

ORIGINAL RESEARCH ARTICLE

Unsafe abortion – A Risk factor for maternal mortality in Liberia - An analysis of the characteristics of unsafe abortion clients and risk factors for maternal morbidity and mortality

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Abstract

Worldwide, an estimated 68,000 women die yearly due to unsafe abortion practices. In Liberia, the maternal mortality ratio is 1072 deaths per 100,000 live births. However, there has not been a study conducted to understand the relationship between unsafe abortion and maternal mortality. We conducted a retrospective cohort study at three county hospitals and assessed obstetric data gathered using a defined questionnaire in 2016 - 2018, from maternal-child health units. The results of the study suggest a strong association between unsafe abortion and maternal morbidity and mortality and also provide insight into the characteristics and factors that put women and girls who have unsafe abortions at risk. The results can inform programs and policies on age disaggregation of women and girls who choose abortion. The variation in the association between unsafe abortion and the risk factors, have implications for maternal morbidity and mortality. (*Afr J Reprod Health 2021; 25[6]: 43-50*).

Keywords: Maternal death, sub-Saharan Africa, pregnancy, adolescent fertility

Résumé

Dans le monde, environ 68 000 femmes meurent chaque année à cause de pratiques d'avortement à risque. Au Libéria, le taux de mortalité maternelle est de 1072 décès pour 100 000 naissances vivantes. Cependant, aucune étude n'a été menée pour comprendre la relation entre l'avortement à risque et la mortalité maternelle. Nous avons mené une étude de cohorte rétrospective dans trois hôpitaux de comté et évalué les données obstétricales recueillies à l'aide d'un questionnaire défini en 2016 - 2018, auprès des unités de santé maternelle et infantile. Les résultats de l'étude suggèrent une forte association entre l'avortement à risque et la morbidité et la mortalité maternelles et donnent également un aperçu des caractéristiques et des facteurs qui mettent en danger les femmes et les filles qui subissent des avortements à risque. Les résultats peuvent éclairer les programmes et les politiques sur la ventilation par âge des femmes et des filles qui choisissent l'avortement. (*Afr J Reprod Health 2021; 25[6]: 43-50*).

Mots-clés: Décès maternel, Afrique subsaharienne, grossesse, fécondité des adolescentes

Introduction

According to the World Health Organization (WHO), each year approximately 25 million unsafe abortions take place worldwide¹. Additionally, an estimated 68,000 women die yearly due to unsafe abortion practices¹. Various studies estimate that 30 to 50% of all maternal mortality is attributable to unsafe abortions, making these practices a major risk factor for maternal death². Studies also suggest an additional 5 million women who survive unsafe abortions suffer lifetime health complications and consequences³. Women within sub-Saharan Africa are disproportionately affected by this issue.

Although the region accounts for 29% of all unsafe abortions, it holds 62% of all abortion-related deaths⁴.

In Liberia, like other countries in sub-Saharan Africa, abortions are prohibited with the exception of a few scenarios. This makes data on unsafe or safe abortion, even under the context of the law, virtually impossible to access and document. The country has a high maternal mortality ratio of 1072 deaths per 100,000 live births. Additionally, the Liberia Demographic Health Survey in 2013 estimated the median age at birth for Liberia is 19 years of age. The adolescent birth rate, one of the highest in the region, stands at

177/1000. It is estimated that 14% of maternal deaths occur among the adolescent age group⁵. Therefore, there is a high probability of a correlation between maternal mortality and unsafe abortion within the country.

Within Liberia, there has not been a study conducted to understand the relationship between unsafe abortion and maternal death. Due to the data unavailability within the national health system, it is difficult to determine the impact of unsafe abortion on maternal mortality, the age groups most affected, the trimester in which unsafe abortions occur, and the specific complications and outcomes. These factors make unsafe abortion a potentially hidden epidemic and a public health problem. In an effort to fill some of the mentioned gaps, UNFPA has commissioned this study. The purpose of this study is to understand the relationship between unsafe abortion and maternal morbidity and mortality among women attending post-abortion care services in three of Liberia's active hospitals. We conducted a retrospective cohort study that gathered and assessed obstetric data recorded between 2016 - 2018, from maternal-child health units and delivery books.

Methods

Study sites

This study was conducted at three county hospitals in Liberia, Martha Tubman hospital, Redemption hospital, and James David's Jr. (JDJ) hospital. These hospitals are situated in Montserrado County and Grand Gedeh County, and the estimated population of the study area is approximately 2.8 million people. Two of the hospitals; Redemption and JDJ, are regarded as two of the most utilized public secondary health facilities around Monrovia. The Martha Tubman hospital is regarded as one of two secondary hospitals serving as referral hubs for patients from smaller neighboring counties in the southeast region.

To be included in the study each health facility had to have a functioning MCH laboratory to conduct hemoglobin measurements and a functioning record system where post-abortion care client information from history taking to discharge could be collected using patient charts. Given the limited time, geographical accessibility was also a

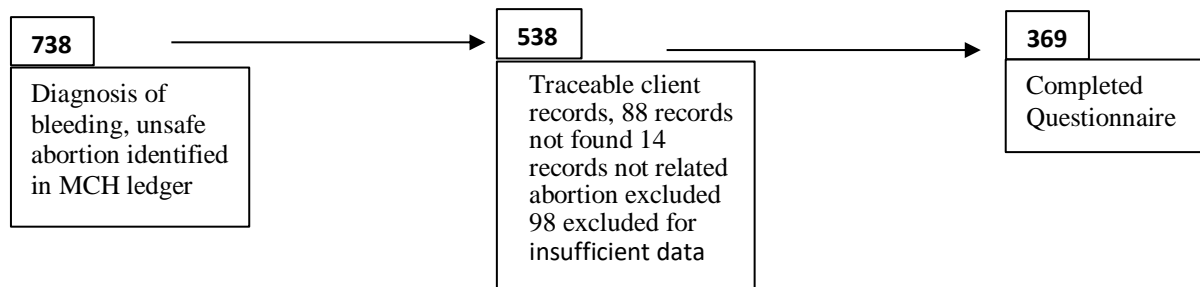
major determining factor for the inclusion of facilities in the study. The inclusion of facilities was also based on their record-keeping capacity and traceability of post-abortion care client records. In order to evaluate this, pilot testing of the study questionnaire was carried out at three Health Centers (Pipeline, Duport Road, and Clara Town) and four hospitals including Redemption, James David's, Bensonville, and Martha Tubman, this determined the final selection of study sites. By the end of the questionnaire testing phase, only three hospitals were qualified as study sites, Redemption Hospital and James David's Jr. Hospital in Monrovia, and Martha Tubman Hospital in Zwedru.

Data collection

Data was collected using a defined questionnaire and entered into forms that were designed in Epi-Info version 7. The questionnaire was developed by the UNFPA Reproductive Health team in order to assess the impact of unsafe abortion on maternal mortality.

When assessing the impact of unsafe abortion on maternal mortality we looked at several variables, including the diagnosis of sepsis, hemorrhage, and anemia. Sepsis, diagnosed by laboratory confirmation, was defined as a WBC >10000 microL. Anemia is defined as a hemoglobin (Hb) level <11g/dl. The three categories of anemia ranging from mild, moderate to severe were described as follows: mild anemia - Hb 10g/dl - 10.9g/dl; moderate anemia 7g/dl - 9.9g/dl; severe anemia Hb < 7g/dl. Hemorrhage was assessed in post-abortion care clients and rated as mild, moderate, and severe. Disability/morbidity was defined as the inability of the patient to live a normal life due to permanent defect or damage to the reproductive organs, while mortality was defined as the death of the patient resulting from unsafe abortion.

Unsafe abortion was defined as abortion that is not carried out by a medical practitioner, and incomplete or induced¹. Additionally, age, gravidity, gestational age of the pregnancy, administration of antibiotics, and or hypertension/hypotension were explanatory variables secondary to unsafe abortion. Hypertension was defined as a systolic blood pressure of > 140mmHg and / or a diastolic blood

Exclusion criteria

pressure >90 mmHg and hypotension will be defined as readings below the normal range on the lower scale. Gravity was described as primigravida (1st pregnancy), secundigravida (2nd pregnancy), and multigravida (3 or more pregnancies).

A mixed team of health personnel participated in the data collection process. The nurses and midwives, hospital maternal and newborn unit staff, and staff from hospital record rooms, were responsible for filling out the questionnaires. A one-day training workshop was held to orientate enumerators on the data collection process using the questionnaire. Visitations to various hospitals to arrange and discuss processes were done to ensure a smooth and collective involvement in the collection of quality data. The main criteria for the inclusion of client records into the study was the availability of post-abortion client records (admission, treatment, and discharge), traced from admission to the point of discharge or exit.

Data handling and analysis

Excel software was also used to clean and recode various variables before transposing them to Epi-Info version 7 for analysis of frequencies, cross tabulation, stratification, and generation of risk/odds ratio using logistic regression.

Study population

The main study participants were all women of reproductive age and parity attending the targeted health facilities for post-abortion care services between 1 January 2016 and 31 December 2018. Women with unconfirmed/undiagnosed abortions via physical or clinical examination during the study period were excluded from the study.

Results

Post-abortion care data harvested from three hospitals was collected during various months in 2016, 2017, and 2018. The data assessed was only from a few months in each year because many facility ledgers were incomplete or had missing sections. A total of 738 women in all three hospitals were identified but only 369 (50%) were included in the analysis due to several reasons (Figure 2). The remaining 369 clients were excluded due to incomplete or missing information.

Characteristics of study participants

Within the study, 22% of the cases were aged 10 to 19, 27% were aged 20 to 24, 23% were aged 25 to 29, and 29% were 30 and older. Overall, young women and youth constituted approximately 49% of all recorded unsafe abortion cases. In terms of occupation, the study found that students made up the largest number of cases at 37%, followed by “housewives” at 8%. The remaining patients had various occupations including bankers, marketers, business women, and farmers. 77% of clients had been pregnant previously. 43% were on their second pregnancy (secundigravida), 34% were on their third or higher pregnancy (multigravida), and 21%, predominantly adolescents, were on their first pregnancy (primigravida).

Hemoglobin measurements were important to determine the severity of anemia among clients accessing post-abortion care services. 8.4% of women had severe anemia (<7g/dl), 26.6% of women had mild anemia (10 -10.9g/dl), and 21.9% of women had moderate anemia (7-9.9g/dl). So overall, 57% of all women seen presented with some form of anemia. A total of 61.8% of patients had blood pressure readings within the normal blood

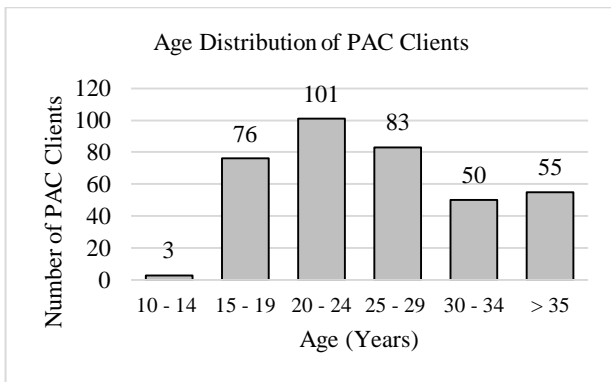


Figure 1: Age distribution of PAC clients

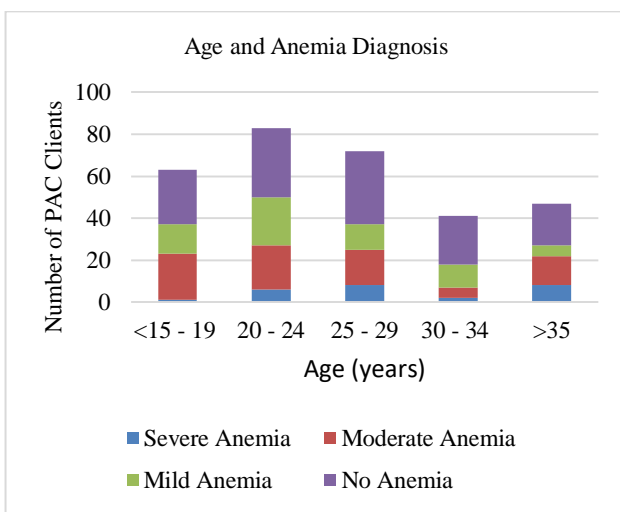


Figure 2: Age distribution and anemia diagnosis

pressure range, while 32.2% had low blood pressure readings and 6% had high blood pressure readings. Records on the administration of parenteral and oral antibiotics were available for 98.3% of all clients. 68% of patients received both types of antibiotics, while 32% received one or the other. Additionally, only 15.4% (56/363) of patients were recorded to have been diagnosed with sepsis.

Pregnancy termination by trimester and age group

According to the study results, 60% of all pregnancies were terminated in the first trimester while 36% were terminated during the second trimester. Adolescents and young women accounted for 49% of all first-trimester pregnancy termination. This includes girls aged 15 to 19 and young women

aged 20 to 24 years. 48% of all pregnancies terminated during the second trimester were adolescents and young women. 3% of pregnancies were terminated in the third trimester of which adolescent and young women constituted 50%.

Pregnancy termination by age and gravidity

Women and girls experiencing their first pregnancies accounted for 21% while those experiencing their second pregnancy and third pregnancy or higher accounted for 43% and 36% respectively. Overall, 97% of all first-time pregnancy termination occurred among adolescents and young women aged 15 to 24. Adolescents (15-19 years) alone constituted 58% of all women who terminated their first pregnancies and 19% who terminated second pregnancies. Women aged 20 to 24 experiencing their first and second pregnancies who obtained an unsafe abortion constituted 38% and 34% respectively. On the other hand, older women aged 25 to 35 constituted 87% of abortions among women who had already been pregnant multiple times.

Risk factors for anemia

Records on anemia were available for 82% of all clients (306/369). More than half (55.2%) of all clients suffered from anemia ($\leq 10.9\text{g/dl}$) and age was found to be a factor associated with the diagnosis. All age groups of women in the study showed some degree of association. Women within older age groups, 30+, had a significant association with anemia, especially when compared to younger women with the exception of those aged 15 to 19. Women aged 30-34 had an odds ratio of 2.62 (95% CI= 0.8-7.88, $P < 0.0084$), those 35+ had an odds ratio of 2.92 (95% CI=1.18-7.22, $P < 0.0012$). Additionally, adolescents aged 15 to 19, had an odds ratio of 2.00 (95% CI= 0.67-5.55, $P < 0.00132$). Association between anemia and women aged 20 to 29 was present but much weaker compared to other age groups.

Risk factors for hemorrhage

Hemorrhage was rated as mild, moderate, and severe. Almost all of the clients experienced one form of hemorrhaging. There was a significant

Table 1: Distribution of client records per health facility per year

COUNTY	HOSPITAL	Cases of PAC from MCH Ledger identified			Corresponding Charts available in room			Patient records			Charts with adequate records harvested		
		2016	2017	2018	2016	2017	2018	2016	2017	2018	2016	2017	2018
Montserrado	Redemption	100	140	113	40	55	75	35	44	69			
Montserrado	James David's Jr.	97	54	95	97	54	95	33	32	54			
Grand Gedeh	Martha Tubman	55	36	48	50	30	42	42	20	40			
Total per year/facility		252	230	256	187	139	212	110	96	163			
Grand Total		738			538			369					

Table 2: Characteristics of age groups that accessed post abortion care services

Characteristics	AGE									
	<15-19 (n=79)		20-24 (n=101)		25-29 (n=83)		30-34 (n= 50)		>35 (n=55)	
	N	%	N	%	N	%	N	%	N	%
Hemoglobin (in g/dl)										
<7g/dl	1	(1.3)	6	(5.9)	8	(9.6)	2	(4)	8	(14.5)
7-9.9g/dl	22	(27.8)	21	(20.8)	17	(20.5)	5	(10)	14	(25.5)
10-10.9g/dl	14	(17.7)	23	(22.8)	12	(14.5)	11	(22)	5	(9.1)
11->11g/dl	26	(32.9)	33	(32.7)	35	(42.2)	23	(46)	20	(36.4)
missing	16	(20.3)	18	(17.8)	11	(13.3)	9	(18)	8	(14.5)
Hemorrhage										
severe	10	(12.7)	7	(6.9)	12	(14.5)	6	(12)	13	(23.6)
moderate	21	(26.6)	19	(18.8)	28	(33.7)	18	(36)	14	(25.5)
mild	45	(57.0)	69	(68.3)	39	(47.0)	23	(46)	28	(50.9)
missing	3	(3.8)	6	(5.9)	4	(4.8)	3	(6)	0	(0.0)
Gravidity										
Primigravida (1st)	38	(48.1)	25	(24.8)	1	(1.2)	1	(2)	0	(0.0)
Secundigravida (2nd)	24	(30.4)	44	(43.6)	34	(41.0)	17	(34)	10	(18.2)
Multigravida (≤ 3)	2	(2.5)	12	(11.9)	32	(38.6)	25	(50)	38	(69.1)
missing	15	(19.0)	20	(19.8)	16	(19.3)	7	(14)	7	(12.7)
Gestational Age										
Trimester 1 (≤ 12 wks)	44	(55.7)	50	(49.5)	45	(54.2)	24	(48)	29	(52.7)
Trimester 2 (13- 22 wks.)	20	(25.3)	35	(34.7)	23	(27.7)	19	(38)	18	(32.7)
Trimester 3 (≥ 24 wks.)	4	(5.1)	1	(1.0)	3	(3.6)	0	(0)	2	(3.6)
missing	11	(13.9)	15	(14.9)	12	(14.5)	7	(14)	6	(10.9)
Sepsis										
Yes	10	(12.7)	14	(13.9)	10	(12.0)	8	(16)	6	(10.9)
No	69	(87.3)	86	(85.1)	71	(85.5)	42	(84)	49	(89.1)
missing	0	(0.0)	1	(1.0)	2	(2.4)	0	(0)	0	(0.0)
Occupation										
Housewife	6	(7.6)	7	(6.9)	7	(8.4)	4	(8)	7	(12.7)
Student	15	(19.0)	41	(40.6)	21	(25.3)	3	(6)	1	(1.8)
Others	58	(73.4)	53	(52.5)	55	(66.3)	43	(86)	47	(85.5)
missing	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)	0	(0.0)

association between women aged 35+ and severe cases of hemorrhage with an odds ratio of 2.31 (95% CI=1.13–4.77, $P < 0.0213$). Moderate cases of hemorrhage had a significant association with women 25 to 29 years and those 30-34 years with an odds ratio of 1.5 (95% CI=0.89 -2.6, $P < 0.1169$) and 1.6 (95% CI=0.89 – 3.20) respectively. On the

other hand, women aged 20 to 24 had a significant association with mild hemorrhage with an odds ratio of 2.65 (95% CI= 1.46 – 4.81, $P < 0.0091$). Adolescents aged 15 to 19 also showed an association with mild hemorrhage with an odds ratio of 1.60 (95 CI=0.8 – 2.96). Clients who had been pregnant more than twice (multigravidas) were

more likely to experience severe hemorrhaging compared to women who were on their first or second pregnancy. There appeared to be a significant association between severe hemorrhage among multigravida women; they had an odds ratio of 1.37 (95% CI= 0.68 – 2.78, $P < 0.0137$) compared to primigravida clients who had no association. Women in their secundigravida also had an association with severe hemorrhage with an odds ratio of 2.0 (95% CI= 0.65-5.23, $P < 0.247$) compared to multigravida women with higher significance OR 2.54 (95% CI = 0.9-7.2, $P < 0.078$).

Risk factors for sepsis

Sepsis was measured against various explanatory variables including, gravidity, gestational age, and age groups of the client. The study also measured the relationship between sepsis and the various degrees of hemorrhage. There was no association between sepsis and pregnancies terminated in the first trimester. However, pregnancies terminated during the second and third trimesters were found to have a significant association with sepsis. Pregnancies terminated during the second trimester (weeks 13 to 23) were significantly associated, with an odds ratio of 2.5 (95% CI= 1.07-5.95, $P < 0.0034$). Abortion cases occurring in the third trimester (<23 weeks) were also found to be significantly associated with sepsis with an odds ratio of 2.37 (95% CI=0.48–11.7, $P < 0.0028$). Gravidity was also found to be significantly associated with sepsis; the higher the number of pregnancies the more significant the association. Multigravida women were more like to develop sepsis with an odds ratio of 1.50 (95% CI = 0.7-2.9, $P < 0.0211$) compared to primigravida women, who had an odds ratio of 0.53 (95% CI= 0.18 – 1.50, $P < 0.020$). However, the association between multigravida women and sepsis has a slightly lower significance with an odds ratio of 1.87 (95% CI = 0.66-5.31, $P < 0.0234$) when compared to secundigravida women who have an odds ratio of 2.77 (95% CI= 0.98 – 7.81, $P < 0.0051$). It is not clear why this association with gravidity exists with older women.

Discussion

This study looked retrospectively into post-abortion care treatment data from three active hospitals

within two counties (Grand Gedeh and Montserrado), with the aim of documenting the impact of unsafe abortion on maternal mortality and attempting to understand the characteristics of those who choose unsafe abortion. It was the first study to assess the relationship between unsafe abortion and maternal death in Liberia. Unsafe abortion in Liberia is significantly associated with the risk of death and morbidity among women of childbearing age.

In the study, we found that that terminating abortion in the second and third trimesters was significantly associated with developing sepsis. Second-trimester terminations of pregnancies were 2 to 3 times more likely to develop sepsis than pregnancies terminated at <12 weeks of gestation. This places women at a high risk of death with sepsis alone accounting for 15% of all maternal deaths⁶. A similar study conducted in Kenya, that found that amongst women who experienced an unsafe abortion those whose gestational age was more than 12 weeks had higher proportions of severe complications compared to their counterparts⁷. Furthermore, other studies have found that second-trimester pregnancies (12 weeks – 21 weeks) are associated with higher rates of complications and deaths, specifically, 3.4 deaths per 100,000 procedures compared to 8.9 deaths per 100,000 procedures among women in the west, this number triples in developing countries⁸. Additionally, the risk of death is 75 times higher than the risk of death with abortion at <12 weeks⁸.

In the study, gravidity was significantly associated with their chances of experiencing unsafe abortion complications. Multigravida women in the study were more susceptible to sepsis compared to primigravida and secundigravida women. Gravidity was also significantly associated with hemorrhaging. Women who had experienced multiple pregnancies were found to be more susceptible to severe hemorrhaging. This finding was inconsistent with some previous studies that found that the risk for moderate to severe complications from unsafe abortions did not vary by gravidity⁹. However, previous studies have found that there is an association between multiple gravidity and maternal outcomes, concluding that multiple gravidity increased the risk of maternal morbidity and mortality^{10,11}. It is possible that these

findings were confounded by other factors such as age, further research would need to be conducted in order to explore potential confounders and understand the reason behind this association.

Another risk factor for mortality among women who opt for an unsafe abortion is hemorrhage. A hemorrhage is a typical sign that indicates the possibility of a pregnancy being at risk for termination. Therefore, all subjects in the study experienced some degree of hemorrhaging on admission. Severe hemorrhaging was strongly associated with women > 35 years of age. Older women (30-34 and >35) were also 2 or more times at risk for all categories of anemia than younger women. This is similar to findings in a previous study that found that advancing age was a risk factor for complications in induced pregnancies¹².

Limitations

1. Difficulties in facility-based data collection: The completion of the questionnaire was a complicated process that required coordination between various teams, which sometimes led to errors during the data collection process. A number of subjects were eliminated from the study as a result of missing or incomplete information on the MCH ledger and patient charts. Additionally due to incomplete data on referral cases the study did not have conclusive data on the final outcome of the subjects. Information on direct mortality and disability outcomes was also very low and as such could not be included in the analysis.
2. Limited data on adolescents and other outcomes: Limited information made it difficult to provide a clear analysis of outcomes and risk factors for adolescents less than 15 years of age.
3. The study did not consider private health facilities: Only public health facilities were included in the study due to limited time for data collection processes.

Conclusion

The findings in this study are similar to those of studies conducted in countries like Liberia where the abortion laws are very restrictive. For the first time, health facility-based data on unsafe abortion was assessed using post-abortion care service

records and documented for program and policy consumption in Liberia. The results of the study not only support the argument of a strong association between unsafe abortion and maternal morbidity and mortality but also provide an insight into the characteristics and factors that put women and girls who have unsafe abortions at risk. The results can inform programs and policies on age disaggregation of women and girls who choose abortion. The variation in the association between unsafe abortion and the risk factors, have implications for maternal morbidity and mortality. The main risk factors for mortality among women were gravidity, age, and gestational age of the pregnancy. The results emphasize that unsafe abortion is an important issue and is strongly associated with maternal mortality. Data unavailability renders it difficult to determine the real public health burden of unsafe abortion on the health care delivery system. The restrictive abortion law in Liberia may be a contributing factor to the lack of information at service delivery points. To fully understand the extent, impact, and burden of unsafe abortion on the health care delivery system, the study recommends a more in-depth study, involving many health facilities. The Sustainable Development Goal to improve maternal health is unlikely to be achieved without addressing complications of unsafe abortion associated mortality and morbidity.

Contribution of authors

Bannet Ndyanabangi – Technical leadership, oversight and supervision, Co-Author
 Maybe Livingstone – Led Primary/Initial Study Design & Protocol; supported secondary data review; Co-Author
 Woseh Gobeh – Led the study design, development of the protocol, questionnaire and supervised collection and analysis of Secondary Data; Principal Investigator & Co-Author
 Gorbee G. Logan – Technical Leadership and supervision/Data Collection, Co-Author
 Laura Atukunda- Prepared the manuscript.

References

1. Grimes DA, Benson J, Singh S, Romero M, Ganatra B, Okonofua FE and Shah IH. Unsafe abortion: the preventable pandemic. *Lancet* 2006; 368 (9550): 1908–19.

2. World Health Organization. Unsafe abortion: Global and Regional Estimates of the Incidence of Unsafe Abortion and Associated Mortality in 2003. 2007. Available from: https://www.who.int/reproductivehealth/publications/unsafe_abortion/9789241596121/e/.
3. Thonneau PF. Maternal Mortality and Unsafe Abortion: A Heavy Burden for Developing Countries. 2001.
4. World Health Organization. Preventing Unsafe Abortion: Evidence Brief. 2019. Available from: <https://apps.who.int/iris/handle/10665/329887>
5. Liberia Institute of Statistics and Geo-Information Services - LISGIS, Ministry of Health and Social Welfare/Liberia, National AIDS Control Program/Liberia, and ICF International. 2014. *Liberia Demographic and Health Survey 2013*. Monrovia, Liberia: LISGIS and ICF International.
6. Boushra M, Rahman O. Postpartum Infection. [Updated 2021 Jul 15]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2021 Jan-. Available from: <https://www.ncbi.nlm.nih.gov/books/NBK560804/>
7. Ziraba AK, Izugbara C, Levandowski BA, Gebreselassie H, Mutua M, Mohamed SF et al. Unsafe abortion in Kenya: a cross-sectional study of abortion complication severity and associated factors. *BMC Pregnancy Childbirth* 2015; 15: 34.
8. Grossman D, Blanchard K and Blumenthal P. Complications after second trimester surgical and medical abortion. *Reprod Health Matters* 2008;16(31 Suppl):173-82.
9. Gebreselassie H, Gallo MF, Monyo A. and Johnson, BR. The magnitude of abortion complications in Kenya. *BJOG: An International Journal of Obstetrics & Gynaecology* 2005;112:1229-1235.
10. Conde-Agudelo A, Belizán JM, Lindmark G. Maternal morbidity and mortality associated with multiple gestations. *Obstet Gynecol.* 2000; 95(6 Pt 1):899-904.
11. Shan D, Qiu PY, Wu YX, Chen Q, Li AL, Ramadoss S Wang RR and Hu YY. Pregnancy Outcomes in Women of Advanced Maternal Age: a Retrospective Cohort Study from China. *Sci Rep* 2018; 8:12239.
12. Buehler JW, Schulz KF, Grimes DA, Hogue CJ. The risk of serious complications from induced abortion: do personal characteristics make a difference? *Am J Obstet Gynecol.* 1985 ;153(1):14-20.