Active Management of the Third Stage of Labor

Data Obtained from the National Health Network Hospitals in El Salvador

July to August 2006

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Prevention of Postpartum Hemorrhage Initiative

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The report was prepared by Dr. José Angel Portillo Henriquez, a member of the Association of Gynecology and Obstetrics of El Salvador (ASOGOES) and the El Salvadoran coordinator within the Research Committee of the Central American Federation of Associations of Obstetricians and Gynecologists (COMIN-FECASOG). The country research coordinator was Dr. José Angel Portillo. Data collectors included the following nurses: Rut Marlene Bueno, Marlene Ercilla Chiguila, Flor de Maria Guevara Vargas, Yenni Elizabeth Chavez, Sara Raquel Martinez, Karla Isabel Chavez Pineda, Jenny Flores Sortoñ, and Patricia Maricela Molina.

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About POPPHI

POPPHI is a USAID-funded, five-year project focusing on the reduction of postpartum hemorrhage, the single most important cause of maternal deaths worldwide. The POPPHI project is led by PATH and includes four partners: RTI International, EngenderHealth, the International

Federation of Gynecology and Obstetrics (FIGO), and the International Confederation of Midwives (ICM).

Commitment to Health: The Central American Federation of Associations and Societies of Obstetricians and Gynecologists

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Table of Contents

Tables and Figures

Acronyms

AMTSL	Active management of the third stage of labor
ASOGOES	Association of Gynecologists and Obstetricians of El Salvador
COMIN-FECASOG	Committee for Research of the Central American Federation of Gynecology and Obstetric Associations
FIGO	International Federation of Gynecology and Obstetrics
ICM	International Confederation of Midwives
IM	Intramuscular administration
IV	Intravenous administration
MSPAS	Ministry of Public Health and Social Work (Ministerio de Salud Pública y Asistencia Social)
POPPHI	Prevention of Postpartum Hemorrhage Initiative
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Postpartum hemorrhage is of the world's leading causes of maternal mortality. Active management of the third stage of labor (AMTSL) is a feasible and inexpensive intervention that can help save thousands of women's lives. AMTSL involves three basic procedures: the use of a uterotonic agent (preferably oxytocin) within one minute following the delivery of the baby, delivery of the placenta with controlled cord traction, and massage of the uterus after delivery of the placenta, with palpation of the uterus to assess the need for continued massage for the two-hour period following delivery of the placenta. Based on conclusive evidence from clinical trials, the International Confederation of Midwives (ICM) and the International Federation of Gynecology and Obstetrics (FIGO) issued a joint statement in 2003 stating that every woman should be offered AMTSL as a means of reducing the incidence of postpartum hemorrhage.[1] The World Health Organization (WHO) Making Pregnancy Safer Technical Update on Prevention of Postpartum Haemorrhage by AMTSL recommends that "AMTSL should be practiced by all skilled attendants at every birth to prevent postpartum haemorrhage."[2]

Currently, very little is known about the actual practice of AMTSL. The aim of this study is to provide ministries of health and their international partners with the descriptive information necessary to assess AMTSL practices and identify major barriers to its use. Specifically, the study asks:

1. In what proportion of deliveries is AMTSL used nationally?
2. What practices are in place that do not conform with the FIGO/ICM definition of AMTSL?
3. What are the facility- and policy-level barriers and facilitators to the use of AMTSL?

To answer these questions, a nationally-representative sample of facility-based deliveries was observed; clinical care guidelines, the Essential Drug List, and medical and midwifery school curricula were reviewed; the central pharmaceutical storage site, as well as pharmacies in health facilities selected for the study, were visited; and interviews were conducted with hospital directors and pharmacists.

The study showed that only 60 percent of the deliveries received a uterotonic drug during the third or fourth stage of labor. The third stage of labor begins with the birth of the baby and ends with the delivery of the placenta, and the fourth stage of labor is the first postpartum hour, which begins after the delivery of the placenta. Oxytocin, the drug of choice for AMTSL, was the only uterotonic drug used. Two AMTSL definitions were used in the study. The first definition strictly reflects the FIGO/ICM recommendations, including the administration of the uterotonic drug within one minute of delivery of the baby; the second definition is slightly more flexible, extending the timing of the uterotonic drug to within three minutes of delivery of the baby. The results of the study show that three percent of deliveries met the strict definition of correct AMTSL use, and seven percent met the more relaxed definition of AMTSL use. This means that between 93 and 97 percent of the women delivering in national public health network facilities did not receive adequate prevention of postpartum hemorrhage.

Several practices led to the low use of AMTSL. These include the incorrect timing of the administration of oxytocin, inappropriate application of traction to the cord, low use of massage immediately following delivery of the placenta, and even lower use of massage followed by

palpation to assess the need for continued massage. The study also documented several potentially harmful practices, such as application of traction to the cord without prior administration of a uterotonic or without manual support to the uterus, and application of fundal pressure or uterine massage while awaiting delivery of the placenta. At least one of these practices was observed in 80 percent of deliveries.

The policy and logistical environment to support AMTSL use in El Salvador is mixed. Some key clinical guidelines for obstetric care promote and define AMTSL using a definition that is close to the FIGO/ICM definition (with the exception that palpation of the uterus to assess need for continued massage following delivery of the baby is not included), while others mention only the use of uterotonics for the prevention of postpartum hemorrhage. Also, AMTSL is not included in the curricula for medical doctors or nurses. However, it should be noted that both oxytocin and ergometrine are included on the Essential Drug List, oxytocin is clearly the uterotonic of choice in El Salvador for AMTSL, and drugs are appropriately stored at the Central Warehouse. At the facility level, the logistics regarding the procurement and storage conditions of uterotonic drugs in health facilities is quite good, with specific problems in a small percentage of facilities, which require attention. For example, oxytocin and ergometrine were observed being stored at room temperature in seven and ten percent, respectively, of the pharmacies of visited facilities, and an overstock of uterotonic drugs appears to be more common than understock.

Recommendations

The following recommendations are made based on the results of this study regarding the use of AMTSL in the national hospital network:

National Policies

1. Standardize and disseminate the use of MSPAS National Clinical Care Guidelines for the Principal Obstetric Morbidities at the Second Level of Medical Care (*Guias clinicas de atención por las principales morbilidades obstetricas en el segundo nivel de atención)* in national public health network hospitals and at private and autonomous health facilities. Ensure that massage/palpation every 15 minutes for two hours is included in the AMTSL definition.
2. Update and disseminate the National Clinical Care Guidelines for Obstetric Morbidities at the Third Level of Medical Care (*Guias clinicas de las Morbilidades obstetricas en el tercer nivel de atención)* to comply with the FIGO/ICM definition of AMTSL.
3. Implement the FIGO/ICM definition of AMTSL into pre-service training programs for medical doctors and nurses as a strategy to decrease morbidity and mortality due to postpartum hemorrhage.
4. Work jointly with the MSPAS, ASOGOES, international cooperating agencies, and other organizations to promote and implement the use of AMTSL in compliance with the definition described in the clinical care guidelines for obstetric morbidity at the second level of medical care .
5. Adequately promote and disseminate international standards for the appropriate storage of uterotonic drugs.

Facility-level interventions

Health Providers/Practice

6. All medical and paramedical personnel responsible for managing deliveries in the 28 maternity hospitals should practice AMTSL. This can be accomplished either by:
    a) Conducting hands-on, competency-based, in-service AMTSL training for those providers not skilled in AMTSL.
    b) Identifying barriers, including motivation, that impede use of AMTSL, and address barriers.
7. Conduct training for pharmacy personnel regarding the appropriate conditions recommended by the manufacturer for storage of uterotonic drugs.

Logistics and Supplies

8. Provide facilities with supplies and equipment needed for the appropriate storage of uterotonic drugs in pharmacies and delivery rooms.
9. Guarantee the adequate supply of uterotonic drugs in each hospital, avoiding under- and overstock of drugs to ensure that drugs do not pass their expiration date.

Monitoring and Evaluation

10. Establish systems of supervision within labor and delivery wards such that use of AMTSL is an expected behavior in all national public health network birthing facilities.
11. Include use of AMTSL in the routine reporting of statistics for national public health network birthing facilities for monitoring and control of its implementation and use.
12. Add a column to the registration books of the delivery rooms for monitoring the practice of AMTSL.
13. Implement clinical audits focused on AMTSL.

1. Background

Postpartum hemorrhage is one of the world's leading causes of maternal mortality. Active management of the third stage of labor (AMTSL) is a feasible and inexpensive intervention that can help save thousands of women's lives.

AMTSL involves three main components:

- The use of a uterotonic agent within one minute following the birth of the baby.
- Delivery of the placenta with controlled cord traction.
- Massage of the uterus after delivery of the placenta.

This definition is supported by the International Federation of Gynecology and Obstetrics (FIGO), the International Confederation of Midwives (ICM)[1] and the World Health Organization (WHO)[2]. This definition differs from the original research protocol in the Bristol[3] and Hinchingbrooke[4] trials because the original protocols include immediate cord clamping and did not include massage of the uterus. The FIGO/ICM joint statement[1] and *Managing Complications in Pregnancy and Childbirth*,[5] produced by WHO, do not include immediate cord clamping.

Clinical trials in developed countries have shown that the use of AMTSL significantly reduces postpartum hemorrhage, in contrast to physiologic management of the third stage of labor where oxytocic drugs are not used and the placenta separates spontaneously and is delivered by gravity and maternal effort. When compared to AMTSL, the use of physiologic management has a higher rate of postpartum hemorrhage and severe postpartum hemorrhage, greater need for blood transfusion and therapeutic oxytocics, and a longer duration of the third stage of labor. A Cochrane review of these trials concludes by recommending AMTSL for all women delivering in a hospital and anticipating the vaginal birth of a single infant.[6]

Endorsement and use of AMTSL

Based on this body of evidence, ICM and FIGO issued a joint statement in November 2003 stating that every woman should be offered AMTSL "as a means of reducing the incidence of postpartum hemorrhage due to uterine atony."[1] The inclusion of AMTSL in the WHO evidence-based manual *Managing Complications in Pregnancy and Childbirth* also attests to the international acceptance of this practice as the standard of care.[5]

Evidence regarding adoption of this practice, however, is limited. Evaluations of donor-funded projects incorporating AMTSL tend to be limited to reporting on the numbers of providers trained and the percent achieving competence following training. Apart from anecdotal information, a 2003 article by the Global Network for Perinatal and Reproductive Health (Festin et al.) [7] offers a limited glimpse into the adoption of this practice. Their results, based on an evaluation of 15 university-based referral obstetric centers in developed and developing countries, show substantial variation between and within hospitals. Overall, only 25 percent of observed deliveries included AMTSL. Only one (in Dublin, Ireland) consistently used all three components of the practice. Variation in the prophylactic use of oxytocic drugs ranged from 0 to 100 percent; the practice of controlled cord traction ranged from 13 to 100 percent; and the number of women who received additional doses of oxytocin during the third stage of labor

ranged from 5 to 100 percent. There is insufficient evidence for drawing conclusions about the effectiveness of this practice in its altered states. These results do suggest, however, that the use of AMTSL is quite low and, where it is practiced, the definition varies within and between countries.[7]

Since 1997, the Safe Motherhood Initiative has stated that maternal mortality is an issue of health infrastructure. AMTSL is a highly measurable, evidence-based, life-saving aspect of this health infrastructure. Given that postpartum hemorrhage is a leading cause of maternal death in many countries with high maternal mortality, there is an important and urgent need for information from these countries on current practices regarding AMTSL.

About this study

As a complement to work undertaken by the Global Network for Perinatal and Reproductive Health, these surveys have been carried out to advance the understanding of current AMTSL practices in East and West Africa (Ethiopia, Tanzania, and Benin), Asia (Indonesia), and Central America (El Salvador, Guatemala, Honduras, and Nicaragua). Surveys are underway in Uganda and Ghana. This report focuses on El Salvador, where maternal mortality was estimated at 71 per 100,000 live births in 2006, according to the Maternal Mortality Baseline Study,[8],with hypertensive disease of pregnancy and hemorrhage as the two leading causes of maternal death (representing 42 percent and 38 percent of all maternal deaths, respectively). As of 2003, the percent of births delivered in public health facilities was 54 percent, 12 percent were in social security facilities, and only three percent occurred in private sector institutions,[9] suggesting that more than two-thirds of births that take place in facilities could potentially benefit from AMTSL.

The ten country AMTSL surveys focus on policy, provider-related factors, and supplies and logistics. When viewed together, these components provide important insights on routine use of AMTSL (Figure 1.1).

Policy

At the national level, a number of influences determine the priority given to AMTSL. For example, given that AMTSL has been a standard of care in the United Kingdom (UK) for many years, some researchers have hypothesized that AMTSL is more common in former UK colonies and among providers who have trained in the UK. Likewise, effective leaders from national or international agencies may have been able to influence national policies, the inclusion of drugs in the essential drug list and country formulary, and health provider education regarding AMTSL. In turn, such training may influence facility-based policies and behavioral expectations.

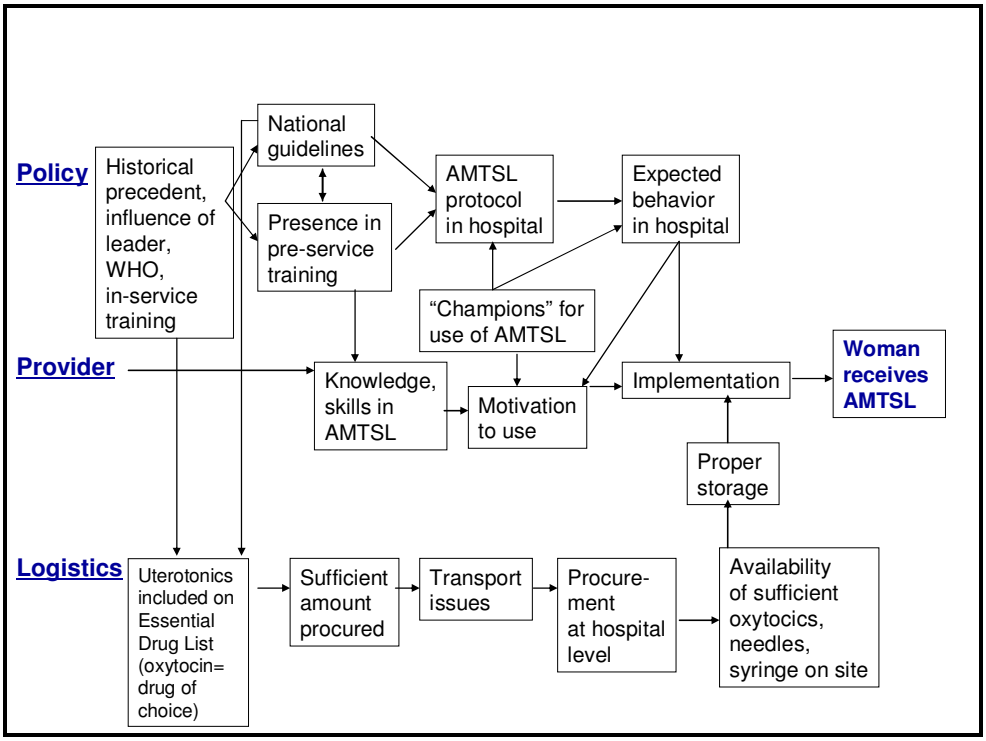
Provider-related factors

The knowledge and skills required to perform AMTSL are essential for routine use of the practice. Provider motivation, which is influenced by facility-based behavioral expectations, also is key.

Supplies and logistics

The sufficient availability of high-quality uterotonic drugs, needles, and syringes at national and local levels is essential for routine use of AMTSL. Effective use of AMTSL also requires appropriate conditions during transport and storage to ensure the use of chemically-active drugs and safe, sterile needles and syringes.

Figure 1.1. Determinants of the routine use of AMTSL.



The aim of this study is to provide ministries of health (MOHs) and their international partners with the descriptive information necessary to assess AMTSL practices and identify major barriers to its use. The findings will inform interventions that improve adoption and implementation of AMTSL.

The study's specific research questions are as follows:

1. For what proportion of deliveries is AMTSL used at a national level? Which components of AMTSL (e.g., prophylactic use of oxytocic agents, controlled cord traction, and fundal massage) are practiced, and how consistently are they practiced?
2. Is AMTSL formally promoted in the Standard Treatment Guidelines (STGs) in each country at national and/or facility levels? If so, since when? How is AMTSL defined in the standards?
3. How is the need for AMTSL drugs quantified at national and facility levels?
4. Which uterotonic drug (e.g., oxytocin, ergometrine, or a prostaglandin) is used? How is it stored?
5. At the facility level, is enough oxytocin available to allow for routine use of AMTSL?

6. What are the major barriers to correct use of AMTSL, as defined by WHO and FIGO/ICM in their joint statement on the prevention of postpartum hemorrhage?

2. Methods

This study is part of a multiple country study to assess use of AMTSL among facility-based deliveries. The development of the study was a participatory process which involved an initial expert meeting in Washington, DC in May 2005 to elicit feedback on the draft protocol, a planning workshop in Nairobi, Kenya in July 2005 for the first two country studies, and planning workshops in Panama and El Salvador in January and February 2006 with representatives of the Central American Federation of the Associations and Societies of Gynecologists and Obstetricians (COMIN-FECASOG) to further refine the protocol and questionnaires before the beginning of data collection in El Salvador, Guatemala, Honduras, and Nicaragua.

In the case of El Salvador, prior to data collection the study protocol was submitted to and approved by the Ministry of Public Health and Social Work (MSPAS) of El Salvador. Following this approval, the protocol was submitted to the Committee for Human Research at the Johns Hopkins Bloomberg School of Public Health in Baltimore, Maryland. The Johns Hopkins Committee for Human Research judged the protocol to be exempt from review for human subjects research because no personal identifiers were collected and because the procedures observed were all standards of care. They did specify that informed consent must be obtained at admission to the health facility and not in the labor and delivery room. In this study, informed consent consisted of describing the study and requesting participation from women at admission to the health facility. PATH deferred to Johns Hopkins for their review. The MSPAS did not consider review by local ethics committees to be necessary.

Questionnaire development

The processes and outcomes identified in the conceptual framework for the study (Figure 1.1) determined the content and number of questionnaires required for the study. In all, three questionnaires were developed:

- **National-level questionnaire.** This questionnaire was designed to capture the policy environment for AMTSL. It includes questions regarding the content of the essential drug list, STGs, pre-service training curricula, procurement practices for uterotonic drugs, and storage conditions for uterotonic drugs at the central pharmaceutical storage site. Completing this questionnaire required document review, interviews with MOH staff and other policymakers, and a visit to the pharmaceutical storage site. The study's country coordinator conducted the national-level data collection.
- **Facility-level questionnaire.** This questionnaire was designed to capture the policy environment at the individual facility level. It includes questions on the availability of clinical guidelines in the facility, provision of in-service training on AMTSL, the cost of uterotonic drugs to the facility and to patients, access to the facility pharmacy, procurement practices for uterotonic drugs, and supply and storage conditions at the facility. Completing this questionnaire required interviews with hospital administrators and the pharmacist and a visit to the facility pharmacy. One of the two members of the data-collection team completed this questionnaire during his/her visit to selected facilities.
- **Observation-of-deliveries questionnaire.** This questionnaire was designed to document provider practices during the third stage of labor and the first 30 minutes of the fourth stage

of labor for all vaginal deliveries. It was based on the questionnaire used in the study by Festin et al.[7] The questionnaire documents the availability of uterotonic drugs and other supplies in the labor and delivery unit as well as storage conditions for uterotonic drugs. Members of the data collection team completed the questionnaire based on their observation of deliveries during the visit to selected facilities.

Training for data collectors

A group of eight data collectors was trained to observe deliveries in selected health facilities. The team was made up of eight graduate nurses. The country coordinator and the Regional representative COMIN-FECASOG were in charge of observer training. A three-day training session (July 22 to 24, 2006) was held in San Salvador, El Salvador. The training involved lectures, a visual CD-ROM presentation on AMTSL, demonstrations and practice using an anatomical model, and field practice that provided an opportunity to pretest the questionnaires and to supervise the observers.

Sample Design

A nationally-representative sample of approximately 200 facility-based deliveries was required to meet the aims of the study described in the methodology section. Sample size calculations assumed a prevalence of 30 percent, a 90 percent response rate, and a design effect of two. Due to budgetary and logistical concerns, the sample was restricted to public facilities. El Salvador has 28 national public health maternity hospitals, which are distributed throughout all five regions of the country. All of these public maternity hospitals were included in the sample.

One team of two data collectors visited each health facility for two days. Each data collector observed all vaginal deliveries during an eight-hour period during the first and second day, thus ensuring observations over a 16-hour period per day for two days. A total of 190 deliveries were observed across 28 facilities. In two facilities there were no deliveries during the two-day period of observation.

To ensure a nationally-representative sample of deliveries, weights were calculated for use during analysis. When the number of deliveries observed in a facility over the two-day period is not proportional to the reported annual number of deliveries in that facility, weights will correct for this over- or under-representation. The weighted number of observed deliveries is 190. All of the tables in this report show weighted values for n.

Fieldwork

The MSPAS sent a memorandum to the directors of the 28 hospitals authorizing the study. The study coordinator provided a copy of the memorandum to the observers as letters of introduction for each facility. Four teams of two data collectors carried out fieldwork from July 28 to August 12, 2006. The study coordinator made one quality-control visit to hospitals in each regional zone.

Data entry and analysis

The study team adapted the data entry programs developed for the global survey to the finalized El Salvadoran questionnaire. EpiInfo (version 3.3.2) was used for data entry and cleaning. The data were double entered, and a preliminary data cleaning process was carried out immediately following fieldwork. Data cleaning was completed during a data analysis workshop held in Baltimore, MD in December 2006. Data analysis was conducted using STATA 9.1.

3. Results

The National Policy Environment

Standard Treatment Guidelines

In El Salvador, there are two national guidelines related to maternal health. One is for second-level medical care and the other is for third-level medical care.[*] AMTSL is mentioned in the guidelines entitled, *Guías clínicas de atención de las principales morbilidades obstétricas para el Segundo nivel de atención* (Clinical Guidelines for the principal obstetric morbidities for Second Level Medical Care) published in 2005. In this document, AMTSL is defined to include: intramuscular administration of 10 international units (IU) of oxytocin after delivery of the baby, controlled cord traction with manual support to the uterus, and uterine massage after delivery of the placenta. Palpation every 15 minutes for two hours following delivery of the placenta to assess the need for continued massage is not mentioned. Oxytocin is the uterotonic drug recommended for AMTSL use. There is no second choice drug.

The use of AMTSL is not mentioned in the Clinical Care Guidelines for third level medical care that was published in 2004. In this document, only the treatment of postpartum hemorrhage is described. However, there are no policies that restrict the use of AMTSL in the country, for example, by limiting who has the authority to use uterotonic drugs.

Essential Drug List

Both oxytocin and ergometrine are registered in El Salvador and are included as uterotonic drugs in the *Cuadro Basico de Medicamentos*, the basic table of drugs. Misoprostol, although registered in the country, is not included as a uterotonic drug on the list. Syntometrine or other prostaglandins are also not included. The procurement of AMTSL drugs in the public sector is limited to the drugs listed in the basic table.

Availability and storage of uterotonic drugs

El Salvador has a Central Drug Storage and Distribution Warehouse. The Central Warehouse procures the uterotonic drugs included in the basic table of drugs. The quantity of drugs to be procured is determined by consumption. There was no ergometrine in stock at the time of the visit to the Central Warehouse. Oxytocin was available and stored in temperature and light conditions recommended by the manufacturer, that is between 2 to 8° C in the dark. According to the information obtained, no routine quality-control tests are performed when the drugs are received at the warehouse.

[*] The second level of medical care includes all district level hospitals in the country. The third level of medical care refers to the National Referral Maternity Hospital.

Table 3.1. Availability and storage conditions for the uterotonic drugs at the central warehouse

	Oxytocin	Ergometrine
Storage temperature recommended by the manufacturer	2-8° C	2-8° C
Actual storage temperature	2-8° C	Not available at the time of the visit
Light conditions recommended by the manufacturer	Store far away from light	Store far away from light
Current light storage conditions	Store in the dark	Not available at the time of the visit
Tests done to guarantee the quality of the drug upon reception	No	No
How is quantity of drugs determined for procurement	Based on consumption	Based on consumption

Pre-Service and In-Service Training in AMTSL

Even though AMTSL is mentioned in some clinical practice guidelines, it is not currently included in the pre-service curriculum of medical doctors or nurses. However, some in-service training programs have been held. This past year, the *Gerencia de Atención Integral a la Mujer y Niñez* (Management for Integrated Health Care for Women and Children) of the MSPAS, with technical support from the *Salvadoreños Saludables* project (SALSA-PRIME II/USAID) offered theoretical training on emergency obstetric care for nurses and medical doctors from second-level hospitals. Although the curricula were not standardized, the components of AMTSL described above in the clinical guidelines for second-level medical care were included in some of the training.

The Facility-level Policy Environment

For all health facilities in the sample, the data collectors interviewed the director of the health facility (or other responsible staff) and the pharmacist and visited the pharmacy to record the availability and storage conditions of uterotonic drugs. The results of these visits are summarized below.

Availability of clinical guidelines specific to AMTSL

Clinical Guidelines mentioning AMTSL were available in all 28 maternity hospitals included in the study.

Accessibility of the Pharmacy and Pharmaceuticals at the Facility-level

As shown in Table 3.2, the 28 facilities included in the study have pharmacies that for the most part ensure 24-hour drug availability. Necessary supplies such as syringes *and* uterotonic drugs are also provided for free to patients in the vast majority of cases.

Table 3.2 Percent of health facilities with available pharmacies and supplies

Pharmacies and supplies	% of facilities N=28
Pharmacy exists in the facility	100.0
Can reserve drugs for night delivery/Pharmacy with 24-hour service	96.4
Family has to buy syringes required for the delivery	0.0
Family has to buy uterotonic drugs	3.6

Storage Conditions for Uterotonic Drugs at the Facility-level

All facilities included in the study procure oxytocin, 75 percent procure ergometrine, and 79 percent procure misoprostol. See Table 3.3. Most facilities follow the specific temperature and light conditions during storage indicated by the manufacturer. However, manufacturer recommendations were either missing or could not be located in approximately 10 percent of the facilities that procure oxytocin and misoprostol and in 24 percent of those that procure ergometrine. Oxytocin is maintained at a temperature between 2 and 8 ºC in 68 percent of facilities and at less than 15ºC in an additional 18 percent of the facilities that procure it. In seven percent of facilities that procure oxytocin, the drug was stored at room temperature. Ergometrine is maintained between 2 and 8 ºC in 62 percent of facilities, with an additional ten percent stored at less than 15ºC in facilities that procure it. Ten percent of facilities that procure ergometrine store it at room temperature. Misoprostol, where available, was maintained at temperatures above 15ºC in two-thirds (68 percent) of facilities.

Eleven percent of the facilities that procure oxytocin, five percent that procure ergometrine, and five percent that procure misoprostol indicated that the light conditions required for drug storage were not indicated in the manufacturer recommendations. Most of the facilities keep oxytocin and ergometrine in the dark away from direct light, whereas misoprostol is kept in daylight but away from the direct sunlight in 55 percent of the facilities that procure it and in darkness in 23 percent.

Table 3.3 Percent of facilities procuring oxytocin, ergometrine and misoprostol and percent distribution of procured drugs by recommended and observed storage conditions

	% of facilities n = 28		
Conditions	**Oxytocin**	**Ergometrine**	**Misoprostol**
Procured by the institution	100.0	75.0	78.6
	% of facilities		
	n =28	n =21	n =22
Storage temperature recommended by the manufacturer			
2-8°C	57.1	38.1	0.0
<15 °C	17.9	14.3	9.1
15-25 °C	7.1	14.3	50.0
25-30 °C (Room temperature)	7.1	9.5	31.8
Missing data or could not locate recommendations	10.7	23.8	9.1
Actual storage temperature for storage of drug			
2-8 °C	67.9	61.9	0.0
<15 °C	17.9	9.5	9.1
15-25 °C	7.1	14.3	31.8
25-30 °C (Room temperature)	7.1	9.5	36.4
Missing data	0.0	4.8	22.7
Light conditions recommended by the manufacturer			
No indication	7.1	4.8	4.6
Away from light	89.3	85.7	90.9
Missing data or could not locate recommendations	3.6	9.5	4.6
Actual light conditions for storage of drug			
Kept in the dark/refrigerated	89.3	85.7	22.7
In daylight, away from direct sunlight	10.7	9.5	54.6
In direct sunlight	0.0	0.0	0.0
Missing data	0.0	4.8	22.7

The quantity of the uterotonic drug procurement is mostly done based on previous consumption for all three uterotonic drugs. See Table 3.4. The procurement price of uterotonic drugs purchased for facilities varies considerably. Generally, oxytocin tends to be the least expensive drug per ampoule and misoprostol the most expensive. The average cost per ampoule of oxytocin and ergometrine is US$0.46 and US$0.4, respectively. The average cost per tablet of misoprostol is US$3.42 (data not shown).

The availability of uterotonic drugs was assessed by documenting current availability, history of stockouts, and months of stock available, based on current consumption. Oxytocin was available at the time of the visit in all facilities, with supplies for at least one month in approximately 80 percent of the hospital pharmacies. No stockouts of oxytocin were documented during the three previous months. However, seven percent of facilities had a stock sufficient for 12+ months,

based on current consumption of oxytocin. Given that only 60 percent of women received oxytocin during the third or fourth stages of labor, this excess stock should be used to expand the use of AMTSL for all deliveries. Ergometrine was available at the time of visit in 90 percent of the facilities, and among these facilities, ten percent had experienced a recent stockout. For five percent of these facilities, the stockout lasted 30 days or longer. One-third of these facilities had a stock of ergometrine sufficient for greater than 12 months, based on current consumption. Misoprostol is the uterotonic drug the least available in El Salvador, with only in 64 percent of the facilities that usually procure it. In more than one-third of these facilities (36 percent), there had been stockouts of misprostol during the three previous months. Of the 22 hospitals that procure misoprostol, 27 percent had stock on hand sufficient for longer than 12 months.

Table 3.4. Percent of facilities procuring oxytocin, ergometrine and misoprostol by costs and stock of uterotonic drugs

	% of facilities n = 28		
Conditions	**Oxytocin**	**Ergometrine**	**Misoprostol**
Procured by the institution	100.0	75.0	78.6
	% of facilities		
	n =28	n =21	n =22
Availability at the time of the visit	100.0	90.5	63.6
How is quantity of drug determined for procurement			
Based on consumption	96.4	90.4	91.0
Standard/fixed quantity (determined at the central level)	3.6	4.8	4.5
No information	0.0	4.8	4.5
Facility's procurement price per ampoule/tablet in US$			
<0.40	28.6	14.3	9.1
0.40 - < 0.80	53.6	9.5	4.5
0.80 - < 1.20	10.7	33.3	4.5
1.20 - < 1.60	0.0	0.0	4.5
1.60 - < 2.00	0.0	4.8	0.0
2.00 - < 3.00	0.0	23.8	27.3
3.00 -_ < 7.00	0.0	0.0	13.6
>= 7.00	0.0	0.0	18.2
No information	7.1	14.3	18.2
Months covered with available stock			
None available at visit	0.0	0.0	36.4
< 1 Month	21.4	9.5	0.0
1- <3 Months	46.4	0.0	18.2
3- <6 Months	10.7	23.8	4.5
6- <9 Months	10.7	4.8	0.00
9- <12 Months	3.6	0.0	0.00
≥12 Months	7.2	33.3	27.3
Missing data	0.0	28.6	13.6
Number of stockout days during the last 3 months			

0	100.0	90.4	63.6
<30 days	0.0	0.0	27.3
≥30 days	0.0	4.8	9.1
No Information	0.0	4.8	0.0

In-Service Training at the Facility-level

In the year preceding the study, in-service training programs that included AMTSL were conducted in the majority of hospitals visited. However, 25 percent of the facilities reported not providing in-service training programs for nurses, and 39 percent of the facilities reported not having or not knowing if in-service training for medical doctors was provided.

4. Findings regarding the management of the third stage of labor

The principle objectives of this study were to measure the use of AMTSL according to FIGO/ICM criteria and to measure current practices regarding the management of the third and fourth stages of labor outside of this definition. This section describes the management of the third and fourth stages of labor by focusing on 1) the overall use of uterotonic drugs; 2) the timing, mode of administration, and dose of these drugs; 3) the practice of the individual components of AMTSL; 4) the correct use of AMTSL; and 5) the observation of potentially-harmful practices.

Description of the study sample

A total of 190 deliveries were observed in 26 maternity hospitals in this study. There were no deliveries during the observation period in two hospitals. The weighted number of observed deliveries is 190.

Deliveries were observed in all regions of El Salvador, with 31 percent in the Oriental region, 25 percent in the Occidental region and between 13 and 16 percent from other three regions. See Table 4.1. The large majority of observed deliveries took place in district hospitals (81 percent), with approximately one-fifth (17 percent) in regional hospitals and only two percent from the central referral hospital. All of the hospitals in the sample are located in urban areas. Ninety-five percent of observed deliveries were in facilities that handle 1,000 or more deliveries per year.

Three-quarters of the observed deliveries were attended by general practitioners or resident doctors, with six percent attended by an obstetrician. Interns were responsible for 18 percent observed deliveries. In these hospitals, nurses attended only two percent of observed deliveries.

The observed deliveries were mainly among young women between 20 and 29 years old (66 percent). Thirty percent of the deliveries were first deliveries. Only seven percent of the deliveries were to high parity women with four or more births. All of the deliveries were single vaginal deliveries.

In 42 percent of the deliveries, the women had received a uterotonic drug before the third stage of labor. Ten percent were induced, 19 percent augmented, and 13 percent were both induced and augmented. In only 60 percent of deliveries did women receive a uterotonic drug during the third or fourth stages of labor. In all cases, oxytocin was the uterotonic drug used.

Table 4.1 Percent distribution of observed deliveries by characteristics of the health facility and the woman

Characteristics of the facility	% of deliveries	n of deliveries	Characteristics of the woman	% of deliveries	n of deliveries
Region			**Age of woman**		
Metropolitan	15.1	29	<20	17.9	34
Oriental	31.2	60	20-29	66.3	126
Occidental	25.0	48	≥30	15.8	30

Central	12.5	24	**Parity**		
Paracentral	16.1	31	0	30.5	58
Area			1	38.4	73
Urban	100.0	192	2-3	24.2	46
Rural	0.0	0	≥4	6.8	13
Type of facility			**Type of delivery**		
Central referral	2.1	4	Simple	100.0	190
Regional	17.2	33	Multiple	0.0	0
District	80.7	155	**Use of uterotonic drugs before the 3rd stage**		
Annual number of deliveries			Induction only	10.0	19
<1000	5.2	10	Augmentation only	18.9	36
1000-2999	60.9	117	Induction and augmentation	13.2	25
≥3000	33.8	65	No uterotonics before the 3rd stage	57.9	110
Percent of deliveries observed in facilities which had offered AMTSL training to staff in the preceding 12 months			**Received a uterotonic during the 3rd or 4th stages of labor**		
Yes	75.0	144	Oxytocin	60.0	114
No	25.0	48	Ergometrine	0.0	0
In-service training for doctors			Misoprostol	0.0	0
Yes	64.0	123	Prostaglandins	0.0	0
No/Unknown	35.9	69	No uterotonic given	40.0	76
Qualification of provider					
Obstetrician	6.3	12			
General Practitioner	74.2	141			
Intern	17.9	34			
Nurse	1.6	3			
Time of delivery					
Day	70.8	136			
Night	29.1	56			

Components of AMTSL

This section of the report describes the use of the various components of AMTSL among observed deliveries. It also describes the practice of AMTSL as defined by FIGO/ICM, which includes all of the following components:

1. Administration of 10 IU of oxytocin (the drug of choice) via intramuscular (IM) injection within one minute of the delivery of the baby. Where oxytocin is not available, 0.2 mg of ergometrine administered via IM injection is recommended
2. Controlled cord traction (gentle traction of the cord with manual support to the uterus).
3. Immediate uterine massage following delivery of the placenta and palpation of the uterus to assess the need for continued massage every 15 minutes for two hours following delivery. For logistical ease, we have defined correct uterine massage as immediate massage following

delivery of the placenta, followed by palpation of the uterus every 15 minutes for the first 30 minutes after delivery of the placenta.

We also present results using a less restrictive definition of AMTSL. This second definition of AMTSL is exactly the same as the first definition above, only the timing of the administration of the uterotonic drug is extended to within three minutes of the delivery of the baby.

Correct use of uterotonic drugs for AMTSL

The first component of AMTSL is the correct use of uterotonic drugs. Four criteria must be met for the correct use of a uterotonic drug. These are:

1. Correct mode of administration: the uterotonic drug should be administered IM. If the woman has been induced or augmented, administration via IM injection, intravenous drip, or intravenous push are all considered correct.
2. Correct dose: 10 IU of oxytocin or 0.2 mg of ergometrine.
3. Correct stage of labor: uterotonic is to be administered following the delivery of the baby and before the delivery of the placenta.
4. Correct timing: uterotonic is to be administered within one minute following the delivery of the baby (or within three minutes for the less restrictive definition used for this study).

Table 4.2 presents the percentages of observed deliveries in which uterotonics were correctly used. Two points should be noted:

1) oxytocin was the only uterotonic drug used across the entire sample of observed deliveries; no other drug such as ergometrine, misoprostol, or prostaglandins were used
2) oxytocin was administered during the third or fourth stage of labor in only 60 percent of observed deliveries.

Among all observed deliveries, oxytocin was correctly used for AMTSL purposes in only 14 percent of deliveries, that is, the drug was correctly administered, the dose was correct for AMTSL purposes, the drug was given at the appropriate stage of labor and was given within one minute or less of the delivery of the baby. This percentage increases to 35 percent when the timing of the uterotonic is relaxed to within three minutes. The practices that lead to lower correct use of oxytocin are: administration of the drug at the incorrect stage of labor (15 percent, with one percent administering oxytocin during delivery of the baby and 14 percent following delivery of the placenta), 11 percent gave an incorrect dose of oxytocin (for AMTSL purposes), and 25 percent administered oxytocin at more than three minutes after the delivery of the baby.

Table 4.2. Percent distribution of deliveries by correct use of oxytocin for AMTSL purposes

Components of the use of oxytocin for AMTSL purposes	% of deliveries	n of deliveries
Use of oxytocin during the 3rd or 4th stages of labor	60.0 (40.8, 76.6)	114
No use of a uterotonic during the 3rd or 4th stages of labor	40.0	76
Correct administration of oxytocin for	57.4	109

AMTSL purposes		
Oxytocin IM	44.2	84
Oxytocin, by any means among inductions	3.7	7
Oxytocin, by any means among augmentations	9.5	18
Incorrect administration	2.6	5
Not used	40.0	76
Correct dose of oxytocin for AMTSL purposes	48.9 (31.0, 67.5)	93
10 IU for oxytocin	49.2	93
Incorrect dose	10.9	21
Not used	40.0	76
Administration of oxytocin at correct stage of labor	44.8 (26.2,65.0)	85
After delivery of the baby	44.8	85
During delivery of the baby	1.2	2
After delivery of the placenta	14.0	27
Not used	40.0	76
Timing in which oxytocin was administered		
≤1 minute	14.1 (7.4, 25.2)	25
>1 and <3 minutes	23.3 (12.4,39.5)	45
≥4 minutes	13.7	27
Incorrect timing/ no information	9.0	17
Not used	40.0	76
Correct use of oxytocin for AMTSL purposes		
Correct use ≤1 minute	13.6 (6.8, 25.2)	26
Correct use >1 and <3 minutes	21.7 (11.3, 37.8)	41
Incorrect use	24.7	47
Not used	40.0	76

Table 4.3 shows the percentage of observed deliveries with correct use of oxytocin for AMTSL purposes during the third stage of labor by selected characteristics of the facility and the woman. In this table, "correct use" is based on the less restrictive definition, which requires administration of oxytocin within three minutes, instead of one. There was no correct use of oxytocin for AMTSL purposes in the Metropolitan or Paracentral regions, and in the Metropolitan region there was no use of oxytocin or any other uterotonic during the third stage of labor at all. Deliveries occurring at regional hospitals are more likely to have correct use of oxytocin (85 percent) than other types of facility (0 to 26 percent), as are facilities with greater than 3,000 deliveries annually (73 percent). Deliveries in low-volume facilities (which constitute only 5 percent of the sample of observed deliveries) show no use of oxytocin during the third stage at all. Whether or not the facility provided AMTSL in-service training for doctors in the year prior to the study made little difference to the correct use of oxytocin for AMTSL purposes

(38 versus 30 percent, and these differences are not statistically significant). However, deliveries in facilities that provided AMTSL training for nurses were significantly more likely to show correct use of AMTSL than those from facilities without such training (42 versus 16 percent). However, one should remember that nurses were only responsible for attending 2 percent of deliveries in this sample. High parity women (women with four or more births) show higher percentages of correct use of oxytocin than lower parity women, and these differences are statistically significant.

Table 4.3. Percent distribution of observed deliveries by use of oxytocin for AMTSL purposes and by characteristics of the facility and woman

	Use of Oxytocin for AMTSL purposes % of deliveries					
Characteristic	**% Correct use of oxytocin (≤3min)**	**% Incorrect use**	**% No use**	**Total %**	**n of deliveries**	**p value**
Total	35.3	24.7	40.0	100.0	190	
Region						0.0023
Metropolitan	0.0	0.0	100.0	100.0	29	
Oriental	53.8	40.0	6.2	100.0	60	
Occidental	50.7	8.3	41.0	100.0	48	
Central	42.9	18.4	38.7	100.0	24	
Paracentral	0.00	51.1	48.9	100.0	28	
Type of facility						0.0590
Central Referral	0.0	0.0	100.0	100.0	4	
Regional	85.1	14.9	0.0	100.0	33	
District	25.8	27.5	46.7	100.0	153	
Annual number of deliveries						0.0003
<1000	0.00	0.00	100.0	100.0	9	
1000-2999	16.8	33.2	50.0	100.0	115	
≥3000	72.6	13.1	14.3	100.0	66	
In-service training for nurses						0.0123
Yes	42.0	32.0	26.0	100.0	142	
No	15.6	3.1	81.3	100.0	48	
In-service training for doctors						0.5485
Yes	38.2	27.9	33.9	100.0	120	
No/does not know	30.3	19.2	50.5	100.0	70	
Qualification of						0.1301

provider						
Obstetrician	34.4	17.2	48.4	100.0	12	
General practitioner	27.5	28.2	44.3	100.0	141	
Intern	67.7	15.1	17.2	100.0	34	
Nurse	32.8	0.00	67.2	100.0	3	
Time of delivery						0.2478
Daytime	39.3	22.7	38.0	100.0	137	
At night	25.2	29.9	44.9	100.0	53	
Age of woman						
<20	43.0	35.7	21.3	100.0	34	0.3462
20-29	35.1	21.8	43.1	100.0	126	
≥30	27.8	24.6	47.6	100.0	30	
Parity						
0	33.0	45.8	21.2	100.0	58	0.0131
1	33.3	18.0	48.7	100.0	73	
2-3	35.6	8.3	56.1	100.0	46	
≥4	55.8	25.5	18.7	100.0	13	
Use of uterotonic drugs before the 3rd stage of labor						
Induction	25.7	35.5	38.8	100.0	19	0.0095
Augmentation	38.3	57.8	3.9	100.0	36	
Induction and augmentation	26.1	23.0	50.9	100.0	25	
None	38.1	12.4	49.5	100.0	110	

Controlled cord traction and uterine massage

Controlled cord traction was used in 27 percent of observed deliveries, fundal massage immediately following delivery of the placenta was used in 62 percent, and fundal massage plus palpation at least twice during the 30 minutes following delivery of the placenta was used in only 24 percent of observed deliveries. See Table 4.4. Few differences were shown by characteristic of the facility and woman (data not shown).

Table 4.4. Percent of deliveries with controlled cord traction and uterine massage following delivery of the placenta

Components of correct AMTSL use	% of deliveries N=190
With controlled cord traction	26.8 (17.1, 39.4)
With massage immediately after delivery of the placenta	62.0 (43.8, 77.4)

With massage immediately after delivery of the placenta PLUS palpation at least twice during the 30 minutes following delivery of the placenta	23.5 (12.1, 40.6)

Use of AMTSL

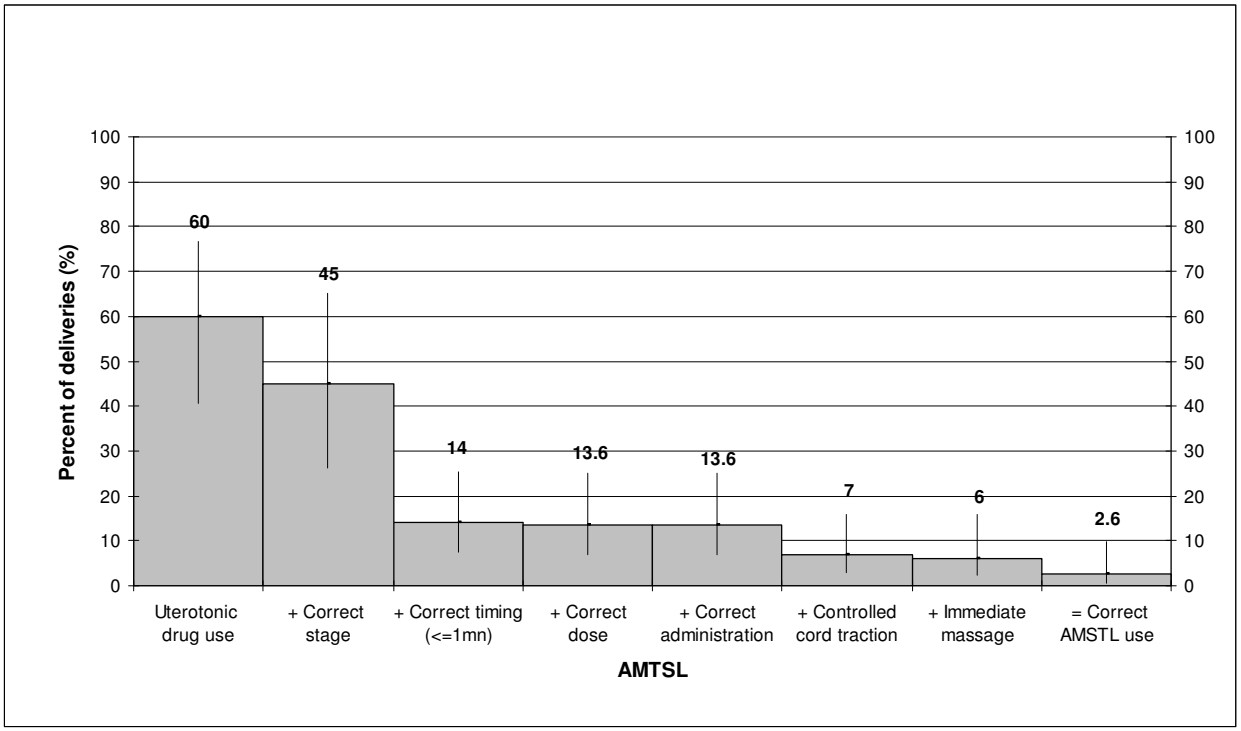
The results of this study show that only three percent (95 percent confidence intervals: 0.7 to 9.9 percent) of public, facility-based deliveries in El Salvador benefit from AMTSL based on the strict definition with administration of a uterotonic within one minute of delivery of the baby. This increases to seven percent (95 percent confidence intervals: 2.4 to 18.2 percent) with administration of a uterotonic within three minutes. See Table 4.5.

Table 4.5. Percentage of observed deliveries with correct AMTSL use

	% with correct AMTSL use (≤1 min)	**% with correct AMTSL use (≤3 min)**
Percentage (95% CI)	2.6 (0.7, 9.9)	6.9 (2.4, 18.2)
n of deliveries	190	190

As a means of identifying where efforts are most needed to improve compliance with the FIGO/ICM definition of AMTSL, Figure 4.1 shows the percentage of observed deliveries during which a uterotonic was given during the third or fourth stage of labor in the left-most column (60 percent). Each column to the right shows the percentage of deliveries having received a uterotonic, plus one additional component of AMTSL. This figure clearly shows that infrequent administration of a uterotonic during the third stage of labor, administration of the uterotonic at greater than one minute following delivery of the baby, lack of both controlled cord traction and immediate massage and palpation following delivery of the placenta are the components responsible for the very low use of AMTSL in El Salvadoran facilities. In short, it is not just one practice that needs to be emphasized to improve correct use of AMTSL.

Figure 4.1. Percent of deliveries with use of a uterotonic drug during the third or fourth stage of labor, plus additional components of AMTSL



Patterns of cord clamping

Immediate cord clamping is not an element of the FIGO/ICM definition of AMTSL. WHO has recently recommended delayed cord clamping for the benefit of the newborn. Debate on the best timing for cord clamping for maximum benefit of mother and baby persists. Table 4.6 shows that cord clamping in less than one minute of delivery is the norm in El Salvadoran health facilities, with 99 percent of observed deliveries having the cord clamped within one minute or less of delivery of the baby.

Table 4.6 Percent distribution of the duration between delivery of the baby and cord clamping

Time	% of deliveries	n of deliveries
<1 minute	70.7	134
1-2 minutes	28.2	54
≥ 2 minutes	1.1	2
Total	100.0	190

Duration of the third stage of labor

The duration of the third stage of labor varies depending on how it is managed. Table 4.7 shows the average duration of the third stage of labor by whether the correct use of AMTSL was practiced (using both the strict and the relaxed definitions regarding timing) and whether or not oxytocin was administered during the third stage of labor. When AMTSL was used, the average duration of the third stage of labor was 5.8 minutes (95 percent confidence interval: 5.6 to 6.0) using the strict definition and 7.0 minutes (95 percent confidence interval: 6.1 to 8.0) using the more relaxed definition. In both cases, the third stage was significantly shorter than when oxytocin was not administered (9.3 minutes on average). When oxytocin was used during the third stage but not following the definition of correct use of a uterotonic for AMTSL purposes, the average duration of the third stage was 6.9 minutes (6.1 to 7.9), still significantly shorter than when no uterotonic was used at all.

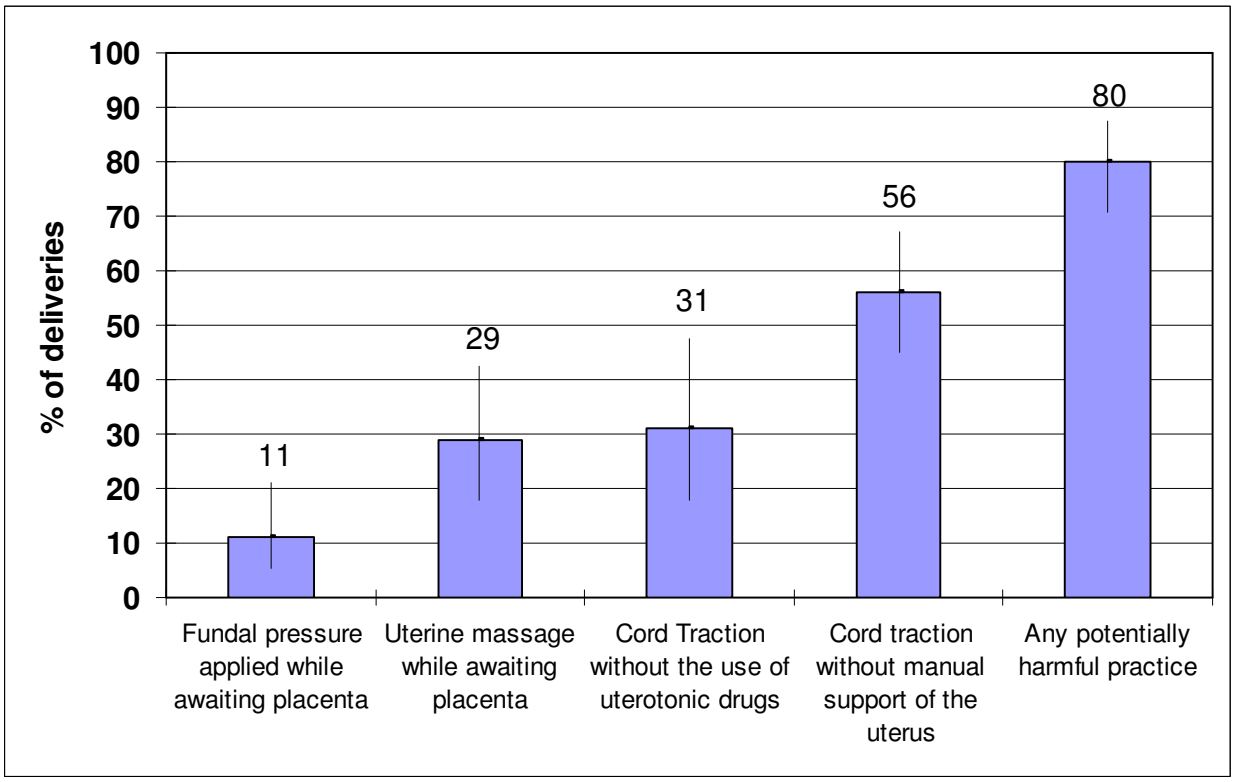
Table 4.7. Average duration of the third stage of labor by AMTSL use

AMTSL use	Average duration (in minutes) of the 3rd stage of labor	95% confidence interval	n of deliveries
Correct AMTSL use (≤1 minute)	5.8	(5.6, 6.0)	5
Correct AMTSL use (≤3 minute)	7.0	(6.1, 8.0)	13
Other use of oxytocin	6.9	(6.1, 7.9)	109
No use of oxytocin or other uterotonic	9.3	(8.6, 10.0)	76

Potentially-harmful practices

In addition to documenting AMTSL use, data from this study also identified four practices considered potentially harmful. These practices include the application of fundal pressure while awaiting the placenta, uterine massage following delivery of the baby, application of cord traction without previous administration of a uterotonic, and application of cord traction without manual support of the uterus. All of these practices can increase the risk of postpartum hemorrhage or cause problems such as uterine inversion. As shown in Figure 4.2, these practices are very common in El Salvadoran facilities. Four-fifths (80 percent) of observed deliveries had at least one of these practices. In 56 and 31 percent of deliveries, traction to the cord was applied without manual support to the uterus or without the previous administration of a uterotonic drug, respectively. In 29 percent of deliveries, uterine massage was applied while awaiting delivery of the placenta, and in 11 percent of deliveries, uterine pressure was applied while awaiting delivery of the placenta. Little variation was seen in these practices across characteristics of the facility and the woman, and none were statistically significant (data not shown).

Figure 4.2. Percent of deliveries with potentially harmful practices



5. Conclusions and recommendations

The study documented practices during the third or fourth stages of labor in a representative sample from facilities in the National Health Network of El Salvador. The study showed that only 60 percent of the deliveries received a uterotonic drug during the third stage of labor. Oxytocin, the drug of choice for AMTSL, was the only uterotonic drug used.

Two AMTSL definitions were used in the study. The first definition strictly reflects the FIGO/ICM recommendations, including administration of the uterotonic drug within one minute of delivery of the baby; the second definition is slightly more flexible, extending the timing of the uterotonic drug to within three minutes of delivery of the baby. Three percent of the observed deliveries comply with the strict definition, and seven percent comply with the more relaxed definition of AMTSL use. This means that between 93 and 97 percent of the women delivering vaginally in national public health network facilities did not receive adequate prevention of postpartum hemorrhage.

Several practices led to the low use of AMTSL. These include: no use of uterotonics during the third or fourth stages of labor; administration of oxytocin following delivery of the placenta, versus following delivery of the baby; where oxytocin was administered during the third stage of labor, administration more than one minute following delivery of the baby; inappropriate application of traction to the cord (further described below); low use of massage immediately following delivery of the placenta; and even lower use of massage followed by palpation to assess the need for continued massage. Even though there is a history of in-service training for medical doctors and nurses in maternity hospitals, thorough retraining of personnel in AMTSL is clearly needed. Either the previous training did not provide enough clinical practice to raise participants to levels of competency, or there are problems with motivation to practice AMTSL, or both. The answer to this question will help to determine what strategies to use to increase the utilization of AMTSL in El Salvador.

In addition to measuring the use of AMTSL, this study also documented four potentially-harmful practices. These are: the application of fundal pressure while awaiting the placenta, uterine massage following delivery of the baby, application of cord traction without previous administration of a uterotonic, and application of cord traction without manual support of the uterus. At least one of these practices was observed in 80 percent of deliveries. Of particular concern was the application of cord traction without previous administration of a uterotonic (observed in 31 percent of deliveries) and application of cord traction without manual support to the uterus, which was observed in 56 percent of deliveries.

The national policy environment for AMTSL is mixed in El Salvador. Favorable conditions include: one of two key clinical guidelines (*Guias clinicas de atención por las principales morbilidades obstetricas en el segundo nivel de atención*) at the national level promote the use of AMTSL (based on a definition that is similar to that recommended by FIGO/ICM); there are no specific policies that restrict the use of AMTSL; oxytocin and ergometrine are both in the Essential Drug List (the basic table of drugs); and uterotonic drugs are stored under appropriate conditions in the Central Warehouse. On the other hand, the other of two key clinical guidelines at the national level mentions only use of uterotonics for the treatment of postpartum hemorrhage. AMTSL is not included in pre-service education for medical doctors or nurses.

Although there is evidence of in-service training in the last year that includes AMTSL, in this study there was a significant positive relationship between the use of AMTSL in facilities with such training for nurses but not for doctors. Unfortunately, the nurses conduct only a small percentage of the deliveries (though they may conduct more deliveries at lower-level health facilities). The high percentage of deliveries conducted by general practitioners (and interns) makes it imperative that AMTSL be included in their pre-service education.

Overall, the logistics regarding the procurement of uterotonic drugs and the storage conditions of those drugs in health facilities is quite good, with specific problems in a small percentage of facilities which require attention. For example, oxytocin was available at the time of visit in all facilities, there had been no stockouts of oxytocin documented during the previous three months, and in 86 percent of facilities, oxytocin was stored at below 15°C (with 68 percent stored at 2 to 8°C). However, in seven percent of facilities, oxytocin was stored at room temperature, and in seven percent of facilities there was a stock of oxytocin sufficient for greater than 12 months. Given that only 60 percent of deliveries received oxytocin during the third or fourth stages of labor, this excess stock should be used to expand the use of AMTSL for all deliveries. Regarding ergometrine, 75 percent of facilities procure ergometrine, of which 90 percent both had ergometrine in stock at the time of the facility visit and reported no stockouts during the three previous months. In 72 percent of the facilities that procure ergometrine, the drug was stored at below 15°C (with 62 percent stored at 2 to 8°C). In ten percent of these facilities, ergometrine was stored at room temperature, and in 33 percent there was a stock sufficient for greater than 12 months.

Recommendations

The following recommendations are made based on the results of this study regarding the use of AMTSL in the national hospital network:

National Policies

1. Standardize and disseminate the use of MSPAS National Clinical Care Guidelines for the Principal Obstetric Morbidities at the Second Level of Medical Care (*Guias clinicas de atención por las principales morbilidades obstetricas en el segundo nivel de atención)* in national public health network hospitals and at private and autonomous health facilities. Ensure that massage/palpation every 15 minutes for two hours is included in the AMTSL definition.
2. Update and disseminate the National Clinical Care Guidelines for Obstetric Morbidities at the Third Level of Medical Care *Guias clinicas de las Morbilidades obstetricas en el tercer nivel de atención* to comply with the FIGO/ICM definition of AMTSL.
3. Integrate the FIGO/ICM definition of AMTSL into pre-service training programs for medical doctors and nurses as a strategy to decrease morbidity and mortality due to postpartum hemorrhage.
4. Work jointly with the MSPAS, ASOGOES, international cooperating agencies, and other organizations to promote and implement the use of AMTSL in compliance with the

definition described in the clinical care guidelines for obstetric morbidity at the second level of medical care .

5. Adequately promote and disseminate international standards for the appropriate storage of uterotonic drugs.

Facility-level interventions

Providers/Practice

6. All medical and paramedical personnel responsible for managing deliveries in the 28 maternity hospitals should practice AMTSL. This can be accomplished either by:
    a. Conducting hands-on, competency-based in-service AMTSL trainings for those providers not skilled in AMTSL.
    b. Identifying barriers, including motivation, that impede use of AMTSL and address these barriers.
7. Conduct training for pharmacy personnel regarding the appropriate conditions recommended by the manufacturer for storage of uterotonic drugs.

Logistics and Supplies

8. Provide facilities with supplies and equipment needed for the appropriate storage of uterotonic drugs in pharmacies and delivery rooms.
9. Guarantee the adequate supply of uterotonic drugs in each hospital, avoiding under- and overstock of drugs to ensure that drugs do not pass their expiration date.

Monitoring and Evaluation

10. Establish systems of supervision within labor and delivery wards such that use of AMTSL is an expected behavior in all national public health network facilities that attend deliveries.
11. Include use of AMTSL in the routine reporting of statistics for national public health network birthing facilities for monitoring and control of its implementation and use.
12. Add a column to the registration books of the delivery rooms for monitoring the practice of AMTSL.
13. Implement clinical audits focused on AMTSL.

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