COMPLICATIONS OF INDUCED ABORTION COMPARED TO THOSE OF SPONTANEOUS ABORTION IN YAOUNDÉ-CAMEROON: A COHORT STUDY

Fouedjio Jeanne Hortence, MD, MPH[1,2], Teufack Patrick, MD[1], Fouelifack Ymele Florent,MD, MPH[2,3], Ebong Cliford,MD, MPH[1,2], Foumane Pascal, MD[1,4]

ABSTRACT

BACKGROUND: Induced abortion is a major public health challenge worldwide particularly in developing country. It is one of the leading causes of maternal death. However some spontaneous abortions can also lead to major complications.

OBJECTIVE: To compare the complications of induced abortion with those of spontaneous abortion in Yaoundé.

METHODOLOGY: The researchers conducted a cohort study from November 1st 2019 to May 31st, 2020 with prospective data collection in the gynecology departments of the Yaoundé Gyneco-Obstetric and Pediatric Hospital and the Yaoundé Central Hospital. . The participants were all patients admitted for abortion and who gave their informed consent. All patients known to have co-morbidities were excluded because it could be confused with one or more complications of abortion. Patients lost during the period of follow-up were also excluded. Sampling was consecutive and exhaustive, with a minimum sample size calculated of 40 participants for each group. The questionnaire was used to collect the data which were analyzed using SPSS 23.0. To compare the different observations, the Odds Ratio with 95% confident interval and the significance threshold was set at less than 5%.

RESULTS: A total of one hundred and fifteen (115) abortion cases were included during our study period: 56 for the induced abortion group and 59 for the spontaneous group. Patients with induced abortion were significantly younger than those with spontaneous one (median age: 24 years [20-30] vs. 28 years [24-32]; p = 0.013). Clinically, fever was significantly more common in induced abortion group (28.6%) than in spontaneous one (6.8%) (p= 0.004). The rate of complication was higher in the induced abortion group. Induced abortion increases the risk of sepsis by 4.48. Some complications were observed only in cases with induced abortion, namely uterine perforation (8.9%), pelvic peritonitis (7.1%), septic shock (3.6%) and intestinal lesions (1.8%). However, haemorrhage and anaemia were observed in both groups with no significant difference. In terms of management, induced abortion carries twice the risk of blood transfusion (p = 0.030). The overall post-abortion contraceptive use rate was only 40.9%. In terms of prognosis, the lethality rate was 3.6% among patients with induced abortion.

CONCLUSION: Induced abortion, compared to spontaneous abortion, is the prerogative of adolescents. Abortion remains a major provider of maternal morbidity and mortality in the poor settings, where the unmet needs of contraception are high. We recommend a full implementation of post abortion care.

KEYWORDS: Induced abortion, spontaneous abortion, miscarriage, infection, maternal death, family planning

(The Ethiopian Journal of Reproductive Health; 2022; 15;31-40)

1 Faculty of Medicine and Biomedical Sciences, University of Yaounde I
2 Gyneco-Obstetric Unit, Central Hospital of Yaounde
3 Institute of medical technologies Nkolondom
4 Yaoundé Gyneco-obstetric and pediatric Hospital

INTRODUCTION

Abortion refers to the expulsion of the product of conception before the age of viability which according to WHO is 22 weeks gestation. It is termed induced abortion when it results from the deliberate action of the woman or a third party; and spontaneous (or miscarriage) if it occurs without any deliberate action[1].

Induced abortion is a major public health problem worldwide, with a prevalence in the general population of 7-16%[2]. It is the fifth leading cause of maternal death, accounting for 13%[3]. A recent study estimates that during the period 2010-2014, 55.7 million abortions took place each year worldwide[4]. Miscarriage is the most common complication during pregnancy with an estimated prevalence of 12-16%[5]. In Africa, data on abortion have limitations: on the one hand, there is a lack of completeness due to under-reporting of women, and on the other hand, problems of representativeness because surveys often only cover specific populations. With respect to induced abortion, a study conducted in Kinshasa in 2016 in a hospital setting reported a rate of 56 per 1,000 women aged 15 to 49 years[5]. In Cameroon, induced abortion is most often unsafe because of restrictive laws. This results in complications that often lead to maternal death. Estimates published by the WHO in 2010 for our country showed a maternal mortality rate of 600 per 100,000 live births, among which abortion complications were about 32% of the causes of these deaths[1]. In a study conducted by Foumane et al. in 2015 at the Yaoundé Gyneco-Obstetric and Pediatric Hospital (HGOPY), septic abortion alone was responsible for 17.2% of maternal deaths[6]. Most studies conducted in our context do not clearly distinguish the responsibility for each type of abortion. This justifies our study; whose general objective was to compare the early complications of induced abortion with those of spontaneous abortion in Yaoundé.

METHOD AND MATERIALS

The conduct of the study was authorized by the Institutional Committee of Ethics and Research of the Faculty of Medicine and Biomedical Sciences CIER/FMSB of the University of Yaounde. All participants gave their prior informed consent. It was a cohort study with prospective data collection in the Gynecology-Obstetrics departments of the Yaounde Gyneco-Obstetrics and Pediatrics Hospital (HGOPY) and the Yaounde Central Hospital (HCY) for a duration of seven months from November 1, 2019 to May 31, 2020. The participants were all patients admitted for abortion and who had given their informed consent. All patients known to have co-morbidities were excluded because it could be confused with one or more complications of abortion. Patients lost during the period of follow-up were also excluded.. Sampling was consecutive and exhaustive, with a minimum sample size of 40 participants for each group. . Once their agreement to participate in the study was obtained through an informed consent form, the participants were interviewed using a standardized, pre-tested questionnaire. The researcher then performed a physical examination of these patients to complete the information in the questionnaire. The variables of the study were the socio-demographic, clinical and reproductive characteristics, as well as the management of abortions. Patients were followed up during their stay in the hospital and those managed as outpatient were called to get their evolution during the first seven days following the abortion The data were analyzed using SPSS (Statistical Package of the Social Science) version 23.0. Categorical variables were described as percentages, proportions, and/or frequencies. To compare the different observations, the Odds Ratio (OR) with 95% confident interval and the significance threshold was 5%.

RESULTS

One hundred and fifteen (115) abortion cases were collected during our study period: 56 for the induced abortion group and 59 for the spontaneous group (Table I).

- **Socio-demographic profile of abortion patients**

The socio-demographic profile of the study population shows that participants in the induced abortion group were significantly younger. The marital status and the level of education don't influence the occurrence of induced or spontaneous abortion (table I).

Table I: distribution of participants according to socio-demographic profile

Variables	Abortion		Total (N=115)	OR (95% CI)	p-value
	Induced (N=56) n (%)	Spontaneous (N=59) n (%)			
Age (years)					
<20	9 (16.1)	0 (0.0)	9 (7.8)	-	0. 030
[20-25[	20 (35.7)	17 (28.8)	37 (32.2)	1.37 (0.63-3.01)	0 .427
[25-30[	12 (21.4)	16 (27.1)	28 (24.3)	0.73 (0.31-1.73)	0.478
≥30	15 (26.8)	26 (44.1)	41 (35.7)	0.46 (0.21-1.02)	0.055
Marital status					
Single*	50 (89.3)	43 (72.9)	93 (80.9)	1.02 (0.81-1.29)	0.856
Married**	6 (10.7)16 (27.1)	22 (19.1)			
Level of education					
Not attending school	2 (3.6)	1 (1.7)	3 (2.6)	2.15 (0.19-24.37)	0.537
Primary	3 (5.4)	8 (13.6)	11 (9.6)	0,36 (0.09-1.43)	0.148
Secondary	37 (66.1)	33 (55.9)	70 (60.9)	1.53 (0.72-3.26)	0.267
University	14 (25.0)	17 (28.8)	31 (27.0)	0.84 (0.36-1.88)	0.645

* non-legalized union

**legalized union by competent authorities

Median age: 24 years [20-30] vs 28 years [24-32]

- Reproductive variables

Comparing the two populations (induced abortion vs. spontaneous abortion) on their reproductive variables, there were no statistically significant differences in gestation, parity, history of abortion and number of live children (Table II).

Table II: distribution of participants by reproductive profile

Variables	Abortion		Total (N=115)	OR (95% CI)	p-value
	Induced (N=56) n (%)	Spontaneous (N=59) n (%)			
Gestity					
Primigeste	17 (30.4)	13 (22.0)	30 (26.1)	1.54 (0.67-3.57)	0.311
[2-4]	26 (46.4)	30 (50.8)	56 (48.7)	0.84 (0.40-1.74)	0.636
≥5	13 (23.2)	16 (27.1)	29 (25.2)	0.81 (0.35-1.89)	0.630
Parity*					
Nulliparous	20 (35.7)	15 (25.4)	35 (30.4)	1.63 (0.73-3.63)	0.232
Primipara	18 (32.1)	16 (27.1)	34 (29.6)	1.27 (0.57-2.84)	0.555
Paucipara	12 (21.4)	17 (28.8)	29 (25.2)	0.67 (0.29-1.58)	0.363
Multipara	5 (8.9)	8 (13.6)	13 (11.3)	0.62 (0.19-2.04)	0.436
Grand multipara	1 (1.8)	3 (5.1)	4 (3.5)	0.34 (0.03-3.36)	0.356
History of abortion	18 (32.1)	15 (25.4)	33 (28.7)	0.90 (0.60-1.33)	0.588
Not precised	38 (67.9)	44 (74.6)	82 (71.3)	0.72 (0.32-1.62)	0.427
[1-2]	16 (28.6)	13 (22.0)	29 (25.2)	1.41 (0.61-3.29)	0.421
≥3	2 (3.6)	2 (3.4)	4 (3.5)	1.06 (0.44-7.76)	0.958
Number of children alive					
0	20 (35.7)	15 (25.4)	35 (30.4)	1.63 (0.73-3.63)	0.232
[1-2]	27 (48.2)	27 (45.8)	54 (47.0)	1.10 (0.53-2.29)	0.792
≥3	9 (16.1)	17 (28.8)	26 (22.6)	0.47 (0.19-1.17)	0.107
Gestational age (WA)					
Unknown	12 (21.4)	5 (8.5)	17 (14.8)	2.94 (0.96-8.99)	0.058
<9	13 (29.5)	10 (18.5)	23 (23.5)	1.48 (0.59-3.72)	0.403
[9-13[	18 (40.9)	25 (46.3)	43 (43.9)	0.59 (0.26-1.34)	0.208
≥14	14 (25.0)	24 (40.7)	38 (33.0)	0.48 (0.22-1.08)	0.076

WA: Weeks of Amenorrhea

- Participant Pathways and Clinical Profile

Forty-three point five percent of the study population was referred. Participants in the induced abortion group preferentially sought first referral to peripheral level health facilities (induced: 39.3%; spontaneous: 16.9%; OR: 3.17; p=0.009). Among the most frequent symptoms, fever was present in 28.6% of induced abortion participants and only 6.8% of spontaneous abortion participants. This observed difference was statistically significant (p=0.004). However, there was no significant difference between the two groups for all other symptoms sought (Table III).

Table III: distribution of participants according to where they came from and the admission/reference reasons

Variables	Abortion		Total (N=115)	OR (95% CI)	p-value
	Induced (N=56) n (%)	Spontaneous (N=59) n (%)			
Home	30 (53.6)	35 (59.3)	65 (56.5)	0.79 (0.37-1.66)	0.534
Other health centres	26 (46.4)	24 (40.7)	50 (43.5)		
Peripheral level*	22 (39.3)	10 (16.9)	32 (27.8)	3.17 (1.33-7.54)	0.009
intermediate level**	4 (7.1)	14 (23.7)	18 (15.6)	0.25 (0.07-0.80)	0 .020
Admission/reference reasons					
Bleeding	43 (76.8)	49 (83.1)	92 (80.0)	0.67 (0.27-1.69)	0.403
Abdomino-pelvic pain	32 (57.1)	31 (52.5)	63 (54.8)	1.20 (0.58-2.51)	0.620
Fever	16 (28.6)	4 (6.8)	15 (13.0)	5.50 (1.71-17.70)	0.004
Purulent vaginal discharge	8 (14.3)	4 (6.8)	12 (10.4)	2.29 (0.64-8.09)	0.197

* District Medical Centres; Integrated Health Centres; District Hospitals; **Regional Hospitals

- Qualifications of the authors of unsafe abortion

As for the authors of induced abortions, Medical Doctors were the most involved at 44.4%. In 40.7% of cases the identity of the perpetrator was not revealed and in two cases (4.2%), the partner was the author (Figure 1).

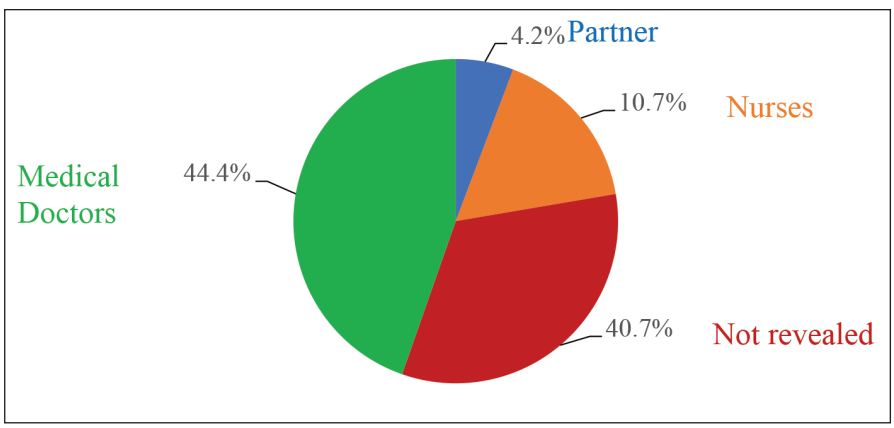

Figure 1: qualification of those involved in unsafe abortion (N=47)

- Abortion complications

The complication rate was higher in the induced abortion group. However, hemorrhage and anemia were observed in both groups without significant difference. Multiple induced abortions increased the risk of sepsis by 4.48 times. Some complications were observed only in cases with induced abortion (Table IV).

Table IV: distribution of Complications by Type of Abortion

Variables	Abortion		Total (N=115)	OR (95% CI)	p-value
	Induced (N=56) n (%)	Spontaneous (N=59) n (%)			
Immédiates complications	33 (58.9)	26 (41.1)	59 (51.3)	1.34 (0.93-1.91)	0.112
Genital Haemorrhage	24 (42.9)	19 (32.2)	43 (37.4)	1.33 (0.82-2.15)	0.239
Anemia	29 (55.8)	23 (44.2)	52 (45.2)	1.32 (0.88-1.99)	0.169
Hypovolemic choc	8 (14.3)	3 (5.1)	11 (9.6)	2.81 (0.78-10.06)	0.107
Septic abortion	17 (30.4)	4 (6.8)	21 (18.3)	4.48 (1.60-12.49)	0.003
Placental retention	2 (3.6)	1 (1.7)	3 (2.6)	2.11 (0.20-22.60)	0.612
Pelviperitonitis	4 (7.1)	0 (0.0)	4 (3.5)	-	0.053
Uterine perforation	5 (8.9)	0 (0.0)	5 (4.3)	-	0.025
Septic choc	2 (3.6)	0 (0.0)	2 (1.7)	-	0.235
Bowel lesions	1 (1.8)	0 (0.0)	1 (0.9)	-	0.478
Peritonitis	1 (1.8)	0 (0.0)	1 (0.9)	-	0.478

- Management

Cases with induced abortion required significantly blood transfusion compared with spontaneous abortion cases. Overall, only 40.9% of patients have chosen a contraceptive method (Table V).

Table V: distribution of participants by the means of management

Variables	Abortion		Total (N=115)	OR (95% CI)	p-value
	Induced (N=56) n (%)	Spontaneous (N=59) n (%)			
Resuscitation means					
Blood transfusion	23 (41.1)	13 (22.0)	36 (31.3)	2.47 (1.09-5.56)	0.030
Hydroelectrolytic resuscitation	8 (14.3)	3 (5.1)	11 (9.6)	3.11 (0.78-12.39)	0.107
Adrenaline/Noradrenaline	2 (3.6)	1 (1.7)	3 (2.6)	2.15 (0.19-24.37)	0.537
Others PAC					
Counseling on unsafe abortion	28 (50.0)	22 (37.3)	50 (43.5)	1.68 (0.80-3.57)	0.171
Counseling on the FP	39 (69.6)	47 (79.7)	86 (74.8)	0.59 (0.25-1.37)	0.219
Choice of a contraceptive method	27 (48.2)	20 (33.9)	47 (40.9)	1.81 (0.86-3.85)	0.120
Link others health services	17 (30.4)	15 (25.4)	32 (27.8)	1.28 (0.56-2.89)	0.556
Community involvement	23 (41.1)	18 (30.5)	41 (35.7)	1.59 (0.74-3.42)	0.238

PAC: Post Abortion Care; FP: Family Planning

- Outcome of cases from day 1 to day 7

The outcome seven days following initial treatment was marked by the occurrence of two maternal deaths in the induced abortion group corresponding to the letality rate of 3.6%. (Table VI).

Table VI: distribution of Participants by Changes in Clinical Status Between Day 1 and Day 7

Variables	Abortion		Total (N=115)	OR (95% CI)	p-value
	Induced (N=56) n (%)	Spontaneous (N=59) n (%)			
Favorable	49 (87.5)	51 (86.4)	100 (86.9)	1.01 (0.88-1.17)	0.866
Anemia	4 (7.1)	1 (1.7)	5 (4.3)	4.21 (0.49-36.56)	0.187
Placental retention	2 (3.6)	3 (5.1)	5 (4.3)	0.70 (0.12-4.05)	0.692
Endometritis	1 (1.8)	2 (3.4)	3 (2.6)	0.53 (0.05-5.65)	0.596
Death	2 (3.6)	0 (0.0)	2 (1.7)	-	0.235
Hypovolemic choc	1 (1.8)	0 (0.0)	1 (0.9)	-	0.478
Sepsis	2 (3.6)	0 (0.0)	2 (1.7)	-	0.280

DISCUSSION

Socio-demographic profile

Analysis of the socio-demographic characteristics of this study population shows that participants who had induced abortions were significantly younger than those who had spontaneous abortions (with a median age of 24 years[20-30] vs. 28 years[24-32]; p = 0.013). Schwandt et al.[10] in 2011 in Ghana found similar results to with mean ages of 25.2 ± 6 years in the induced group and 28.7 ± 6.3 years in the spontaneous group. These results could be explained by the fact that most adolescent girls and young women are single, pursuing education and feel unable to care for a child, hence the use of Voluntary Interruption of Pregnancy (VIP). Similarly, participants under 20 years of age were significantly more likely to have an induced abortion than a spontaneous one (p=0.030). Several authors have also found that women 20 years of age and younger were heavily involved in abortion[8,11]. In contrast to theses results, Banerjee et al[7] in India in 2012 reported that women who had spontaneous abortions were significantly younger than those who had induced abortions (mean age: 24.9 vs 26.5).

Marital status did not have a significant influence on the type of abortion, as it was found that 89.3% of participants who had had an abortion were single, compared with 72.9% of those who had had a spontaneous abortion. These results are different from those of Schwandt et al.[10] in 2011 in Ghana, who reported that married women were significantly less involved in induced abortion compared to those who had spontaneous abortion (induced: 27.0%; spontaneous: 67.0%; p < 0.001). This difference could be explained by the fact that their patients were recruited from a family planning service, whereas the latter is more frequently attended by married women.

Participant Pathways and Clinical Profile

Participants with induced abortion were significantly more likely to use peripheral-level health facilities compared with those with spontaneous abortion (induced: 39.3%; spontaneous: 16.9%; OR: 3.17; p=0.009). These results corroborate those of Banerjee et al. who report that patients in the induced group have a more complex and complication-prone treatment regimen[7]. These findings may be explained by the restrictive nature of the country's law on induced abortion, which leads women to seek services and unqualified or unskilled individuals to provide them with quality care.

Among the most frequent symptoms, fever was present in 28.6% of induced abortion cases and only 6.8% in the spontaneous abortion group (p=0.004). These results are similar to those of

Sangani et al[12] in 2018 in Kisangani (D.R. Congo), who found the most frequent infectious signs among abortion patients (14.3%), with a significant difference compared to spontaneous abortion patients. Banerjee et al. also reported that abortion patients had significantly more infectious signs than spontaneous abortion patients, notably fever, fetid leukorrhea (P<0.05) and vomiting (P<0.01). These results would reflect the fact that most of these induced abortions are performed clandestinely where aseptic measures are often not respected.

Participants who had induced abortions most often cited unwanted pregnancy and/or concern about birth spacing as the reason (62.5%). Unwanted pregnancy was also the reason given by the majority of patients (44.4%) in the study conducted by Sangani et al[12] in 2018 in Kisangani, Congo. These results further highlight the unmet need for contraception in our society.

Profile of immediate complications

The frequency of complications was higher in this study compared to that found in the literature. In fact, complications occurred in 58.9% of participants who had an induced abortion and 41.1% of those who had a spontaneous abortion. On the other hand, Carlsson et al[13] in 2018 found a complication rate of only 6.7% in a group of patients treated for induced abortion in Sweden. Participants in the abortion group were 4 times more likely to have a septic abortion compared to those in the spontaneous group (induced: 30.4%; spontaneous: 6.8%; p=0.003). In Finland in 2011, Niinimaki et al[9] found results that were also different from ours, since in their study, septic abortion only concerned 2% of abortions and no cases of spontaneous abortion. This difference could be explained by the fact that the law on induced abortion in these two Northern European countries is much more liberal compared to ours. This encourages women to freely go to health facilities with a high technical level and qualified personnel able to offer them a safe abortion. The high complication rates in this study could also be explained by the fact that the two recruitment sites were referral hospitals, which generally receive the most serious cases from lower level health facilities, lacking sufficient human and material resources.

Some complications were observed only in the induced abortion group. Indeed, among the latter 7.1% developed pelviperitonitis complicating uterine perforation. These results are close to those found in the literature. In 2017 in Yaoundé, Kamga et al[8] found significantly more infectious complications (septic shock, peritonitis and post-abortal pelviperitonitis) in patients who had undergone abortion compared with those who had had spontaneous abortion (p < 0.001). Ishoso et al[14] in 2018 in Kinshasa reported that 6.5% of women who had induced abortion had developed post-abortal pelviperitonitis complicating uterine perforation. These results would reflect the risky practices that are used by the perpetrators of these abortions to manage unplanned pregnancies. The fact that the difference between the induced and spontaneous groups regarding these infectious and traumatic complications was not statistically significant in this study could be explained by the size of the sample and the study period, which were shorter compared to those in the literature.

Therapeutic profile

Induced abortion was twice as likely to require an urgent blood transfusion compared with spontaneous abortion (p = 0.030). Several authors found similar results to ours[7,11]. This could be explained by the fact that abortions induced by unskilled professionals are often complicated by placental retention or trophoblastic debris [8], and patients referred with a clinical picture of severe anemia, or even hypovolemic shock, requiring emergency blood transfusion.

The results of the study are consistent with those of the literature that many women, mostly young girls, use induced abortion as a “method of contraception” (birth control). The findings suggest that this phenomenon is perpetuated largely because of the neglect of Postabortion Care (PAC) by some health care providers and by women themselves. Indeed, among the participants

who had had an induced abortion, nearly one-third had not received family planning counseling and more than half (51.8%) had left the hospital without even choosing a contraceptive method. These results differ from those found by Madziyire et al[15] in Zimbabwe in 2016, who reported that 92% of their study participants had received family planning counseling and 43% of them had been put on modern contraceptives upon discharge from hospital. This difference could be explained by the fact that the majority (80%) of their patients were married compared to only 19.1% of married women in this study. Indeed, married women are generally more responsible and adhere better to family planning methods.

Prognosis of abortion cases

Although the majority of participants (86.9%) had a favorable clinical outcome within seven days of admission, there were two deaths among those who had induced abortions, with a case-fatality rate of 3.6% and no deaths in the spontaneous group. This difference was not statistically significant. Gayaux et al[11] found a significantly higher case fatality rate among abortion patients than among spontaneous abortion patients (abortion: 2.3%; spontaneous abortion: 0.4%; RR: 5.61; p = 0.001). This difference with our results could be explained by the relatively short duration of the study. Ymele et al[16] in 2018 in Yaoundé found similar results, with 2.6% of deaths among patients who have had an induced abortion. These relatively low death rates would only reflect the tip of the iceberg, given that four out of five women in need of abortion care do not go to formal health facilities[17]; and as a result, the proportions would be much higher, given the unsafe and insecure nature of the situation.

CONCLUSION

Induced abortion, compared to spontaneous abortion, is the prerogative of adolescents. Abortion remains a major provider of maternal morbidity and mortality in the poor settings, where the unmet needs of contraception are high. We recommend a full implementation of post abortion care.

COMPETING INTERESTS

The authors have no conflicts of interest to declare for this study.

CORRESPONDING AUTHOR

Fouedjio Jeanne Hortence, MD, MPH
Faculty of Medicine and Biomedical Sciences, University of Yaounde
Email: fouedjiojeanne@yahoo.fr

REFERENCES

1. Organisation Mondiale de la Santé. Rapport sur la Santé dans le Monde. Donnons sa chance à chaque mère et à chaque enfant. OMS. 2005 ; p.68-9.
2. Guillaume A, Khlat M. Fréquence et conditions du recours à l'avortement. Paris : Nogentsur-Marne. sep 2004; p.71–94.
3. Ganatra B, Gerdts C, Rossier C, Johnson Jr BR, Tunçalp Ö, Assifi A, et al. Global, regional, and subregional classification of abortions by safety, 2010–14: estimates from a Bayesian hierarchical model. The Lancet. Elsevier; 2017; 390(10110): p.2372–81.
4. Sugiura M, Suzuki S, Ozaki Y, Katano K, Suzumori N, Kitaori T. Frequency of recurrent spontaneous abortion and its influence on further marital relationship and illness: The Okazaki Cohort Study in Japan. Int J Gynecol Obstet. 2013; 39(1): p126-31.
5. Chae S, Kayembe PK, Philbin J, Mabika C, Bankole A. The incidence of induced abortion in Kinshasa, Democratic Republic of Congo. PLoS ONE. 2016; 12(10): p.1-16.
6. Foumane P, Dohbit JS, Ngo Um Meka E, Nkada MN, Ze Minkande J, Mboudou R. Étiologies de la mortalité maternelle à Yaoundé : Une Série de 58 Décès. Health Sci. Dis: 2014; 16 (3): p.1-5.
7. Banerjee K, Kathryn L, Janardan W. Pathways and consequences of unsafe abortion: A comparison among women with complications after induced and spontaneous abortions in Madhya Pradesh, India. Int J Gynecol Obstet. 2012; 118(Suppl 2): S28–30. S113 – S120.
8. Kamga DVT, Nana PN, Fouelifack FY, Fouedjio JH. Role of abortion and ectopic pregnancies in maternal mortality rate at three university hospitals in Yaoundé. Pan Afr Med J. 2017 ; 27(248): 9p.
9. Niinimaki M, Suhonen S, Mentula M, Hemminki E, Heikinheim. Comparison of rates of adverse events in adolescent and adult wemen undergoing medical abortion: population ragister based study.BMJ.2011; 8p.
10. Schwandt MH, Creanga AA, Danso KA, Adanu RM, Agbenyega T, Hindin MJ. A comparison of women with induced abortion, spontane ous abortion and ectopic pregnancy in Ghana. Elsevier. 2010 ; 84 (2011): p.87–93.
11. Goyaux N, Alihonou E, Diadhiou 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): p.568 73.
12. Mwetaminwa SG, Kyembwa MM. Prévalence, complications et issue des avortements clandestins dans la ville de Kisangani en République Démocratique du Congo. IJIAS. 2018; 25 (1): p.403-9.
13. Carlsson I, Breding K, Larsson P-G. Complications related to induced abortion: a combined retrospective and longitudinal follow-up study. BMC. 2018; 18(158): 9p.
14. Ishoso DK, Tshefu AK, Coppieters Y. Analysis of induced abortion-related complications in women admitted to referral health facilities in Kinshasa, Democratic Republic of the Congo. PLoS ONE. 2018; 13(8): 11p.
15. Madziyire MG, Polis CB, Riley T, Sully EA, Owolabi O, Chipato T. Severity and management of postabortion complications among women in Zimbabwe, 2016: a crosssectional study. BMJ Open. 2018; 8(2): 11p.
16. Ymele FF, Sone CE, Nana NP, Fouedjio JH. Cost and Economic Consequences of Unsafe Abortion In the Yaoundé Central Hospital. Health Sci. Dis. 2018; Vol 19 (4): 6p.
17. Almeida N, Teixeira A, Sachiteque A, Molina JR, Sachiteque AC, Ramalho C et al. Characterisation of induced abortion and consequences to women's health at Hospital Central do Huambo – Angola. Int J Gynecol Obstet. 2019 ; p1 6.