AVERTING MATERNAL DEATH AND DISABILITY

Testing the Safe Abortion Care model in Ethiopia to monitor service availability, use, and quality

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ABSTRACT

Objective: To implement the Safe Abortion Care (SAC) model in public health facilities in the Tigray region of Ethiopia and document the availability, utilization, and quality of SAC services over time. Methods: The project oriented providers in 50 public health facilities in Tigray to the SAC model. Changes in SAC indicators between baseline and endline were assessed using a retrospective review of procedure logbooks at baseline and prospective monitoring of procedure logbooks for facility performance after introduction of the SAC model. Results: Availability of SAC services increased from 39% to 86% of the recommended number of 5 facilities per 500,000 population, primarily as a result of functional improvements at health centers. Decentralization was accompanied by a 94% increase in the annualized number of women who received services. The proportion of uterine evacuation procedures for induced abortion rose from 7% to 60% (P < 0.01), and the proportion performed with recommended technology increased from 30% to 85% (P < 0.01). The proportion of abortion patients who received modern contraception also increased from 31% to 78% (P < 0.01). Discussion: While widespread service delivery improvements were recorded using the SAC monitoring approach, the project design was built around existing programmatic activities of the local health authority and reflects some related research limitations. For example, there was no comparison group of facilities, timing did not allow for prospective collection of the baseline data before the intervention, and facilities received different levels of monitoring support. Conclusion: Using the SAC model, public health facilities tracked progress and made needed adjustments, which improved service delivery. Continued focus on critical safe abortion care elements should increase the availability, quality, and use of life-saving care to reduce preventable abortion mortality in the region.

1. Introduction

1.1. Safe Abortion Care model

Reducing high rates of maternal mortality in low-resource countries has been a major global effort for over 20 years. The Millennium Development Goal 5 for Maternal Health (MDG5) includes a reduction in maternal mortality by 75% by the year 2015, and new maternal mortality estimates showing declines in some countries have underscored the need for continued political commitment and effective interventions to prevent such deaths [1]. Complications of unsafely performed abortion, which contribute to 13% of global maternal mortality, have received much less attention than other obstetric emergencies [2].

Over the last decade a set of tools and indicators have been used to monitor emergency obstetric care (EmOC) interventions for reducing maternal deaths. These UN EmOC indicators include treatment of abortion complications [3,4]. However, essential preventive means to reduce unsafe abortion are not represented.

The safe abortion care (SAC) model was developed to fill this need and focuses on 3 elements that contribute to reductions in abortion-related mortality: safe induced abortion, prompt treatment for complications of unsafely-performed abortions, and postabortion contraception to reduce repeat unintended pregnancy [5]. Consisting of a set of indicators and a group of SAC signal functions (critical services that facilities must perform in order to prevent and treat abortion complications), application of the approach should enable facilities to monitor progress toward achieving recommended levels of service availability and quality of care. Similar to the EmOC process indicators, the SAC model assumes that abortion-related mortality will decline if SAC services are available, of sufficient quality, and used by women.

Table 1 lists the 10 signal functions that determine the availability and distribution of SAC facilities. Health facilities must have performed the first 6 signal functions in the prior 3 months to be classified as “basic” or all 10 signal functions to be considered “comprehensive.” The basic signal functions are attainable for health centers and include services for first trimester induced abortion and treatment of complications. The additional 4 comprehensive signal functions are more

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consistent with hospitals’ capacity and include surgery and blood transfusion as well as second trimester abortion care. The recommended level of coverage is 5 facilities per 500,000 population, at least 1 of which is comprehensive.

The SAC indicators listed and defined in Table 2 are used to monitor facility availability and distribution (as determined by performance of the signal functions), service utilization, and quality of care.

### 1.2. Ethiopia and the Tigray Region

The 2008 maternal mortality ratio for Ethiopia is 590 deaths per 100,000 live births [1]. Nationally in 2005, only 14% of married women of reproductive age currently used modern contraception, and an additional 34% had an unmet need for family planning [6]. Women who do not want to become pregnant and do not have access to contraception are at risk of unplanned pregnancy and unsafe abortion. A nationally representative study of public and private health facilities in 2008 found that an estimated 382,000 induced abortions were performed in Ethiopia in 2008, about 27% of which were legal procedures in health facilities [7]. At the same time, almost 58,000 women were treated for complications of unsafe abortion and miscarriage [8].

To address deaths caused by unsafe abortions, in 2005 the Ethiopian Parliament liberalized the indications for legal abortion. Termination of pregnancy is now legal when the pregnancy results from rape or incest, when continuation of the pregnancy endangers the health or life of the woman or the fetus, in cases of fetal impairment, for women with physical or mental disabilities, for minors who are physically or psychologically unprepared to raise a child, and in cases of serious and imminent danger that can be averted only through immediate pregnancy termination. No consent from a spouse, partner, or parent is required to obtain a legal abortion, and no legal documentation of age, rape, or incest is needed. The Federal Ministry of Health (MOH) issued guidelines for implementation of induced abortion services in 2006.

The northern region of Tigray was selected to pilot the SAC model. The primarily rural population of 4.3 million [9] is served by 50 public health facilities (12 hospitals and 38 health centers) and there is little out-migration to seek health care in other regions. In addition to the public health system, nongovernmental organizations (NGOs) and for-profit medical clinics also provide reproductive health and abortion services in the region.

### 1.3. Study objectives

Ipas and the Tigray Health Bureau (THB) sought to document changes in the availability, utilization, and quality of abortion care

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### Table 1

<table>
<thead>
<tr>
<th>Signal functions for Safe Abortion Care (SAC)</th>
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<tbody>
<tr>
<td><strong>Signal functions for basic SAC services</strong></td>
</tr>
<tr>
<td>• Administer essential antibiotics</td>
</tr>
<tr>
<td>• Administer intravenous replacement fluids</td>
</tr>
<tr>
<td>• Administer oxytocics</td>
</tr>
<tr>
<td>• Perform removal of retained products for uterine sizes &lt; 12 weeks</td>
</tr>
<tr>
<td>• Perform induced abortion for uterine size ≤ 12 weeks for all legal indications</td>
</tr>
<tr>
<td>• Provide postabortion contraception</td>
</tr>
<tr>
<td><strong>Signal functions for comprehensive SAC services</strong></td>
</tr>
<tr>
<td>• Perform all basic functions plus:</td>
</tr>
<tr>
<td>• Perform removal of retained products for uterine sizes ≤ 12 weeks</td>
</tr>
<tr>
<td>• Perform blood transfusion</td>
</tr>
<tr>
<td>• Perform laparotomy</td>
</tr>
<tr>
<td>• Perform induced abortion for uterine size &gt; 12 weeks for all legal indications</td>
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</tbody>
</table>

Adapted from Healy et al. [5].

### Table 2

<table>
<thead>
<tr>
<th>Study question</th>
<th>Indicators</th>
<th>Definition</th>
<th>Recommended level</th>
</tr>
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<tbody>
<tr>
<td>Are enough facilities providing safe abortion care?</td>
<td>1. Amount of SAC services available.</td>
<td>Number of facilities providing basic and comprehensive SAC.</td>
<td>For every 500,000 population: 5 SAC facilities, at least 1 of which offers comprehensive SAC.</td>
</tr>
<tr>
<td>Are safe abortion care services well distributed?</td>
<td>2. Distribution of SAC facilities.</td>
<td>Number of facilities providing basic and comprehensive SAC in subnational areas.</td>
<td>Minimum: 100% of subnational areas have adequate level of SAC per recommended levels in indicator 1.</td>
</tr>
<tr>
<td>What proportion of services for women with obstetric complications is directed toward abortion complications?</td>
<td>3. Proportion of women treated for obstetric complications that are abortion related</td>
<td>Numerator: number of women with abortion complications treated at facility in a given period. Denominator: number of women with obstetric complications treated at facility in the same time period.</td>
<td>Over time, a declining percentage of women with abortion complications.</td>
</tr>
<tr>
<td>How common are serious abortion complications?</td>
<td>4. Proportion of women treated for abortion complications that are serious.</td>
<td>Numerator: number of women with serious abortion complications treated at facility in a given period. Denominator: number of women with all abortion complications treated at facility in the same time period.</td>
<td>Over time, a declining percentage of women with serious abortion complications.</td>
</tr>
<tr>
<td>To what extent are induced abortions being provided?</td>
<td>5. Proportion of women who received abortion services that had induced procedures.</td>
<td>Numerator: number of women receiving induced abortion procedures at facility in a given period. Denominator: number of women receiving abortion services at facility in the same time period.</td>
<td>Over time, a shift toward a higher proportion of women receiving induced abortion as a part of all abortion services in facility. Recommended level: approaching 100%.</td>
</tr>
<tr>
<td>Are appropriate technologies being used?</td>
<td>6. Proportion of induced evacuations (UE) performed with appropriate technology.</td>
<td>Numerator: number of UE procedures performed with appropriate technology at facility in a given period. Denominator: number of all UE procedures performed at facility in the same time period.</td>
<td>Over time, a shift toward a higher proportion of procedures performed with appropriate technology as per WHO recommendations. Recommended level: 100%.</td>
</tr>
<tr>
<td>Are women who have received abortion care provided contraception before being discharged from the facility?</td>
<td>7. Proportion of women who received abortion services that obtained contraception.</td>
<td>Numerator: number of women receiving abortion services who obtain a modern contraceptive method before leaving facility in a given period. Denominator: number of women receiving abortion services at facility in the same time period.</td>
<td>At least 60% of all women receiving abortion services.</td>
</tr>
</tbody>
</table>

Adapted from Healy et al. [5].
services in 50 public health facilities in the Tigray Region of Ethiopia using the SAC monitoring approach.

2. Methods

The 2-year project began in May 2007 and concluded in May 2009.

2.1. The intervention

Following release of the national abortion service guidelines and prior to implementation of SAC monitoring activities, Ipas Ethiopia and the THB began a series of trainings in comprehensive abortion care that eventually included clinical providers from all 50 public facilities. The trainings enabled facilities to add first trimester induced abortion to their services and provide women with postabortion contraception if they wished. The 2-week courses encompassed both didactic and supervised hands-on clinical practice. The trainings occurred between August 2006 and August 2008, prior to and continuing after the baseline assessment. Provider training in second trimester abortion did not occur during the project period. Following the training events, the MOH and Ipas provided manual vacuum aspiration (MVA) instruments for uterine evacuation to the 50 facilities, and staff from the THB and Ipas made periodic facilitative supervisory visits to assess availability of supplies and offer technical support. In addition, all sites were able to track comprehensive service delivery details in a special MOH-issued abortion logbook and awareness-raising efforts were undertaken by community health workers.

To accommodate the training roll-out schedule and to ensure that the facilities received clinical training prior to implementation of SAC monitoring, the 50 facilities were divided into 2 phases. In November 2007, providers from 28 of the 31 Phase 1 facilities participated in a 3-day orientation to the SAC approach. A similar 2-day SAC orientation was conducted in October 2008 for 18 of the 19 Phase 2 sites. On-site SAC orientations were conducted for providers from the 4 facilities unable to attend the group sessions.

2.2. Research methods

The project consisted of: (1) a baseline assessment of SAC performance in the 50 public health facilities before the intervention; and (2) routine monitoring visits to the facilities after the intervention, during which facility performance data were collected.

2.2.1. Baseline SAC assessment

The baseline SAC assessment of the 50 public health facilities in Tigray was conducted in May 2007 [10]. Using standardized data collection instruments [11], interviewers visited all facilities to obtain information for the period April 2006 to March 2007 [10]. Data collectors interviewed key informants to ascertain which signal functions had been performed in the 3 preceding months and obtained other required information from the obstetric and abortion logbooks for the 1-year baseline period. Baseline SAC indicators were then calculated for the region.

2.2.2. SAC monitoring visits

Following the 2007 SAC orientation for facility providers, Ipas and the THB made 4 visits to the Phase 1 sites over an 18-month period to collect logbook data, interview key informants about signal function performance, discuss progress in achieving the recommended indicator levels, and problem-solve barriers to service provision. Owing to budget limitations, only one SAC monitoring visit was made to Phase 2 sites, although most facilities had also received post-training visits from the THB and/or Ipas to support abortion service implementation.

2.3. Data management and analysis

Signal function and logbook data were obtained from each facility at the baseline assessment and monitoring visits. Monitoring was conducted by a team of 2, who reviewed and verified previous case counts while also collecting new information. Data were entered into Microsoft Excel 2007 and cross-checked against original entry forms. All data were converted into Stata/IC 11 (StataCorp LP, College Station, TX, USA) for analysis. Esri ArcInfo version 9.3 (Esri, Redlands, CA, USA) software and geographic coordinates for facilities were used to create maps showing availability and distribution of SAC services. The 2007 Ethiopian census data provided population figures for the Tigray Region [9].

The SAC indicators were calculated for 2 periods: the year-long, 2006–07 baseline for all 50 facilities; and the 6-month endline period common to all 50 sites from both phases (October 2008 through March 2009) [12]. Results are reported for each SAC indicator. For indicators 3–7, caseload numbers for the 6-month endline period are annualized for ease of comparison with the year-long baseline caseload numbers. The Wilcoxon matched-pairs signed-rank test was used to compare baseline and endline indicators for each facility. Significance was evaluated at $P<0.01$.

2.4. Ethical approval

The Tigray Health Bureau approved the project.

3. Results

3.1. Availability and distribution of Safe Abortion Care (indicators 1–2)

Table 3 shows the number of facilities achieving the basic and comprehensive designation according to signal function performance in the 3 months preceding data collection. For Tigray’s 2007 population, a minimum of 44 SAC facilities are recommended. In the baseline, a total of 17 facilities achieved basic or comprehensive designation according to signal function performance. The lack of comprehensive facilities was particularly acute, with just 3 of the recommended number of 9 comprehensive facilities (33%) achieving the designation. By 2009, the number of facilities achieving basic status was 91% of the recommended number, while the number of facilities fulfilling the comprehensive functions for SAC was 67% of the recommended number.

Figs. 1 and 2 show the baseline and endline distribution of SAC facilities. The expanded distribution of basic and comprehensive facilities between the two periods is apparent in each subregional area. One important example is the improved coverage in the far western area of the region, an especially remote area with difficult terrain.

3.2. Utilization of Safe Abortion Care (indicators 3–5)

Table 4 shows changes in abortion service utilization over time. At baseline, 48% of obstetric complication cases presenting to health

<table>
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<tr>
<th>Table 3</th>
<th>Recommended and actual SAC service availability in Tigray, Ethiopia (indicator 1) Jan–Mar 2007 and Jan–Mar 2009.</th>
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<tbody>
<tr>
<td></td>
<td>Recommended number of SAC facilities</td>
</tr>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>Basic</td>
<td>35</td>
</tr>
<tr>
<td>Comprehensive</td>
<td>9</td>
</tr>
<tr>
<td>Total (Basic + Comprehensive)</td>
<td>44</td>
</tr>
</tbody>
</table>

$^a$ Recommended number of SAC facilities based on Tigray population of 4314456 in 2007.

$^b$ Performed SAC signal functions during 3-month period.
facilities were due to abortion, which decreased to 35% at endline. The percentage of abortion complications at health centers remained similar over time, while the percentage dropped markedly in hospitals, where it had been especially large (51%) at baseline.

In the abortion logbooks, providers can indicate whether an abortion complication is serious or moderate in severity. At baseline, just over 6% of abortion complications were considered serious, while at endline, 17% were serious. The increased use of this classification
was greater at hospitals, rising from 6% to 20% of abortion complications.

The proportion of all abortion services that were induced abortions rose significantly from 7% to 60% between baseline and endline (P < 0.01). This trend was particularly notable at health centers, where 77% of abortion procedures were for induced services at endline. Hospitals provided very few induced abortions during the baseline period, but at endline, care was evenly split between treatment of abortion complications and induced services. In addition, the actual number of induced abortions increased dramatically: from 168 at the baseline to an estimated annual induced caseload of 2672 at the endline, an increase of 1490%. The number of abortion complications cases fell by 16%.

Changes in the facility level of service provision also occurred during the project. Fig. 3 shows that at baseline, most abortion procedures (89%) were performed in hospitals. At endline, this figure dropped to 64%, and more than one-third (36%) of women obtained services at health centers.

### 3.3. Quality of Safe Abortion Care (indicators 6–7)

Marked improvement was seen in the quality of abortion care between baseline and endline (Table 5). The proportion of women who underwent uterine evacuation (UE) with recommended technologies increased significantly, from 30% to 85% (P < 0.01). An analysis of use of recommended technologies by trimester at endline (indicators 6a–6b in Table 5) showed that 94% of first trimester procedures were performed with recommended technologies compared with only 45% of second trimester procedures. While the increase in recommended methods for second trimester procedures (dilatation and evacuation, use of mifepristone/misoprostol or gemeprost, or vaginal administration of misoprostol) was considerable (37 percentage points), the overall proportion was lower than first trimester procedures.

Contraceptive uptake increased significantly from 31% to 78% (P < 0.01). A higher proportion of women seen at health centers received contraception than those at hospitals at both baseline and endline.

### 4. Discussion

The performance of 50 public health facilities in Tigray region improved markedly over time in almost all measures of SAC availability, distribution, utilization, and quality of services. Of the 11 health centers that did not meet the requirements for a basic SAC facility at baseline, the most common missing signal function was treatment of an abortion complication. However, 8 of these 11 facilities were providing safe induced abortion. As women use safe services, fewer women will need treatment for abortion complications. However, it is important that facilities and outreach efforts continue to ensure that women know to seek treatment for abortion complications. Gaps in the number of comprehensive facilities also remained, possibly because providers had not yet been trained in second trimester abortion.

The study has several limitations. To accommodate the rolling intervention schedule, the SAC program had 2 groups of sites and 2 time frames; however, from both a logistic and measurement perspective, incorporating all 50 facilities into the study at the same time would have been preferable. In addition, no comparison group of facilities without the SAC intervention was included in the project.

The drop in abortion complications as a proportion of obstetric complications over a relatively short time period is notable, but this indicator requires cautious interpretation. Although the absolute number of abortion complications declined between the 2 periods, nonabortion obstetric complications also rose by 13%--a trend that requires further exploration. A likely explanation is that the THB has worked to improve treatment of obstetric complications in recent years, and more women may have become aware of these services and sought treatment.

It seems likely that improved record keeping affected the increase in the recorded number of serious abortion complications and second trimester abortions. During the SAC orientation, providers received training in recordkeeping, with a particular emphasis on the definition of serious complications. The health facilities also received wall charts with definitions of logbook categories to be posted in the facility. These interventions could have led to improved logbook classification of complications over time. Similarly, clarifications about protocols for second trimester induced abortion may have contributed to more recording of second trimester cases.
In contrast, data on nonabortion obstetric cases came from logbooks that were not standardized across facilities and were of variable quality and completeness.

5. Conclusions

The relative simplicity of the SAC model allowed providers and facilities to focus on the minimum elements needed for adequate access to and quality of safe abortion care.

The provision of safe induced abortion increased dramatically in Tigray, both in the percentage of all abortion cases and in absolute numbers of women served, representing a rapid transition from a focus on treatment of abortion complications to provision of safe abortion since liberalization of the national abortion law.

This transition from postabortion care to safe induced abortion and improved postabortion contraception represents a critical step in reducing abortion-related maternal mortality. The association between access to safe abortion services and declines in abortion-related maternal mortality has been demonstrated in countries across the world (e.g., Romania, Bangladesh, and South Africa) [13–15]. Building on the widespread use of the UN process indicators for monitoring emergency obstetric care, the SAC indicators can be used to ensure that necessary elements of abortion-related care are appropriately identified, improved, and monitored as part of efforts to achieve MDG5.

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Conflict of interest

The authors report no conflict of interest.

References