, Kopp Kallner H, andFaundes A. Contraception following abortion and the treatment of incomplete abortion: A FIGO initiative. Int J Gynaecol Obstet. 2014;126:S52–5.
20. Mugore S, Kassouta NTK, Sebikali B, Lundstrom L, andSaad A. Improving the quality of post abortion care services in Togo increased uptake of contraception. Glob Health SciPract. 2016;4:495-505.
21. Mbengue S, Salamatou M, andEvouna B. Japoma health district annual activities report for 2016. Retrieved in manuscript from the Japoma District Health Service. 30 p.
22. Tumasang F, Leke RJI, andAguh V. Expanding the use of manual vacuum aspiration for incomplete abortion in selected health institutions in Yaounde, Cameroon. Int J GynaecolObstet. 2014;126:S28-S30.
23. Bain LE,andKongnyuy EJ. Eliminating the high abortion related complications and deaths in Cameroon: the restrictive legal atmosphere on abortions is no acceptable excuse. BMC Women's Health. 2018;18:71. doi.org/10.1186/s12905-018-0564-6. PubMed PMID: 29793462; PubMed Central PMCID: PMC5968528.
24. Makenzius M, Oguttu M, Klingberg-Allvin M, Gemzell-Daniellson K, Odero TMA, andFaxelid E. Post-abortion care with misoprostol – equally effective, safe and accepted when administered by midwives compared to physicians: a randomised controlled equivalence trial in a low-resource setting in Kenya. BMJ Open. 2017;7:e016157. doi:10.1136/ bmjopen-2017-01615.
25. Rominskia SD, Morheb ESK, andLoric J. Post-abortion contraception choices of women in Ghana: A one-year review. Glob Public Health. 2015;10:345-53.
26. Mutua MM, Maina BW, andIzugbara CO. Factors associated with delays in seeking post abortion care among women in Kenya. BMC Pregnancy Childbirth. 2015;15:241. doi: 10.1186/s/2884-015-0660-7.

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27. Rabiu KA, Omololu OM, Ojo TO, Adewunmi AA, andAlugo BG. Unsafe abortion in Lagos, Nigeria: a continuing tragedy. Niger Postgrad Med J.2009;16:251-5.
28. Kalu CA, Umeora OU, andSunday-Adeoye I. Experiences with provision of post-abortion care in a university teaching hospital in south-east Nigeria: a five-year review.Afr J Reprod Health. 2012;16:105-12.
29. Gerdts C, Prata N, andGessessew A. An unequal burden: risk factors for severe complications following unsafe abortion in Tigray, Ethiopia.Int J GynaecolObstet. 2012;118:S107-12.
30. Benson J, Andersen K, Brahmi D, Healy J, Mark A, Ajode A, andGriffin R. What contraception do women use after abortion? An analysis of 319,385 cases from eight countries. Glob Public Health. 2018;13:35-50.
31. Benson J, Andersen K, Healy J, andBrahmia D. What factors contribute to post abortion contraceptive uptake by young women? A program evaluation in 10 countries in Asia and sub-Saharan Africa. Glob Health SciPract. 2017;5:644-57.
32. World Health Organization. Health worker roles in providing safe abortion care and post-abortion contraception. Geneva: WHO; 2015. 92 p.
33. Maxwell L, Voetagbe G, Paul M, andMark A. Does the type of abortion provider influence contraception uptake after abortion? An analysis of longitudinal data from 64 health facilities in Ghana. BMC Public Health. 2015;15:586-94.

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