

Unsafe Abortion in Sierra Leone: An Examination of Costs and Burden of Treatment on Healthcare Resources

Mary Paul¹, Hailemichael Gebreselassie², Mohamed Samai³, Janie Benson¹, SAS Kargbo³ and Maribel Manibo Lazzarino⁴

¹Ipas, Chapel Hill, North Carolina USA

²Ipas, Nairobi, Kenya

³Sierra Leone Ministry of Health and Sanitation, Freetown, Sierra Leone

⁴Independent Consultant, Durham, North Carolina, USA

*Corresponding author: Mary Paul, Research and Evaluation, Ipas, Chapel Hill, North Carolina, USA, P.O. box 9990, Chapel Hill, NC 27515, Tel: 001 919 883 3738; E-mail: Paulm@ipas.org

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Abstract

Objectives: Maternal mortality in Sierra Leone is one of the highest in the world and complications from unsafe abortion are one of the leading causes. This article reports the results of a 2012 study to assess the impact and costs of treatment of abortion complications on the country's public health system, and estimate the costs of a shift to safe, legal abortion.

Methods: Records of postabortion care (PAC) cases treated in 19 public hospitals in 2011 were reviewed to estimate the number of cases and clinical severity of presenting complications. Personnel time and amounts of supplies and medications to treat PAC cases were estimated by a panel of 16 experienced health care providers and applied to cost information from Ministry of Health records and international sources. The cost of safe abortion services was based on a team of experienced abortion provider estimates of time and supplies needed to provide first trimester induced abortion services.

Results: Deaths from unsafe abortion made up 10% of maternal mortality with a high abortion case-fatality rate of 1.73%. An estimated 3,379 women were treated for abortion complications in the hospitals, 21% of whom presented with clinically-moderate or severe complications. The proportion of cases with clinically moderate or severe complications was 32% at rural secondary facilities, compared to 18% at urban secondary facilities. The mean per-PAC-case cost overall was USD 68. Sierra Leone Government spends an estimated USD 231,000 annually to treat women with abortion complications in public hospitals. This cost could be reduced by an estimated 53% with a shift to safe induced abortion service provision.

Conclusion: Unsafe abortion creates an undue treatment and economic burden on the health system of Sierra Leone. A shift to safe, legal abortion would dramatically reduce the current costs of PAC.

Keywords: Unsafe abortion; Postabortion care; Postabortion complications; Financial cost; Sierra Leone; Burden; Magnitude; Cost reduction

Background

In sub-Saharan Africa, an estimated 1.7 million women seek medical treatment for unsafe abortion complications annually [1]. Providing women the needed life-saving post-abortion care (PAC) treatment is often the responsibility of over-extended public health-care systems and comes at a high cost to the limited available resources. A 2009 study of the economic impact of PAC in sub-Saharan Africa estimated a cost of 68 million US dollars in supplies and staff time annually [2]. An additional 62 million US dollars estimated annual economic costs are incurred due to treatment of long-term, abortion-related health effects [2]. Multiple studies have consistently found that unsafe abortion leads to a high burden of morbidity and mortality and significant costs to public health systems in Africa [3-8].

Women faced with an unintended pregnancy seek abortion for a variety of reasons. These include economic stresses, lack of partner support, timing of the pregnancy, and pregnancies due to rape or incest [9]. In Sierra Leone, low use of contraception contributes to unintended pregnancies and unsafe abortion. Modern contraceptive use among all women ages 15-49 is 20.9%, while among sexually active unmarried women age 15-19, use is 56.3%. Thirty-one percent of 15-19 year old women and 25.0% of all women have an unmet need for family planning [10].

World Health Organization (WHO) evidence shows that in countries where the laws are restrictive, most abortions are unsafe and maternal mortality is higher than in countries with less restrictive laws [9]. Sierra Leone has some of the worst maternal health indicators in sub-Saharan Africa – with a maternal mortality ratio (MMR) of 857 deaths per 100,000 live births, as compared to 640 MMR for the region [11,12]. Of the direct causes of maternal deaths, complications due to unsafe abortion rank fifth in Sierra Leone [11,13].

Sierra Leone's current abortion laws are highly restrictive, limiting women's access to safe, legal abortion services only in cases where it is

necessary to save the mother's life, physical or mental health. Many women experiencing complications of unsafe abortion delay seeking care due to fears of being reported to the police for prosecution, also placing health care providers in a dilemma between the legal system and their obligation to care for patients. Furthermore, after years of civil war that ended in 2002, Sierra Leonean society is working to repair its damaged infrastructures, including the public health system.

The purpose of this study is to document the burden of unsafe abortion in Sierra Leone by 1) capturing the number and clinical severity of cases of abortion complications treated in public hospitals; 2) estimating the costs of personnel, supplies and medications required to treat these complications; and 3) projecting the potential savings to the health system with a shift from treatment of complications to provision of safe, induced abortion services.

Methods

Study design and period

The study incorporated two components in order to estimate the burden and costs of unsafe abortion. The first was a retrospective review of facility registers and logbooks of all obstetric admissions for the period January 1 - December 31, 2011 and a detailed review of all individual PAC patient files managed at each participating facility during three months prior to data collection. The second component involved a modified Delphi technique of postabortion care providers in public hospitals to estimate the time and medical supply costs of PAC treatment. Data were collected in June and July 2012. Information from the first component of the study is presented under the heading "Review of PAC records" and "Estimates of PAC costs" for the second component.

The research protocol was approved by the Sierra Leone National Ethics Committee.

Sampling and Data Collection

Review of PAC records

A list of all public facilities that potentially offered PAC was created in consultation with the Ministry of Health and Sanitation (MoHS), resulting in identification of a total of 21 public facilities. Two hospitals were subsequently eliminated upon confirmation that no PAC services were provided in those sites. The 19 participating facilities included referral (tertiary) and district-level (secondary) hospitals in all four regions: Northern, Southern, Eastern, and Western. Lower level health facilities such as public health centers and posts were excluded since they did not provide PAC services at the time of the study.

Structured data extraction forms were used to collect caseload information on obstetric admissions from facility registers and patient files in the hospitals in 2011. Information collected included: the number of hospital beds dedicated to obstetrics and gynecology, deliveries, women admitted for obstetrics complications (including abortion complications), and the number and causes of maternal deaths. All cases with a recorded diagnosis of incomplete abortion, septic abortion or inevitable abortion were included in the analysis. Cases of threatened abortion, ectopic pregnancy, hydatidiform molar pregnancy, and therapeutic abortion were excluded as were uterine evacuation cases with a missing diagnosis. Data quality was checked for consistency by comparing the number of extracted cases from the

registers with the monthly statistical report from each facility that summarizes all maternal health admissions by diagnosis. If a discrepancy was identified between the two data sources, the register cases were re-counted. For any remaining differences, individual patient files were pulled and reviewed.

For information on the severity of abortion complications and their clinical management, medical records of 343 PAC patients admitted from March to May 2012 in 18 facilities were reviewed using a structured questionnaire. Variables measured included patient demographic and reproductive health characteristics, presenting signs and symptoms, diagnoses, method of uterine evacuation, length of hospital stay, and treatment outcomes. No patient or provider names were collected from facility registers or medical records.

Estimates of PAC costs

For the estimation of direct health system costs, a panel of 16 experienced health care providers from eight public hospitals was convened. Panelists were identified in consultation with the MoHS based on their experience and knowledge of clinical regimens and service delivery for treatment of women presenting with abortion complications. Participants included Medical Officers, Nurse Midwives, Medical Superintendents, and a Senior Registrar working in three types of hospitals: urban tertiary, secondary urban and rural district.

A modified Delphi approach was used to solicit information from the providers using a standardized questionnaire adapted from tools for estimating PAC costs in Nigeria and Malawi [8]. The form captured details about the steps taken from admission to discharge to treat a single case of incomplete abortion at a public health facility. The participants completed forms in response to three scenarios which described women with clinical signs and symptoms suggestive of mild, moderate, and severe abortion complications [3,5,7,14]. For each scenario, each panelist was first asked to describe, from personal practice at their respective facilities, the usual treatment protocol and amount of clinical supplies and medications used, the types of personnel involved in direct care of PAC patients, and the time personnel spent for each step taken during treatment of a typical case. This step was followed by pairing the providers from the same facility to jointly review their individual written estimates (provider time spent and clinical supplies and medications used) and reach a consensus on all three scenarios. Finally, the providers were grouped into three teams, one for each type of hospital (rural district, urban district, and urban referral). Each team then developed a unified estimate for each of the three scenarios for a total of nine final per-case estimates.

Data Analysis

Review of PAC records

Underreporting of PAC cases was identified as a gap during caseload data collection; the panel of clinicians estimated that 48% of PAC cases are recorded in any facility records. An adjusted annual PAC caseload was calculated by dividing the number of cases recorded by .48, to account for the underreporting.

Complication severity levels were analyzed from the medical records of the 343 PAC cases. Severity levels were defined as mild, moderate, or severe (Table 1). The proportion of cases at each severity level was then multiplied by the adjusted annual PAC caseloads to

estimate the number of cases for each combination of complication severity and facility level.

Level of PAC complications	Definition
Mild	No complications or light-to-moderate vaginal bleeding alone; No surgery; and Discharged well
Moderate	One of the following signs of complications: infection/sepsis, shock, or cervical/vaginal tears either alone or in combination with light-to-moderate vaginal bleeding; No surgery; and Discharged well
Severe	One or more of the following complications: pelvic abscess, uterine perforation, peritonitis, combination of sepsis and shock, either alone or in combination with hemorrhage; and/or Required surgery; and/or Died

Table 1: Definition of presenting severity levels of PAC complications

Estimates of PAC Costs

Staff costs were calculated using the annual salary information by cadre provided by the MoHS which were converted from Leones into US dollars, and then into a per-minute rate. Supply and medication costs came from the MoHS Essential Drug list. For supplies and medications not included in the list, costs from the World Health Organization (WHO) Mother-Baby Package (1999) were substituted [15]. When neither source was available supply costs from cost studies in Malawi and Nigeria were used as a third and fourth data source, respectively [8]. All costs are shown as 2012 US dollars (USD). Data on direct costs to women and their families were excluded, as our study focused direct health systems costs.

Overall per-case cost estimates for treating PAC included costs of supplies and medications and provider and other facility staff time. Indirect costs for overhead or management and out-of-pocket costs paid by women were not included in the calculations. The cost of supplies and medication were calculated by multiplying the amount used by the unit cost of that resource. For staff costs, each provider's time spent was multiplied by the unit cost of that provider (per-minute rate). The sum of all supply and medications was added to the sum of all staff costs for the per-case cost of treating a "typical" PAC case. This process was repeated for each combination of three facility types and three levels of severity, resulting in nine scenario estimates of per-case costs.

Estimated average per-case costs for each facility type were weighted by the proportion of complications severity levels treated at that facility type. A weighted average per-case cost for each complications severity level was calculated using the proportion of cases for that complications level seen at each facility type. Annual costs of PAC for each scenario were estimated by multiplying the number of cases and weighted per-case costs for each scenario. The nine scenario cost estimates were then summed to obtain the total costs for all 19 public hospitals.

Estimated savings with shift to safe abortion

Cost projections resulting from shifting from treatment of complications to providing safe, legal, induced first-trimester abortion was calculated with the help of an international team of gynecologists and mid-level providers with experience providing safe abortion services in the United States and developing countries. They estimated the provider time and type and amounts of supplies needed to provide first-trimester abortions using manual vacuum aspiration (MVA) by a trained midwife. The staff salary costs and per unit supply costs identified above were then used to calculate the per-case cost of

providing safe, induced abortion. The estimated annual costs of providing safe abortion assumes the same number of women receiving current PAC treatment receive safe, first-trimester induced abortion with MVA.

Results

Estimated number and severity of PAC cases

A total of 25,298 women were admitted for delivery, PAC and other obstetric complications during 2011. Abortion complications admissions contributed 6% (n=1,622) of all obstetric service and delivery admissions to the facilities. We estimated the number of PAC cases extracted from the records; we estimated that 3,379 cases had received clinical care in all hospitals during 2011. Most (94%) women received a uterine evacuation (UE) for incomplete abortion, and almost all procedures (85%) were performed with dilation and curettage (D&C).

Twenty-one percent of all cases had moderate or severe complications (Table 2). The overall percentage varied by type of facility, with 18-19% of women at tertiary and secondary urban hospitals had moderate to severe complications while 32% of women presenting to secondary rural hospitals had the same level of complications respectively (Table 2). Secondary rural facilities had over 6% of women presenting with severe complications, compared to just 3% at tertiary facilities.

	Tertiary		Secondary Rural		Secondary Urban		Total	
	n	%	n	%	n	%	n	%
Severity of PAC complications								
Simple	1002	81%	443	68%	1219	82%	2664	79%
Moderate	192	16%	169	26%	196	13%	557	16%
Severe	37	3%	42	6%	79	5%	158	5%
Total PAC cases	1231		654		1494		3,379	

Table 2: Number and percentage of PAC cases by complications severity and facility type in 19 public hospitals, 2011 (N=3379)

Abortion complications contributed to 10% of overall maternal mortality in the hospitals. The case-fatality rate in the facilities--the percentage of women presenting with abortion complications who died in the hospital--was 1.73%.

Average per-case PAC costs

Estimated average cost of a typical mild PAC case with UE performed with D&C was 35 USD (Table 3). The average cost of a typical case with moderate complications was 166 USD -over four times the cost of an average mild PAC case. A severe PAC case that required UE and surgical interventions cost 272 USD, more than one and a half times the cost of a moderate PAC case, and almost eight times the cost of a mild PAC case. The overall weighted average cost of treating a PAC case was 68 USD. Supplies and medications contributed most of the per-case cost, due to the use of D&C, an outdated technique which requires use of an operating theatre, anesthesia and, frequently, an overnight hospital stay. Amounts of supplies used varied widely across facilities. The average weighted per-case cost of PAC treatment was 97 USD at secondary rural facilities, substantially higher than the 61-62 USD cost at tertiary and secondary urban facilities. This difference was due to higher treatment costs at secondary rural facilities, as well as the higher distribution of these cases in those facilities.

Severity of PAC complications	Tertiary	Secondary Rural	Secondary Urban	Average per-case cost by severity ²
Simple	40	30	38	35
Moderate	149	217	132	166
Severe	203	314	250	272
Average per-case cost ¹	62	97	61	68

Table 3: Estimated average per-case PAC cost (USD) by complications severity and facility type in 19 public hospitals, 2011

¹Weighting by caseload distribution of complications severity

²Weighting by caseload distribution by facility type

Annual estimated costs of PAC

The estimated 2011 cost of hospital-based PAC was 231,466 USD (Table 4). Forty-three percent of total annual PAC costs were used to treat a majority (79%) of mild PAC cases (data not shown). PAC cases with moderate or severe complications comprised 21% of overall annual caseload, but contributed 57% of the total annual cost. Costs of severe cases represented 18% of the total annual costs but just 5% of caseload.

Projected annual savings after shifting to safe abortion care

Provision of first-trimester induced abortion with MVA was an estimated 32 USD per case. The projected annual cost of providing induced abortion using MVA to the estimated 3,379 women who accessed current PAC treatment would have been 109,181 USD compared to the current estimated cost of 231,466 USD of PAC treatment. The per-case estimates of induced abortion represent a 53% decrease compared to current costs of abortion complications treatment (Table 4).

	Current cost of treating PAC	Projected cost of providing safe abortion ¹
Total annual cost	2,31,466	1,09,181
Amount saved		1,22,285
Percent decrease from current costs	-	53%

Table 4: Estimated annual cost (USD) of PAC and projected savings with safe abortion in public hospitals

¹Assumes no change in number of women who seek PAC treatment at public health facilities

Discussion

This study documents the burden of treatment for as well as the economic cost of abortion complications in the public health system of Sierra Leone. After a review of available records, the treatment burden assessment identified 1,622 PAC cases treated in 2011 which was adjusted to 3,379 to account for underreporting.

Abortion-related mortality is shockingly high in the facilities studied. The 1.73% case-fatality rate found in the assessment is also far higher than that for sub-Saharan Africa which has a case-fatality rate of .46%, which itself is unacceptably high [16]. Overall, 21% of PAC patients in our study presented with moderate or severe complications, with rural facilities experiencing much higher proportion of these cases than urban facilities. The 2010 cost study in Nigeria which used a different data collection methodology estimated that a similar percentage--just fewer than 23%--of PAC patients in hospitals in three states presented with moderate or severe abortion complications [8].

Treatment of women with moderate and severe complications represents a disproportionate burden on Sierra Leone's health system due to the expensive supplies and medications and intensive amounts of staff time required. The hospital-based study in Nigeria found that per-case costs to treat patients with moderate complications were 60% higher than those with simple complications; 22% of PAC caseload in the study facilities was for moderate complications but contributed 31% of total annual PAC treatment costs [8].

Our findings were similar to those reported in PAC cost studies in Kenya and Nigeria which found higher per-case costs associated with uterine evacuation with MVA provided on an outpatient basis compared to use of D&C with an inpatient regimen [8,17]

Despite the significant drain on resources, clinical care of PAC patients is still sub-standard in the hospitals studied. Almost no uterine evacuations were carried out with MVA or medical abortion, the technologies recommended by the World Health Organization for first-trimester abortion [18]. A shift to MVA or medical abortion would facilitate a change from inpatient admissions to outpatient care, especially for the more than three-quarters of women presenting with mild complications [17,18]. This change would reduce hospital stays and costs to the health system and to women themselves.

Improved access to safe, legal abortion could significantly reduce the costs of treating abortion complications. Our findings indicate that if all women who sought treatment for PAC in Sierra Leone hospitals were able to access safe, elective abortions within those facilities, annual costs could be reduced by 53%. Safe, first-trimester abortion

with MVA requires fewer personnel and supply resources than PAC provided on an inpatient basis with D&C. First trimester induced abortions are typically outpatient procedures which can be performed by mid-level providers, and do not require the intensive level of medications that are needed for treating complications from unsafe abortion [19,20]. A study of PAC costs in Uganda estimated health system savings of up to 86% with a shift from treatment of abortion complications to safe, legal abortion with use of recommended technical approaches [19].

This study is the first of its kind in Sierra Leone. Several study limitations should be considered when interpreting the findings. The data on treatment burden must be viewed in light of the overall lack of recordkeeping in the facilities, especially for abortion complications cases. Conversations with providers confirmed major under-reporting of abortion cases, with current records capturing a meager estimated 48% of PAC cases. Some small proportion of these cases is likely for treatment of spontaneous abortion (miscarriage), although clinical distinctions between unsafe induced complications and miscarriage are often difficult to make.

Due to resource constraints and the limited availability of facility data, data collection for the cost estimation assessment included provider estimates of PAC case management, rather than a review of actual patient records or service delivery observation. A limitation of this approach is possible recall bias of the participants. However, although purposively selected, the panel included clinicians from urban, rural and tertiary hospitals and different regions. The use of a panel of experienced clinicians (with an average of 17 years of service) was justified assuming that those with more work experience are better able to estimate provider time spent and supplies and medications used.

Cost estimates were based on recurrent resources expended only for direct patient care as provided in public secondary and tertiary-hospitals. Indirect costs such as management, utilities, space and bedding or start-up costs such as provider training were not included, as they are highly variable, complex and difficult to estimate. Because our study focused exclusively on health system costs.

The projected savings with a shift to safe abortion should not consider as direct, "out-of-pocket" decreases in health care budgets. Reductions in provider time, supplies and medications resulting from a change to safe abortion would likely be re-channeled to meet heavy demands for other obstetrics and gynecology services such as deliveries and contraceptive care.

Furthermore, the projected savings associated with a shift from treatment of abortion complications to safe abortion assume that all women who receive treatment for PAC would instead receive outpatient safe abortion services within the health facility. As seen in other countries, once abortion laws are reformed, the transition to safe abortion service delivery would likely occur over the course of several years as the health system builds capacity and women become aware of service availability. Health facilities would thus continue to provide PAC to treat complications from unsafe abortion until rates of complications decrease as women obtain safe induced abortion services earlier. In addition, PAC will always be a necessary component of comprehensive abortion care in order to treat spontaneous abortion (miscarriage), and thus the savings reported here may be a slight overestimate. However, few women experiencing spontaneous abortion in the first trimester of pregnancy seek medical treatment, so the impact on the projected savings estimates may be

minimal. Future analysis could show intermediate projected savings of providing a combination of PAC and safe abortion services.

The health system of Sierra Leone has made major strides in improving maternal health although it is still struggling to meet the growing needs of its population. Treatment of abortion complications is a costly clinical service that drains staff time and requires scarce medications and supplies. These health system costs could be significantly reduced through provision of safe, legal abortion. Most importantly, a shift to safe abortion would preserve women's health and save women's lives.

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