HEALTH SCIENCES AND DISEASES
The Journal of Medicine and Health Sciences

Original Article

Cost and Economic Consequences of Unsafe Abortion In the Yaoundé Central Hospital

Conséquences économiques de l'avortement à risque à l'Hôpital Central de Yaoundé

Florent Ymele Fouelifack[1,2,3], Charles Enome Sone[2], Philip Njotang Nana[2,4], Jeanne Hortence Fouedjio[2,4]

[1] Department of Obstetrics and Gynecology of Higher Institute of Medical Technology of Nkolondom, Yaoundé - Cameroon
[2] Obstetrics and Gynecology Unit of Yaoundé Central Hospital. Yaoundé-Cameroon
[3] Research, Education and Health Associative Group GARES-Falaise, Dschang-Cameroon
[4] Department of Obstetrics and Gynecology of faculty of Medicine and Biomedical Sciences of University of Yaoundé I-Cameroon
Corresponding author: Florent Ymele Fouelifack P.O. Box: 31186 Tel: +237 696312354 Email: yfouelifack@gmail.com

Mots clés: Impact, économique, avortement à risque, Yaoundé
Keywords: Economic, consequences, unsafe abortion, Yaoundé

RÉSUMÉ

Introduction. En 2008, sur 44 millions de grossesses volontairement interrompues dans le monde, environ 49% étaient des avortements à risque, et plus de 97% des avortements en Afrique étaient à risque. La morbidité et la mortalité liées à l'avortement à risque exigent des dépenses énormes de sante dans les pays en développement, dont le Cameroun. L'objectif de cette étude était d'évaluer les conséquences économiques des avortements à risque. **Méthodes.** L'étude était descriptive transversale et réalisée à la maternité centrale de Yaoundé du 1er octobre 2014 au 31 mars 2015. Etaient incluses, toutes les femmes reçues à l'hôpital en quête de soins après avortement et qui donnaient leur consentement. Les femmes étaient interviewées et des données, collectées sur divers sujets, y compris les frais lies ou occasionnés par l'avortement. **Résultats.** Sur les 258 femmes recrutées, 169 (65,4%) avaient eu des avortements provoqués tandis que 34,6% avaient des avortements spontanés. L'avortement incomplet était la complication la plus fréquente (72,86%), suivie de l'anémie sévère (31,43%) et de l'état de choc (5,71%). Le cout de l'induction de l'avortement variait de 4000 à 35000 Francs CFA. Dans l'ensemble le cout des dépensés liées à l'induction et à la prise en charge de ces avortements variaient de 44480 à 528365 francs CFA. **Conclusion.** L'avortement à risque est associé à une forte morbidité. Le coût moyen d'un avortement à risque et du traitement de sa complication est d'environ 123806,9 francs CFA.

ABSTRACT

Introduction. In 2008, out of 44 million intentionally interrupted pregnancies worldwide, about 49% were unsafe abortions, and more than 97% of abortions in Africa were at risk. The morbidity and mortality associated with unsafe abortion requires huge health expenditures in developing countries, including Cameroon. The purpose of this study was to assess the economic consequences of unsafe abortions. **Methods.** We carried out a cross-sectional study at the maternity ward in Yaoundé Central Hospital from 1 October 2014 to 31 March 2015. Were included all women admitted to the hospital seeking post abortion care and who gave their consent. Women were interviewed and data collected on various topics, including costs related to or caused by abortion. **Results.** Out of the 258 women, 169 (65.4%) had induced abortions while 34.6% had spontaneous abortions. Incomplete abortion was the most common complication (72.86%), followed by severe anemia (31.43%) and shock (5.71%). The cost of inducing abortion ranged from 4000 to 35000 CFA Francs. The overall costs associated with the induction and management of these abortions ranged from 44480 to 528365 CFA francs. **Conclusion.** Unsafe abortion is associated with high morbidity. The average cost of unsafe abortion and the treatment of its complication is about CFAF 123806.9.

INTRODUCTION

Induced abortion has been legal on broad grounds in most of the industrialized world since the early 1970s or longer. However, the legal status of abortion in the developing world is mixed, and interpretation of existing laws varies. As of 2008, 47% of women of childbearing age in the developing world lived in countries that banned the procedure completely or allowed it only to save a woman's life or protect her health [1]. In Cameroon, abortion is only permitted to save a woman's life, or in cases of rape [2]. Despite the high unmet need of family planning in Cameroon (44%), the use of modern methods of family planning in the country remains low (14%) [3]. The resulting wide gap between wanted and actual fertility leaves a large number of Cameroonian women to resort to abortions in order to meet their fertility goals, despite the fact that abortion is legally restricted.

Studies show that women seek to end pregnancies that they find intolerable regardless of legal or other

restrictions. Women terminate pregnancies equally often in countries where abortion is legally restricted and broadly permitted, but deaths and injuries from unsafe abortions occur at much higher rates in restrictive settings [4]. Most women resort to unsafe abortion for the following reasons: highly restrictive laws and policies, inadequate and inaccessible contraceptive and safe abortion services, and access to available safe abortion services often restricted by lack of information, shame in coming forward, reluctance of providers to support or advertise safe services [5]. More than 5 million of these abortions worldwide result in serious medical complications that require hospital-based treatment [5]. Of these cases, many suffer long-term effects, including an estimated 1.6 million women who annually suffer secondary infertility and a further 3–5 million women experience chronic reproductive tract infections and chronic pelvic pain [6].

Unsafe abortion related morbidity and mortality is preventable. Unsafe abortion-related morbidity and mortality exacts a huge price annually in terms of the lives and health of women in developing countries including Cameroon [4]. The economic cost of unsafe abortion is also enormous, burdening public health systems, the patients themselves [7], the households in which these women live and also the economy of the countries. Although data exist on abortion-related morbidity and mortality in our environment, there has been relatively little research on the economic impact of unsafe abortion. The general objective of this study was to evaluate the economic costs of unsafe abortion, specifically to describe the socio demographic characteristics of women seeking post abortion care in the Yaoundé Central Hospital, to estimate the proportion of induced abortion amongst patients seeking post abortion care, determine the rate of use of contraceptive methods among women with induced abortion, to estimate the cost of unsafe abortion through direct cost (as measured by out of pocket expenditure) and indirect cost (as measured by time and income loss).

METHODS

Design, period and site of the study

We carried out a descriptive cross sectional study over a period of six months, from the 1st of October 2014 to the 31st of March 2015 in the Obstetrics of Gynecology Unit of the Yaoundé Central Hospital.

Sampling method and procedure

Were included, all women who were received in the hospital seeking post abortion care and who gave their consent to partake in the study were included in the study. The sample size was estimated using the Lorenz formula as follows: N = [Zα] 2 [p] [1-P] / d2 Where: N is the sample size, Zα = the value of Z corresponding to α in a bilateral situation. Taking α = 0.05, the Fisher Yates tables give a Zα value of 1.96, d = degree of precision (allowable error of known prevalence) = 0.05 p = prevalence rate of unsafe abortion = 20%, substituting these gives: N = 246. All the women retained for the study (or their caretakers if need be) were interviewed and data was collected on various topics, including their socio demographic information, type of abortion, use of contraception, the amount of money the women and their households spent on: obtaining an unsafe abortion, transportation cost, obtaining post-abortion care (money spent to buy material, the management procedure proper, consultation fees, hospitalisation fees, and amount spent on home medications), and duration of hospital stay. The receipts of drugs bought and bills paid were verified where available. Information about the patient's caretaker in the hospital was also collected like their professions and number of days of absence from work. Information relating to the women's admission into the health facility, including the nature (findings on physical examination and admission diagnosis) and severity of their complications and the treatment they received was obtained from the patient's principal care provider or the patient's file.

Data analysis

Data collected were reported on the pretested questionnaire, entered into a data base for analysis using the Epi info version 7 and Excel Version 7 softwares. The chi-squared test (X^2) and Fisher's exact test were used to test associations between variables. A P - value of less than 0.05 was used for correlation studies.

Ethical considerations

Ethical clearance was obtained from the ethics committee of the Faculty of Medicine and Biomedical Sciences. Only women who freely gave their verbal consent were included in the study. Codes were used on the questionnaires rather than patients' names. All information collected was used only for the study.

RESULTS

During our study period, a total of 258 women who came to seek post abortion care were recruited. Their ages varied from 15 to 47 years with a mean of 26.1 +/- 6.7 years, 157 (60.9%) were single.

Socio demographic characteristics

Other socio demographic characteristics of the patients are summarised in the table 1.

The age group from 20 to 25 years was the most represented with 108 that's 41.9%. Students and salaried employees represented respectively 84 (32.6%) and 71 (27.5), 138 (53.5) have had between 2-4 pregnancies, and 124 (48.1%) had 1-3 children.

Table 1: Sociodemographic characteristics		
Patient's characteristic	N	%
Age		
< 20	35	13.6
20 – 25	108	41.9
26 – 30	53	20.5
31 – 35	40	15.5
> 35	22	8.5
Religion		
Catholic Christians	156	60.5
Non Catholic Christians	92	35.7
Muslim	10	3.8
Level of education		
Primary	48	18.6
Secondary	128	49.6
University	82	31.8
Profession		
House wife	63	24.4
Students	84	32.6
Salaried employees	71	27.5
Unemployed	40	15.5
Number of pregnancies		
1	56	21.7
2 – 4	138	53.5
≥ 5	64	24.8
Number of life Children		
0	97	37.6
1 - 3	124	48.1
> 3	37	14.3

Place and characteristics of abortions

The place and characteristics of abortions are presented in table 2.

Table 2. Abortion Characteristics		
Characteristic	Number	%
Place of Abortion		
Government Hospital	26	15.4
Private Clinics	72	42.6
Health Centres	42	24.9
Private Homes	29	17.1
Total	169	100%
Abortionist		
Medical Doctor	44	26
Nurse	105	62.1
Drug Vendor	17	10.1
Self	3	1.8
Total	169	100%
Method Used to Abort		
D and C	63	39.4
Aspiration	52	32.5
Conventional drugs	44	27.5
Non-Conventional drugs	01	0.6
Total	160	100%

About forty two per cent of the abortions were carried out in private clinics and mostly by nurses as seen in 62% of the cases. D and C was the most widely used method to abort as seen in the figure below.

Reasons of abortion

Different reasons of abortions are represented on the figure below (figure 1)

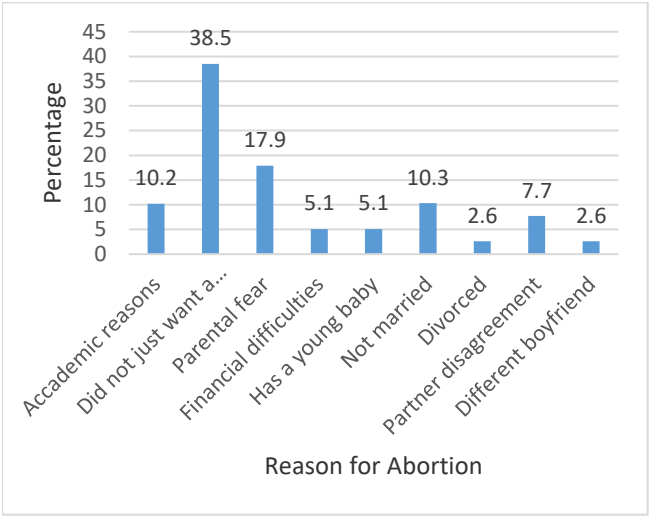

Figure 1. Reasons for abortion.

Out of the 258 patients, the main reasons for abortion were an unwanted pregnancy (38,5%), parental fear (17.9), not married (10.3%) and academic reasons (10.2%).

Morbidity, mortality of unsafe abortions and post abortum management

Post abortum complications

Out of 258 patients, 169 (that's 65, 50%) had complications. Different post abortum complications are shown in the figure 2 below.

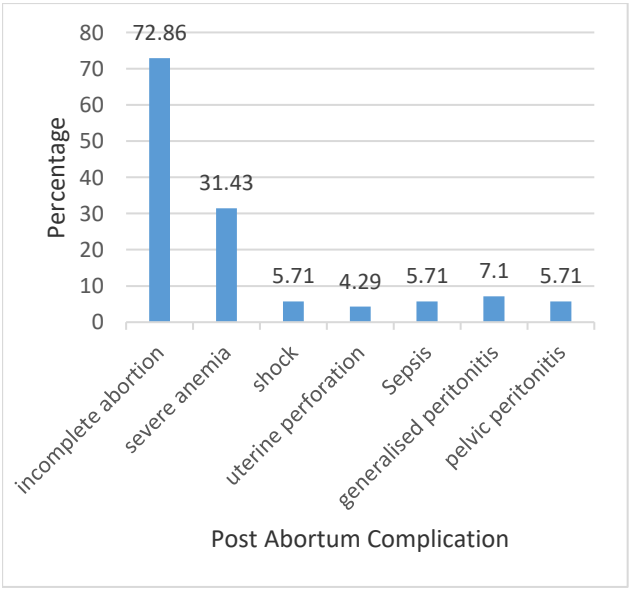

Figure 2. Patient distribution according to post abortum complications.
*Many of them had more than 1 type of complication

Incomplete abortion was the most frequent post abortum complication (72.86%) followed by Severe anaemia (

31.43%), generalised peritonitis (7.1%) and state of shock (5.71%).

Morbidity

Out of 258 patients with complications, 6 (that's 2.6%) died from complications of unsafe abortions during our study period, 3 due to severe anaemia and 3 due to generalised peritonitis.

Management of post abortum complications

Different types of management of post abortum complications are presented in table 3.

Table 3: Methods used in managing post abortum complications

Treatment Option	Number	%
Manual vacuum aspiration	106	62.8
Curettage	14	8.57
Misoprostol	7	4.29
Laparotomy	15	8.87
Blood transfusion	46	27.14
Hysterectomy + oophorectomy	1	0.60
Antibiotherapy	169	100

Manual Vacuum aspiration was the most widely used method in managing the post abortum complications. It was used in 62.8% of the cases. While medical treatment of incomplete abortion was done only in 4.29% of the patients. It is worth noting that one patient had a hysterectomy with bilateral oophorectomy.

Expenditures due to abortions and sources of financing for the post abortion care

Expenditures due to abortions

Mean expenditures due to abortions are presented on table 4.

Table 4: Amount of money spent on abortion

Item	Mean Cost +/- SD (FRS CFA)
Cost of inducing abortion	20,024 +/- 7009
Amount spent on post abortion drugs	6759.4 +/- 2921.5
Transportation cost	1912.2 +/- 1359.6
Cost of material for management of complication	26349 +/- 43774.8
Cost of managing complication	53117.3 +/- 53795.9
Cost of hospitalisation	21537 +/- 9297.4
Amount spent to buy take home drugs	14601.6 +/- 9179.9
Other expenditures (Full blood count, Echography, etc)	16195 +/- 19727
Total expenditure	123806.9 +/- 102247

The amount of money paid by the patients to induce abortion varied between 4000 and 35000 Francs CFA. The mean amount paid for inducing abortion was 20,024 +/- 7009 Frs. While the amount of money spent on transportation to the hospital varied between 250 FRS and 5000 Francs CFA. An average of 26349 +/- 43774.8 Francs CFA was spent to buy material for the management of post abortum complications with a range that varied between 5000 and 270790 Francs CFA. The cost of the management procedure itself ranged between 4900 and 275000 Francs CFA. The amount paid for hospitalisation varied between 20500 and 50500 Francs CFA. The patients spent between 44480 Francs CFA and 528365 Francs CFA as a whole because of unsafe abortion and management of its complications.

Other expenditures

Most of these patients stayed between one and 36 days away from work or school due to unsafe abortion with a mean of 8.2 +/- 6.65 days of absence from work. A majority of them had caretakers who were workers as well. These care takers had to abandon their job site for a period of about 4.04 +/- 2.56 days (range 1 – 11 days).

Source of financing for post abortion care

Sources of financing of post abortion care for the 169 patients with complications are presented on the figure 3. Most of patients were financed by personal savings (68.75%) and the family (18.75%).

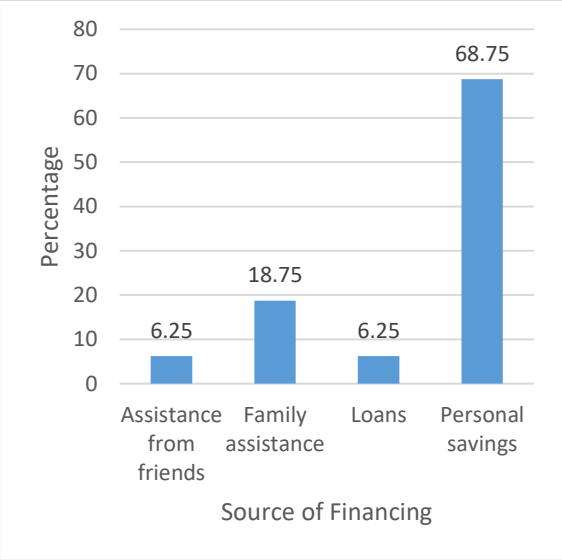

Figure 3: Source of financing for post abortion care.

DISCUSSION

Limits of the study

Since induced abortion is often considered as a taboo in our environment, most women will decline haven had an induced abortion, thus making it difficult to have the true rate in the study population. In spite of the hospital setting, informed consent, and information on the confidentiality in which the information will be treated some women may still not discuss abortion issues freely.

Socio demographic characteristics

As seen from the above results, most of the women who had unsafe abortion were young, single, and had attained at least secondary education. These findings are similar to those of Bankole et al. 2008 and those of Jones et al who showed that women in their 20s account for more than half of all abortions [8, 9]. The 20 to 25 age group was most

affected which is the peak of reproductive activity in our society with a lot of adventures in the youths. Sixty point five percent of women obtaining post abortion care identify as Catholic Christians and 35.7% identify as Non Catholic Christians. This may be due to the restrictive nature of the Catholic Church on the use of contraception. Our findings are however different from those of Jones et al who had more protestant Christians seeking abortion than Catholic Christians [9]. About fifty percent of the women were at their second pregnancy or more and had one or more living children. These findings are similar to those of Mosoko et al who found out that multiparous women had more induced abortions than nulliparous women [10]. A majority of the patients were students.

Place and characteristics of abortions

Forty two point six per cents of the abortions where carried out in private clinics and mostly by nurses (table 2). This can be explained by the fact that under the Penal Code (sections 337-339), the performance of abortions is illegal except if proven necessary to save the mother from grave danger to her health or when the pregnancy is the result of rape. Because of fear of legal consequences and strong social stigma, the vast majority of abortions in Cameroon occur in secrecy or under unsafe conditions. Data indicate an association between unsafe abortion and restrictive abortion laws. The median rate of unsafe abortions in 82 countries with the most restrictive abortion laws is up to 23 of 1000 women compared with 2 of 1000 in nations that allow abortions [11]. Abortion-related deaths are more frequent in countries with more restrictive abortion laws (34 deaths per 100,000 childbirths) than in countries with less restrictive laws (1 or fewer per 100,000 childbirths) [12]. Less restrictive abortion laws do not appear to entail more abortions overall. The world's lowest abortion rates are in Europe, where abortion is legal and widely available but contraceptive use is high; in Belgium, Germany, and the Netherlands, the rate is below 10 per 1000 women aged 15 to 44 years. In contrast, in Africa, Latin America, and the Caribbean, where abortion laws are the most restrictive and contraceptive use is lower, the rates range from 20 to 39 per 1000 women [13]. Changing the law is no guarantee that unsafe abortion will cease to exist. For example, abortion has been legal in Zambia since 1994. However, safe services remain out of reach for most women there for several reasons: There is only one doctor per 8,000 individuals, a woman seeking an abortion must obtain the consent of three physicians, many doctors will not perform abortions for religious or moral reasons and, in the few hospitals where legal abortions are available, the cost is prohibitive [14].

Reasons of abortion

The analysis of the reasons given by women for why they had an abortion showed that the most commonly reported one was postponing childbearing to a more suitable time as most of the women in our study (38.5%) said they did not just want a pregnancy now (figure 1). These findings are similar to those reported by Bankole et al in 1998 [15].

Morbidity, mortality of unsafe abortions and post abortum management

In every part of the world, clandestine abortion often entails considerable medical risk for the women involved. Some of the factors contributing to the occurrence of serious health complications are the use of unhygienic techniques and practices, limited skill of the provider, women's pre-existing poor health, and late gestation. Medical complications resulting from unsafe abortion also constitute a serious burden for both women and the health care system. The most common post abortum complication presented in our series was retained products of conception (figure 2). This was found in up to 72% of the patients. Severe anaemia was found in 31.43% of the women. Up to 27.14% of our patients received blood transfusion. These figures are higher when compared to those of Srinil in Thailand [14]. Seven point one four percent of the patients had generalised peritonitis requiring a laparotomy. 5.71% of the women presented with sepsis, 5.71% with pelvic peritonitis, and 5.71% were received in a state of shock. One woman had a hysterectomy as well as bilateral oophorectomy as a result of complications of unsafe abortion. The hysterectomy rate in our series is lower when compared to that reported by Nana et al in 2005 [16]. The level of serious abortion-related complications varies with the provider and the method they used. Most of the abortions in our study population where carried out by nurses (62.1%). These findings are similar to those of Nkwabong et al who revealed that 62.7% of clandestine abortions were mainly done by health assistants [17].

The method of choice for pregnancy termination in our series was D and C (39.4%) (table 3) contrasting sharply with the findings of Asa et al in Papua New Guinea where induction with misoprostol was the commonly used method and Nkwabong et al who reported manual vacuum aspiration as the most used method of termination of pregnancy [17,18]. The difference between our findings and those of Nkwabong may be due to the smaller sample size in the study population used by Nkwabong (94 cases). We recoded 6 (3.6%) maternal deaths from complications of unsafe abortion. These findings are quite similar to those reported by Henshaw et al in Nigeria in 2008 [19] who recorded a maternal mortality rate of 2% from unsafe abortion.

Expenditures due to abortions and sources of financing for the post abortion care

Payments associated with abortions seemed to incur high expenses to women and their households [20]. The cost of abortion to women and families is largely dependent on the method used (table 2), the type of complication developed (figure 2), the transportation fees and the way the complications are managed (table 4). In our study, patients spent an average of 20,024 +/- 7009 francs CFA (33.1 USD) to terminate a pregnancy (table 4). The patients spent between 44480 Francs CFA and 528365 Francs CFA from induction of abortion to the management of its complications. The mean total expenditure was 123806.9 +/- 102247 Francs CFA. This includes the cost of inducing abortion, money spent to buy

drugs after the procedure, transportation cost, cost of managing complications, cost of hospitalisation, cost of 'take home drugs', and other expenditures like full blood count and ultrasound. Our findings are slightly higher when compared to those of Babigumira et al in Uganda in 2010 [21] where the average cost of induced abortion was $177 ($140-$223) and those of Leke et al [22] who showed that the cost of managing unsafe abortion complications ranged between 700 and 476890 Francs CFA (mean of 50670 Francs CFA). This relatively low cost recorded by Leke et al can be explained by the fact that they did not take into account the amount of money paid to obtain an unsafe abortion as well as the transportation cost. Our findings are however lower than that found by Shearer et al [23], and other authors who had a cost per case of treating post-abortion complications of $392 [23,24]. Most of these patients stayed away from work or school for an average 8.2 +/- 6.65 days while their caretakers spent an average of 4.04 +/- 2.56 days from work.

The consequences of unsafe abortion were not only felt by the patients but also by their family members (figure 3). Most of the patients paid their bills from their personal savings, a good number of them required family assistance or assistance from friends. Some of the patients got indebted by taking loans from their meeting houses or from the bank. This means the impact of the unsafe abortion will not end after the patient leaves hospital as they will be struggling to pay debts incurred in the process of managing unsafe abortion.

CONCLUSION

Unsafe clandestine abortions are being practiced in our environment despite the restrictive nature of the law, 65.4% of patients seeking post abortion care in our study population had an induced abortion. Unsafe abortion is more common among young, single, and educated women. Unsafe abortion was associated with enormous complications and had a negative impact on the well-being of the Cameroonian women and her family. The mean cost of having an unsafe abortion and treating its complications was about 123806.9 Francs CFA.

We suggest that sexual and reproductive health education should be promoted among youths in schools and family planning methods made more available. Providing modern methods of contraception to women with an unmet need would cost less than the average expenditure on post abortum care.

REFERENCES

1. Singh S, Wulf D, Hussain R, Bankole A, Sedgh G. Abortion worldwide: a decade of uneven progress. New York, Guttmacher Institute, 2009.
2. Cameroon penal code. Chapter V: Children and the family, section 337: Abortion and section 339: Saving mother.
3. National institute of statistics and ICF International. (2012) Demographic and Health survey and Multiple Indicators Cluster DHS-MICS 2011.
4.Luchuo Engelbert Bain and Eugene Justine Kongnyuy. Eliminating the high abortion related complications and deaths in Cameroon: the restrictive legal atmosphere on abortions is no acceptable excuse. BMC Women's Health2018 18:71
5. Hilary Standing (2009). The economic costs and impact of abortion related maternal death and ill-health. Institute of Development Studies at the University of Sussex Brighton BN1 9RE UK.
6. Singh S. (2006) 'Hospital Admissions Resulting from Unsafe Abortion: Estimates from 13 Developing Countries', Lancet 368: 1887–92
7. Planned Parenthood. How much does an abortion cost? Dec. 30, 2014, 8:13
8.Vlassoff M, Shearer J, Walker D and Lucas H. (2008) Economic Impact of Unsafe Abortion-Related Morbidity and Mortality: Evidence and Estimation Challenges. IDS Research Report 59.
9. Bankole A, Sedgh G, Oye-Adeniran BA et al. 2008. Abortion-seeking behaviour among Nigerian women. Journal of Biosocial Science 40: 247–68.
10. Jones RK, Finer LB and Singh S, Characteristics of U.S. Abortion Patients, 2008, New York: Guttmacher Institute, 2010.
11. Akinrinola Bankole, Susheela Singh and Taylor Haas. Reasons Why Women Have Induced Abortions: Evidence from 27 Countries. International Family Planning Perspectives Volume 24, Number 3, September 1998. Guttmacher Institute.
12. World Health Organization (WHO). (2011). Unsafe abortion. Global and regional estimates of the incidence of unsafe abortion and associated mortality in 2008. 6th Edition. Geneva.
13. Sedgh G, Singh S, Shah IH, Ahman E, Henshaw S, Bankole A. (2012). Induced abortion: incidence and trends worldwide from 1995 to 2008. Lancet 379(9816):625–632.
14. Grimes DA, Benson J, Singh S, et al. Unsafe abortion: the preventable pandemic. Lancet. 2006; 368:1908–1919.
15. Rijsdijk L, Bos A, Ruiter R et al. 2011. The World Starts with Me: a multilevel evaluation of a comprehensive sex education programme targeting adolescents in Uganda. BMC Public Health 11: 334.
16. Srinil S. Factors associated with severe complications in unsafe abortion. J Med Assoc Thai 2011; 94(4): 408-14.
17. PN Nana, JN Fomulu, RE Mbu et al. A four-year retrospective review of postabortal surgical complications at the central maternity Yaounde, Cameroon. Clinics in Mother and Child Health Vol. 2(2) 2005: 359-363.
18. Nkwabong E , Bechem E, Fomulu JN. Outcome of Clandestine Abortions in Two University Teaching Hospitals in Yaoundé, Cameroon. Health Sci. Dis: Vol 15 (2) April-May-June 2014.
19. Asa I, de Costa C, Mola G. A prospective survey of cases of complications of induced abortion presenting to Goroka hospital, Papua New Guinea, 2011. Aust N Z J Obstet Gynaecol 2012; 52(5): 491-3.
20.Michael Vlassoff, Susheela Singh, and Tsuyoshi Onda. The cost of post-abortion care in developing countries: a comparative analysis of four studies. Health Policy Plan. 2016 Oct; 31(8): 1020–1030.
21. Babigumira JB, Stergachis A, Veenstra DL. et al. Estimating the costs of induced abortion in Uganda: A model-based analysis. BMC Public Health 2011, 11:904.
22.Leke RJI, Nana PN, Halle MG, Nehemiah K. National Assessment of the magnitude and direct cost of abortion in Cameroon 2009.
23. Shearer JC, Walker DG, Vlassoff M. Costs of post-abortion care in low- and middle-income countries: a critical review. Int J Gynecol Obstet. 2010; 108(2): 165-9.
24.Henshaw SK, Adewole I, Singh S. et al. Severity and Cost of Unsafe Abortion Complications Treated in Nigerian Hospitals. International Family Planning Perspectives. Volume 34, Number 1, March 2008 Guttmacher Institute.