Active Management of the Third Stage of Labor

Data obtained from the National Health Network Hospitals of Nicaragua

July to August 2006

POPPHI
1800 K St., NW, Suite 800
Washington, DC 20006 USA
Tel: 202.822.0033 Fax: 202.457.1466

USAID
FROM THE AMERICAN PEOPLE

POPPHI
Prevention of Postpartum Hemorrhage Initiative

SOCIEDAD NICARAGUENSE GINECOLOGIA Y OBSTETRICIA

MINSA

Acknowledgements

Several cooperating agencies and representatives from the Office of Health, Infectious Diseases and Nutrition of the United States Agency for International Development (USAID) have contributed to this project. The information obtained in this report comes from a study approved by the Nicaraguan Ministry of Public Health, and does not necessarily represent official ministry data.

The report was prepared by Dr. Flor de María Marin C., a member and National Secretary of the Nicaraguan Society of Obstetricians and Gynecologists (SONIGOB) and the Nicaruaguan coordinator within the Research Committee of the Central American Federation of Associations of Obstetricians and Gynecologists, in collaboration with USAID's Prevention of Postpartum Hemorrhage Initiative (POPPHI). The team of data collectors included: Dr. Carmen Solorzano and Dir. Camilo Pravia (both members of SONIGOB), and Drs. Magdaly Torrez, Byron Méndez, Byron Darce, Lilliete Uriarte, and Sandra Quintana. National coordination of the study was also managed by Dr. Flor de María Marin C.

We would like to thank the following people and organizations who contributed, in one way or another, to the realization of the study: USAID, particularly the Latin American and Caribbean Bureau of USAID, for its overall support to this study; the assistance of Dr. Luis Urbina, of the Quality Assurance Project (QAP)/USAID project; and especially Deborah Armbruster, Director of the POPPHI project at PATH for her initiative and coordination of the project; the members of SONIGOB and its Board of Directors for support during the project's planning phase; the assistance of the Ministry of Public Health of Nicaragua, through Minister Margarita Gurdian and Dr. Ramiro López, Coordinator of the National Committee for Research in Health; all the Directors, Department Heads, Service Managers, and the medical and paramedical personnel from national network hospitals which participated in the project; and the technical support received from the Johns Hopkins University Bloomberg School of Public Health, especially Cynthia Stanton, Principal Investigator of the global study and our research assistants: Hope Johnson, Victor Rhee, Juliana Cuervo, and Manjunath Shankar, and the statistical and sampling consultant, Rod Knight. We must also recognize the work carried out by Rebeca Quiroga of the POPPHI project for her administrative support.

This study was funded by USAID, under the terms of subcontract No. 4-330-0208954, under Contract No. GHS-I-00-03-00028.

About POPPHI

The Prevention of Postpartum Hemorrhage Initiative (POPPHI) is a USAID-funded, five-year project focused on the reduction of postpartum hemorrhage, the single most important cause of maternal deaths worldwide. POPPHI is led by PATH and includes four partners: RTI International, EngenderHealth, the International Federation of Gynecologists and Obstetricians, and the International Confederation of Midwives.

Commitments to health: the Central American Federation of Associations and Societies of Obstetrics and Gynecology

We would like to thank the Central American Federation of Associations and Societies of Obstetrics and Gynecology because it has encouraged each one of the associations or societies to implement projects such as this one through its commitment to reduce maternal mortality regionally. The Federation offered its support and advice to the Federation Research Committee which consists of a country representative from each Association or Society, and includes: Dr. Douglas Jarquín González, Regional Coordinator; Dr. Ligia Altamirano and Dr. Cesar Augusto Reyes, Regional Sub-coordinators; Dr. Walter Linares Pacheco, Coordinator for Guatemala; Dr. Jesús Vallecillos Walls, Coordinator for Honduras; Dr. Guillermo Ortiz Avendaño, Coordinator for El Salvador; Dr. Adolfo Montero Massis, Coordinator for Costa Rica; Dr. Carlos Montufar, Coordinator for Panama; and Dr. Flor Marín Cisneros, Coordinator for Nicaragua.

For more information or additional copies of this report, please contact:

Deborah Armbruster
Project Director, POPPHI
PATH
1800 K St., NW, Suite 800
Washington, DC 20006

Tel: 202.822.0033
Email: darmbruster@path.org

www.pphprevention.org

Table of Contents

List of Tables and Figures

Acronyms

AMSTL	Active management of the third stage of labor
FIGO	International Federation of Gynecology and Obstetrics
ICM	International Confederation of Midwives
IM	Intramuscular
IU	International Unit
MOH	Ministry of Health
POPPHI	Prevention of Postpartum Hemorrhage Initiative
QAP	Quality Assurance Project
SONIGOB	Nicaraguan Society of Obstetricians and Gynecologists
UNFPA	United Nations Population Fund
USAID	U.S. Agency for International Development
WHO	World Health Organization

Executive Summary

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 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. 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 (MOHs) 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 to 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; Standard Treatment 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 results of the study show that a uterotonic drug was used during the third or fourth stages 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) in 100 percent of facility-based deliveries in the sample, with oxytocin used in 94 percent of deliveries, and oxytocin and ergometrine used in the remainder. However, AMTSL use, according to the FIGO/ICM definition, is almost non-existent in Nicaragua. Three-tenths of a percent of observed deliveries received AMTSL according to this definition and 2 percent received AMTSL, if the timing of the administration of the uterotonic drug is relaxed from one to three minutes following delivery of the baby. The study suggests that several practices must be changed in order for providers to meet the criteria of the FIGO/ICM definition. For example, the data show that most providers do use the correct mode of administration for uterotonic drugs for the purpose of AMTSL (in 97 percent of observed deliveries, uterotonic drugs were correctly administered) and 92 percent received the correct dose. However, more than half of observed deliveries received the uterotonic drug either during the delivery of the baby (26 percent) or following delivery of the *placenta* (22 percent) versus following delivery of the *baby*, as

recommended. Furthermore, in only 11 percent of deliveries was the drug administered within one minute of delivery of the baby. Controlled cord traction and immediate uterine massage upon delivery of the placenta, plus uterine palpation following delivery of the placenta, was only performed in 18 and 10 percent of observed deliveries, respectively.

The national-level policy environment for AMTSL is currently insufficient, but there are several promising efforts underway. Several important policy documents that determine the content of the Standard Treatment Guidelines and the content of the pre- and in-service training curricula do not currently mention AMTSL or, if they do, do not correctly define it. Consequently it is not surprising that only about one-third of facilities visited in this study had clinical protocols available that specifically mention and define AMTSL. However, the Protocols for Obstetric Emergencies, developed by the Nicaraguan Ministry of Health (MOH), SONIGOB, and the United Nations Population Fund (UNFPA), which promote the FIGO/ICM definition of AMTSL, are now finalized and currently under review. Furthermore, the 2006 curriculum of the National School of Obstetric Nurses also contains and promotes this definition of AMTSL.

Other favorable conditions for the expanded use of AMTSL should also be noted: the Essential Drug List includes oxytocin and ergometrine as uterotonic drugs; the availability of uterotonic drugs was not raised as an issue in this study at the national or facility level; and all facilities in the study reported having offered theoretical training on AMTSL to its staff responsible for managing deliveries in the year prior to the study, using reference materials that promote the FIGO/ICM definition of AMTSL. Further efforts are needed to disseminate and use these updated policy and training materials, and for training to include clinical skills training using competency-based methods.

The findings from this study also highlight lack of standardization regarding appropriate storage temperatures for uterotonic drugs both among manufacturers and, not surprisingly, within facility-based pharmacies. Regardless of manufacturer recommendations, more than half of facilities visited stored oxytocin at room temperature and a third stored ergometrine at room temperature.[*]

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. Support and promote the joint work of the MOH, SONIGOB, UNFPA, and other international cooperating agencies in the dissemination and implementation of the newly developed national Protocols for Obstetric Emergencies (*Guías de atención a las emergencias obstétricas*) throughout the entire national public health network.
2. Standardize and disseminate widely the use of these guidelines in national public health network hospitals and its promotion at private and autonomous levels.

[*] The storage temperature for oxytocin can range from 2-8°C to 15-25°C (room temperature in moderate climate) and each manufacturer bases their recommendation on their drug stability studies. Ergometrine routinely requires refridgeration and to be kept out of light.

3. Update and disseminate the National Guidelines for Low-risk Pregnancy (*Normas nacionales de atencion del parto de bajo riesgo)*, to include the FIGO/ICM definition of AMTSL.
4. Promote the use of AMTSLas a preventive measure for postpartum hemorrhage within the curriculum for all medical staff responsible for institutional deliveries, following the FIGO/ICM definition..
5. Disseminate international standards for the storage of uterotonic drugs.

Facility-level interventions

Health providers/practices

1. Ensure that all medical and paramedical personnel that participate in conducting facility-based deliveries practice AMTSL, by:
    a. Providing hands-on, practice-based AMTSL training for health care providers in all public network hospital units for those not skilled in the practice of AMTSL.
    b. Identifying barriers, including motivation, that impede use of AMTSL and address these barriers.
2. Design posters and other job aids promoting AMTSL to be displayed in all health unit delivery rooms of public health network facilities.
3. Prioritize the regions with particularly low use of AMTSL in national planning.
4. Provide training of pharmacy personnel on the storage and handling of medical supplies.

Logistics and supplies

1. Provide the basic necessary logistics for the storage of uterotonic drugs in all warehouses, pharmacies, and delivery rooms in all public health network units that assist in deliveries.
2. Reevaluate and update the procedures for procurement and distribution of uterotonic drugs, particularly oxytocin, in order to ensure that all hospitals have an adequate supply of oxytocin for its use in AMTSL for every patient that has a vaginal delivery.

Supervision and monitoring

1. 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 assist deliveries.
2. Include use of AMTSL in the routine reporting of statistics for national public health network facilities that assist deliveries for monitoring and control of its use.
3. Add a column to the registration books of the delivery rooms for monitoring the practice of AMTSL.
4. 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 Gynecologists and Obstetricians (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 and *Managing Complications in Pregnancy and Childbirth*, produced by the WHO, do not include immediate cord clamping.[5]

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, the need for blood transfusion, the need for therapeutic oxytocics, and a shorter 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 understanding of current AMTSL practices in East Africa (Ethiopia and Tanzania), West Africa (Benin), Asia (Indonesia), and Central America (El Salvador, Guatemala, Honduras, and Nicaragua). Surveys are underway in Uganda and Ghana. This report focuses on Nicaragua, where maternal mortality is estimated at 88 per 100,000 live births according to official statistics,[8] and postpartum hemorrhage is the leading cause of maternal death. The percent of births delivered in any health facility is 60 percent, with only 7 percent occurring in private-sector institutions,[9] suggesting that nearly two-thirds of births that take place in facilities could potentially benefit from AMTSL.

The eight 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

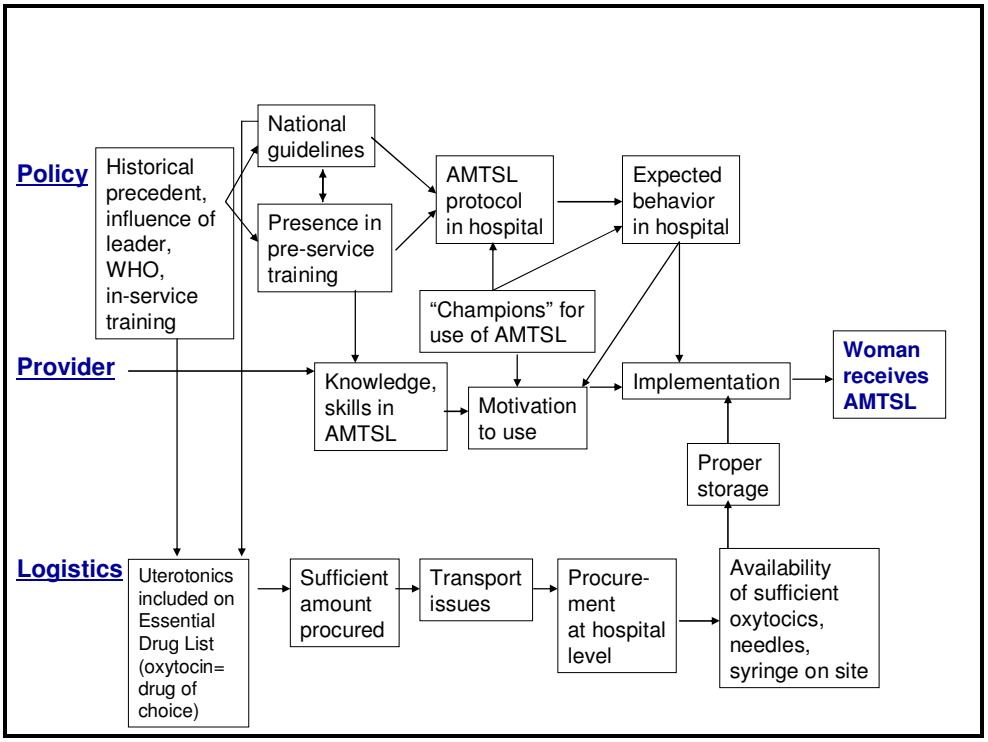
The knowledge and skills required to perform AMTSL are essential for routine use of the practice. Provider motivation, which is influenced by facility-based behavioral expectations, also is key.

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 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, fundal massage) are practiced, and how consistently are they practiced?
2. Is AMTSL formally promoted in the Standard Treatment Guidelines 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 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 to further refine the protocol and questionnaires before the beginning of data collection in El Salvador, Honduras, Nicaragua, and Guatemala.

In the case of Nicaragua, prior to data collection, the study protocol was submitted to and approved by the MOH, with authorization from Dr. Ramiro Lopez Rivas, the Coordinator of the Commission of Research of the Department of Human Resources, Teaching and Research. 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. PATH referred to John's Hopkins School of Public Health for review. 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.

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. 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, standard treatment guidelines, 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 an essential drug list and clinical guidelines in the facility, provision of in-service training (including 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 questionnaires based on their observation of deliveries during the visits to selected facilities.

Training for data collectors

A group of eight data collectors were trained to observe deliveries in selected health facilities. The team was made up of three obstetricians and five general practitioners. The country coordinator, assisted by a gynecologist, carried out 2 three-day training sessions in July 2006. 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 supervise the observers. Following the pretest, minor modifications were made to the questionnaires before beginning on-site work.

Sample design

A nationally-representative sample of approximately 200 facility-based deliveries was required to meet the aim 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 with a minimum of one delivery per day. There are 18 such hospitals in Nicaragua (16 District and 2 National). Of these 15 hospitals were selected for the study. All geographic regions of Nicaragua are represented in the sample.

A team of two data collectors visited each selected health facility for two days. Each data collector observed all deliveries over an eight hour period on the first and second day, thus ensuring observation for 16 hours per day for two days. Given that the selected hospitals all had a minimum of one delivery per day, the anticipated sample size was approximately 225 observed deliveries.

A total of 180 deliveries were observed in the 15 selected national public hospitals. Observers collected information regarding the existence and availability of the pharmaceutical supplies during the afternoon of the first day and the morning of the second day.

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 also 180. All of the tables in this report show weighted values for n.

Field work

The National Coordinator of the study contacted the selected hospitals and the director of each hospital granted permission for the institution to participate in the study. Four teams of two observers carried out the field work from July 25 to August 8, 2006.

Data entry and analysis

The study team adapted the data entry programs developed for the global survey to the finalized Nicaraguan questionnaire. Epi Info™ (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. The final cleaning process was carried out during a data analysis workshop held in Baltimore, Maryland in December 2006. Data analysis was conducted using STATA 9.1.

3. Findings regarding national and facility-level policies and logistics

The national policy environment

This chapter summarizes information describing the policy environment and logistical support for AMTSL at the national and facility-levels.

National standard treatment guidelines

The National Standards for Assisting Low-Risk Deliveries (*Normas Nacionales de Atención al Parto de Bajo Riesgo)* issued by the MOH of Nicaragua in the year 2002 were reviewed. These Standards do not explicitly and in detail mention AMTSL. There is, however, a series of official national-level documents at the MOH entitled National Health Care Protocols *(Protocolos Nacionales de Atención)* which were published by the Amistad Hospital Japan-Nicaragua in 2002. Within these documents, some AMTSL components are cited in the chapter that refers to postpartum hemorrhage. These include: ten units of oxytocin intramuscularly (IM) administered as the drug of choice, or if unavailable, 0.2 mg of ergometrine IM administered with controlled cord traction. Uterine massage immediately after the delivery of the placenta and palpation of the uterus every 15 minutes during the first 30 minutes after delivery are not mentioned. The above mentioned document also suggests early cord clamping during the first minute following delivery.

In 2006, the MOH jointly with SONIGOB and the UNFPA, prepared the Protocols for Obstetric Emergencies (*Guías de atención a las emergencias obstetricas).* This report, which is currently undergoing its final review, includes AMTSL as an essential procedure for the prevention of postpartum hemorrhage, the leading cause of maternal mortality nationwide.

Essential Drug List

Oxytocin and ergometrine are registered in Nicaragua. They are also included in the MOH's Essential Drug List that was reviewed and approved in January 2001. There is no record of combination drugs (such as Syntometrine) or of any prostaglandin in the uterotonic drug section (See Table 3.1). Misoprostol is registered in the country and is included in the Essential Drug List, but is listed as a drug used for the treatment of peptic ulcer. The uses, indications, and contraindications of the above mentioned drugs are all described in the Essential Drug List.

Table 3.1. Utertonic drugs in the Ministry of Health's Essential Drug List

	Oxytocin	Ergometrine	Misoprostol
Uterotonic drugs listed in the Essential Drug List	Yes	Yes	Yes
Indications on uterotonic drugs in the Essential Drug List	Uterotonic	Uterotonic	Treatment of peptic ulcer

Availability and storage of uterotonic drugs

The study team found both oxytocin and ergometrine at the national level Center for Health Supplies (Centro de Insumos para la Salud). There was no misoprostol in this national level storage site. Microbiological testing to detect contaminants is conducted on a random sample of each batch of drugs that enters the warehouse to assure quality control. The quantity of uterotonic drugs to be procured at the national level is pre-determined by the MOH's Central Level Medical Supply Division. The most frequent method used for estimating need is based on previous consumption.

This study found that both oxytocin and ergometrine were stored according to recommendations of the manufacturer (that is, in an environment with a temperature between 2 and 8° C). Both drugs were also stored in the dark (See Table 3.2).

Table 3.2. Availability and storage of uterotonic drugs at the Center for Health Supplies warehouse

	Oxytocin	Ergometrine	Misoprostol
Storage temperature recommended by the manufacturer	2-8° C	2-8° C	Not Available
Actual storage temperature	2-8° C	2-8° C	Not Available
Light conditions recommended by the manufacturer	Not registered/specified	Stored in the dark	Not Available
Light conditions in which drugs are actually stored	Stored in the dark	Stored in the dark	Not available
Tests performed to guarantee the quality of drugs received	Yes - Microbiological Control	Yes - Microbiological Control	Not available
How is quantity of drugs determined for procurement	Standard quantity (Determined at the Central Level)	Standard quantity (Determined by the Central Level)	Not available

Pre-service training in AMTSL

The current curricula for publicly-sponsored professional nursing and medical schools do not specifically mention AMTSL. However, some aspects of the procedure are included in the chapter on Prevention of Postpartum Hemorrhage. The recent 2006 curriculum of the National School of Obstetric Nurses (*Escuela Nacional de Enfermeras Obstetras)* includes a section citing all three AMTSL components, and also recommends early cord clamping. The existing curriculum for post-graduate (resident) students specializing in Gynecology and Obstetrics of the country's two publicly-sponsored universities do not currently include AMTSL (See Table 3.3).

Table 3.3. Inclusion of AMTSL in pre-service curricula

	Evidence of pre-service training in AMTSL at publicly-sponsored schools	Documentation of the inclusion of AMTSL in the curriculum
Obstetric nurses	Yes	Yes
Registered nurses	No	No
Doctors	No	No

The facility-level policy environment

For each of the 15 health facilities selected 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

Table 3.4 shows the availability of clinical guidelines at the facility level and the components of AMTSL specifically cited in the guidelines. In two-thirds of health facilities surveyed (67 percent), clinical guidelines were available. Clinical guidelines were not available at the National Reference Hospitals. The guidelines included specific mention of AMTSL and mentioned oxytocin as the drug of choice in one-third of health facilities in the study. In 27 percent of health facilities, controlled cord traction was mentioned or defined and in 20 percent, uterine massage of the fundus following delivery of the placenta was specified.

Table 3.4. Percent of health facilities with available protocols, clinical guidelines, or obstetric care standards that include AMTSL

Type of health facility	Protocols, clinical guidelines or obstetric care standards are available (%)	Protocols, obstetric care guidelines include AMTSL (%)	Oxytocin mentioned as the drug of choice for AMTSL (%)	Controlled cord traction is mentioned or defined (%)	Uterine massage of the fundus is mentioned and specified (%)	n of health facilities
National Reference Hospital	0.0	0.0	0.0	0.0	0.0	1
District hospitals	71.4	35.7	35.7	28.6	21.4	14
Total	66.7	33.3	33.3	26.7	20.0	15

Accessibility of the pharmacy and pharmaceuticals at the facility level

Each health facility in the study has its own pharmacy that is open 24 hours. The pharmacies provide the necessary supplies for AMTSL (uterotonic drugs, syringes, and needles) to the Labor and Delivery wards. None of the health facilities observed required women to purchase the above mentioned supplies.

During the observation period, at least one uterotonic drug was found in all of the health facilities studied. Oxytocin was available in all health facility pharmacies (in its two presentations; five and ten international units [IU]). Ergometrine was available in 14 out of 15 hospital pharmacies (in 0.2 mg ampoules). However, ergometrine was available in the Labor and Delivery ward in the health facility even though it was lacking it in the pharmacy.

Thirteen out of the fifteen health facilities observed reported that their supply is determined by the central pharmacy based on consumption. The remaining facilities reported receiving a fixed supply.

Storage conditions for uterotonic drugs at the facility level

All of the facilities visited in this study routinely procure oxytocin and ergometrine. However, there was substantial variation in the manufacturers' recommendations regarding storage of oxytocin. In approximately half of the facilities visited (47 percent), it was recommended that oxytocin be stored between 2 and 8° C and in a quarter of facilities the recommendation was for storage at less than 15° C (27 percent) or up to 30° C (27 percent). In approximately half of the facilities visited (53 percent), it was recommended that oxytocin be stored away from direct light and in the remaining half, there was no indication regarding light conditions. There is less variation in the recommendations for ergometrine; in all of the facilities visited, manufacturers agreed that ergometrine must be stored between 2 and 8°C. In only 60 percent of facilities visited, the manufacturer recommendation was that ergometrine be stored away from direct light.

Actual storage conditions for both oxytocin and ergometrine varied. One-third of facilities stored oxytocin between 2 and 8° C. Seven percent stored oxytocin between 15 and 25° C and more than half stored oxytocin at room temperature (some with, some without air conditioning). Only 40 percent of facilities stored ergometrine between 2 and 8° C, as recommended by all manufacturers, 13 percent stored it at less than 15° C and one-third (33 percent) stored ergometrine at room temperature.

Regarding actual storage conditions observed during visits to the facilities, oxytocin and ergometrine were stored with no direct exposure to sunlight in all facilities visited (See Table 3.5).

Table 3.5. Percent of facilities procuring oxytocin and ergometrine and percent distribution of procured drugs by recommended and observed storage conditions

	Percent of all hospitals	
Percent of hospitals with	**Oxytocin**	**Ergometrine**
	100.0	100.0
Storage temperature recommended by the manufacturer		
2 - 8° C	46.7	100.0
< 15° C	0.0	0.0
15 - 25° C	26.7	0.0
Others (<25° or < 30° C)	26.7	0.0
Actual storage temperature		
2 - 8° C	33.3	40.0
< 15° C	0.0	0.0
15 - 25° C	6.7	13.3
Room temperature	53.3	33.3
Missing or inconsistent data	6.7	13.3
Light conditions recommended by the manufacturer		
Not indicated	46.7	40.0
Store away from direct light	53.5	60.0
Actual light conditions for storage of the drug		
Kept in the dark	46.7	60.0
In daylight, away from direct sunlight	53.3	40.0
In direct sunlight	0.0	0.0

At the time of the facility visit, all facility pharmacies had oxytocin in stock and 93 percent had ergometrine. In 80 percent of the facilities visited, the quantity of both oxytocin and ergometrine for procurement is determined based on previous consumption.

The average purchase price for the facility of uterotonic drugs was: oxytocin US$0.19 per ampoule and ergometrine US$0.56 per ampoule (See Table 3.6).

Misoprostol was found in one of the National Reference Hospitals' Labor and Delivery wards as part of the lot of uterotonic drugs present at the time of the visit. However, we were informed that this occurred only by chance, since the drug had been received as part of a donation, which does not usually occur.

Fourteen out of fifteen hospitals did not have any problems with the supply of uterotonic drugs sent by the Central Level warehouse. The one facility that registered a temporary stockout of the drug explained that the shortage of the drug was due to their inability to pick up one quarterly drug order (data not shown). Although stockouts were rare, nearly half (47 percent) of facilities had less than one month stock of oxytocin, based on current levels of consumption. In contrast, overstock was the more common with ergometrine; one-third of the facilities had between one and four years stock of ergometrine based on current consumption.

Table 3.6. Percent of facilities procuring oxytocin and ergometrine and percent distribution of facilities by methods for drug procurement, price, and stock

	Percent of all hospitals			
Percent of hospitals with	**Oxytocin**	**Ergometrine**		
	100.0	100.0		
How is the quantity of drug determined for procurement				
Based on consumption patterns	80.0	80.0		
Standard quantity determined by the Central Level warehouse	13.3	13.3		
Standard quantity based on established requirements	6.7	6.7		
Price per ampoule for the hospital				
Average price per ampoule	USD 0.19	USD 0.56		
Availability of the drug at the time of the visit				
Yes	100.0	93.3		
No	0.0	6.7		
Months covered with available stock				
<1 mo.	46.7	<1 mo	6.7	
1-3 mo.	40.0	1-3 mo	13.3	
7 mo.	6.7	3-5 mo	13.3	
19 mo.	6.7	5-7 mo	13.3	
		16-53 mo	33.3	

In-service training at the facility level

In the 12 months preceding the study, the majority of facilities selected in the sample provided in-service training on AMTSL and the prevention of postpartum hemorrhage. Eighty percent of facilities provided training for their doctors who were responsible for managing deliveries and 60 percent for their nurses. These training events tended to be theoretical with occasional use of anatomical models, but without hands-on practice during deliveries (based on personal

communication with Dr. Luis Urbina of the Quality Assurance Project, funded by USAID). The material covered in these training workshops was based on the WHO Manual of Complications of Pregnancy and Childbirth, which includes all of the components of AMTSL recommended by FIGO/ICM.[1]

Table 3.7. In-service training of AMTSL component in hospitals

Type of providers	**Percentage of hospitals that received in-service training in AMTSL during the previous year**	**n of hospitals**
Nurses	60.0	15
Doctors	80.0	15

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 practices regarding use of the individual components of AMTSL; 4) the correct use of AMTSL; and 5) potentially harmful practices.

Study sample

The study team observed a total of 180 deliveries in 15 health facilities. Tables 4.1 and 4.2 describe the characteristics of the facilities and women associated with these deliveries. As described in Chapter 2, the numbers "n" in all tables in this report are weighted.

The large majority of deliveries observed in this study took place in district hospitals (78.8 percent), with only 21 percent in National Reference Hospitals. Although all regions of Nicaragua were represented in the sample, only three percent of deliveries were observed in Atlantico region. Thirty-eight percent were observed in the West and between 15 and 23 percent in the remaining regions. All hospitals in the sample are in urban areas.

Nearly half (44 percent) of the observed deliveries took place in health facilities with a high volume of deliveries (>4,500 deliveries annually), with only ten percent of deliveries in health facilities with fewer than 2,500 deliveries annually. Three-quarters of the observed deliveries were assisted by obstetricians (11 percent) or other general practitioners or residents (66 percent). Nurses were responsible for only five percent of observed deliveries. Virtually all observed deliveries were assisted by more than one provider (99 percent).

It is also important to note that 59 percent of deliveries occurred in facilities that reported having provided in-service training on AMTSL for nurses during the preceding 12 months. Three-quarters (77 percent) of deliveries were in facilities that had offered such training to physicians.

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

Facility characteristics	Percent	n
Type of health facility		
National Reference Hospitals	21.1	38
District hospitals	78.8	142
Region		
West	38.3	69
Southeast	23.4	42
Central	20.6	37
North	15.1	27
Atlantico	2.6	5
Urban/rural		
Urban	100.0	180
Rural	0.0	0
Annual number of deliveries		
< 2500	10.0	18
2500-3499	32.6	59
3500-4499	13.7	25
≥4500	43.8	79
Provider qualification		
Obstetrician	11.1	20
Other medical (medical resident, general physician, etc.)	65.5	118
Nurse	4.9	9
Other (including interns)	18.5	33
Number of providers present at delivery		
>1	99.0	178
1	1.0	2
Time of delivery		
6 am - 5:59 pm	86.3	155
6 pm -10:00 pm	13.7	25
Total	100.0	180
Percent of deliveries observed in facilities that had offered AMTSL training to staff in the preceding 12 months		
Training for nurses	59.2	180
Training for physicians	76.7	180

Nearly one-third of the observed deliveries were to women under the age of 20. Sixty percent of deliveries were to women between the ages of 20 and 34 and only three percent were to older women (40 or more years of age). All parities under six are well represented, with only four percent of observations of parity six or more.

Use of uterotonic drugs before and following delivery of the baby is very common in Nicaraguan hospitals. One in two observed deliveries received a uterotonic for the purposes of induction (17 percent) or augmentation (32 percent), and all deliveries received a uterotonic during the third or fourth stages of labor. Oxytocin was used in 94 percent of deliveries, with oxytocin and ergometrine (most likely used together for therapeutic reasons) in the remaining six percent of deliveries. There is no use of misoprostol of other prostaglandins during delivery in the sample of deliveries observed for this study.

Table 4.2. Percent distribution of observed deliveries by characteristics of the woman

Characteristics of the woman	Percent	n
Age of woman		
<20	30.2	54
20-34	60.6	109
35-39	6.1	11
≥40	3.1	6
Parity		
0	40.4	73
1	24.2	44
2-5	31.6	57
>5	3.7	7
Received uterotonic drugs prior to the third stage of labor		
For induction	17.1	31
For augmentation	32.1	58
No uterotonics received prior to third stage of labor	50.8	91
Received uterotonic drugs during the third or fourth stages of labor		
Oxytocin only	93.8	169
Ergometrine only	0.0	0
Misoprostol	0.0	0
Oxitocin and Ergometrine	6.2	11
Received no uterotonics during the third or fourth stages of labor	0.0	0
Total	100.0	180

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 ten IU of oxytocin (the drug of choice) via 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 by IM. If the woman has been induced or augmented, administration via IM injection, intravenous drip, or intravenous push are also considered correct.
2. Correct dose: ten 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.
4. Correct timing: uterotonic is to be administered within one minute following the delivery of the baby (or three minutes for the less restrictive definition used for this study).

Table 4.3 presents the percentages of observed deliveries in which uterotonics were correctly used. Although 100 percent of deliveries received a uterotonic during the third or fourth stage of labor (see Table 4.2), only 12 percent of deliveries had correct use of a uterotonic drug for the purposes of AMTSL (with administration within one minute of delivery of the baby), increasing to 26 percent when the uterotonic was administered within three minutes of the delivery of the baby. The correct mode of administration was used for almost all deliveries (97 percent) and the correct dose was given in 94 percent of deliveries (the remaining 6 percent received more than 10 IU of oxytocin which may well have been required for therapeutic reasons). However, only 44 percent of the deliveries received the uterotonic drug following delivery of the baby as recommended, versus during delivery of the baby (26 percent) or following delivery of the placenta (22 percent). Given that the earlier research-based protocol for AMTSL recommended giving the uterotonic at the delivery of the anterior shoulder, this may explain the 26 percent of deliveries in this study that were recorded as having received a uterotonic "during the birth of the baby."

Table 4.3. Percentage of deliveries with correct use of uterotonic drugs or AMTSL purposes and 95 percent confidence intervals

Use of uterotonic drugs for AMTSL purposes	Percent of all deliveries N=180
Correct use of uterotonics (within ≤1 minute)	11.5 (0.7,17.3)
Correct use of uterotonics (within ≤3 minutes)	25.7 (15.3,39.9)
Correct mode of administration	96.6 (88.8,99.0)
Correct dose	93.7 (83.5,97.7)
Correct stage for the administration of the uterotonic (following delivery of the baby)	43.9 (27.9,61.4)
• during delivery of the baby	25.9
• during delivery of the placenta	8.1
• after delivery of the placenta	22.0

Table 4.4 shows the percentage of observed deliveries with correct use of a uterotonic drug during the third stage of labor by selected characteristics of the facility and the woman. Little variation is shown across these characteristics, though these data suggest that nurses may be more likely to correctly use a uterotonic than other cadres (25 percent versus 9 to 17 percent, respectively) and deliveries at the national hospitals are more likely to have had correct use of a uterotonic than deliveries at district hospitals (25 percent versus 11 percent). Given our limited sample size, only the differences by type of hospital are statistically significant.

Table 4.4 Percent of observed deliveries with correct use of uterotonic drugs (within one minute of delivery of the baby) by characteristics of the health facility and the woman

	Correct use of uterotonic drugs (≤1 minute following delivery of the baby) (%)	Incorrect use of uterotonic drugs (%)	Total (%)	n of deliveries	p value
Characteristics of the health facility					
Type of facility					
National Reference Hospital	25.0	75.0	100.0	10	0.0004
District hospital	10.6	89.4	100.0	170	

Region					
West	8.1	91.9	100.0	69	0.4522
Southeast	8.3	91.7	100.0	42	
Central	17.3	82.7	100.0	37	
North	18.8	81.2	100.0	27	
Atlantico	0.0	100.0	100.0	5	
Annual number of deliveries	11.1	88.8	100.0	18	0.3190
<2500	15.8	84.2	100.0	59	
2500-3499	12.1	87.9	100.0	25	
3500-4499	8.1	91.9	100.0	79	
≥4500					
Provider qualification					
Obstetrician	11.7	88.3	100.0	20	0.1864
Other physician (medical resident, general practitioner, etc.)	8.7	91.3	100.0	118	
Nurse	25.0	75.0	100.0	9	
Other (including interns)	17.4	82.6	100.0	33	
Time of delivery					
6 am - 5:59 pm	12.0	87.8	100.0	155	0.5062
6 pm - 10 pm	7.8	92.2	100.0	25	
Characteristics of the woman					
Age of the woman					
<20	15.7	84.3	100.0	54	0.3321
20-34	10.5	89.5	100.0	109	
35-39	0.0	100.0	100.0	11	
≥40	12.1	88.0	100.0	6	
Parity					
0	10.5	89.5	100.0	73	0.4843
1	17.3	82.7	100.0	44	
2-5	8.3	91.7	100.0	57	
>5	10.1	90.0	100.0	7	
Total	11.5	88.5	100.0	180	

Controlled cord traction and uterine massage

Controlled cord traction was practiced in 18 percent of observed deliveries. Uterine massage immediately following delivery of the placenta was practiced in 54 percent of observed deliveries. However, immediate uterine massage, plus palpation of the uterus at least twice during the first 30 minutes after delivery of the placenta was recorded in only one in ten of observed deliveries (See table 4.5).

Table 4.5. Percent of deliveries with controlled cord traction and uterine massage following delivery of the placenta, and 95 percent confidence intervals

Components of AMTSL	Percent of deliveries N=180
Controlled cord traction	17.9 (9.1,32.3)
Immediate massage of the uterus following delivery of the placenta	54.0 (39.9,67.4)
Immediate massage of the uterus following delivery of the placenta and palpation of the uterus every 15 minutes for 30 minutes	10.2 (3.4,26.2)

Given the very low use of immediate uterine massage following delivery of the placenta, followed by palpation every 15 minutes, Table 4.6 presents the percent of observed deliveries having received immediate uterine massage and immediate uterine massage plus uterine palpation by characteristics of the facility and provider. This table shows extremely limited use of uterine palpation postpartum across facility and provider types and region and is suggestive of limited surveillance of women during the postpartum period.

Table 4.6. Percentage of observed deliveries with immediate uterine massage following delivery of the placenta by characteristics of the health facility

	Immediate uterine massage following delivery of the placenta (%)	Immediate uterine massage PLUS uterine palpation every 15 minutes (%)	n of deliveries
Characteristics of the health facility			
Type of facility			
National Reference Hospital	90.0	40.0	10
District hospital	51.8	8.4	170
p-value	**0.0000**	**0.0029**	
Region			
West	73.6	21.7	69
Southeast	38.8	0.0	42
Central	53.2	4.5	37
North	38.1	6.7	27
Atlantico	0.0	0.0	5
p-value	**0.1205**	**0.3277**	

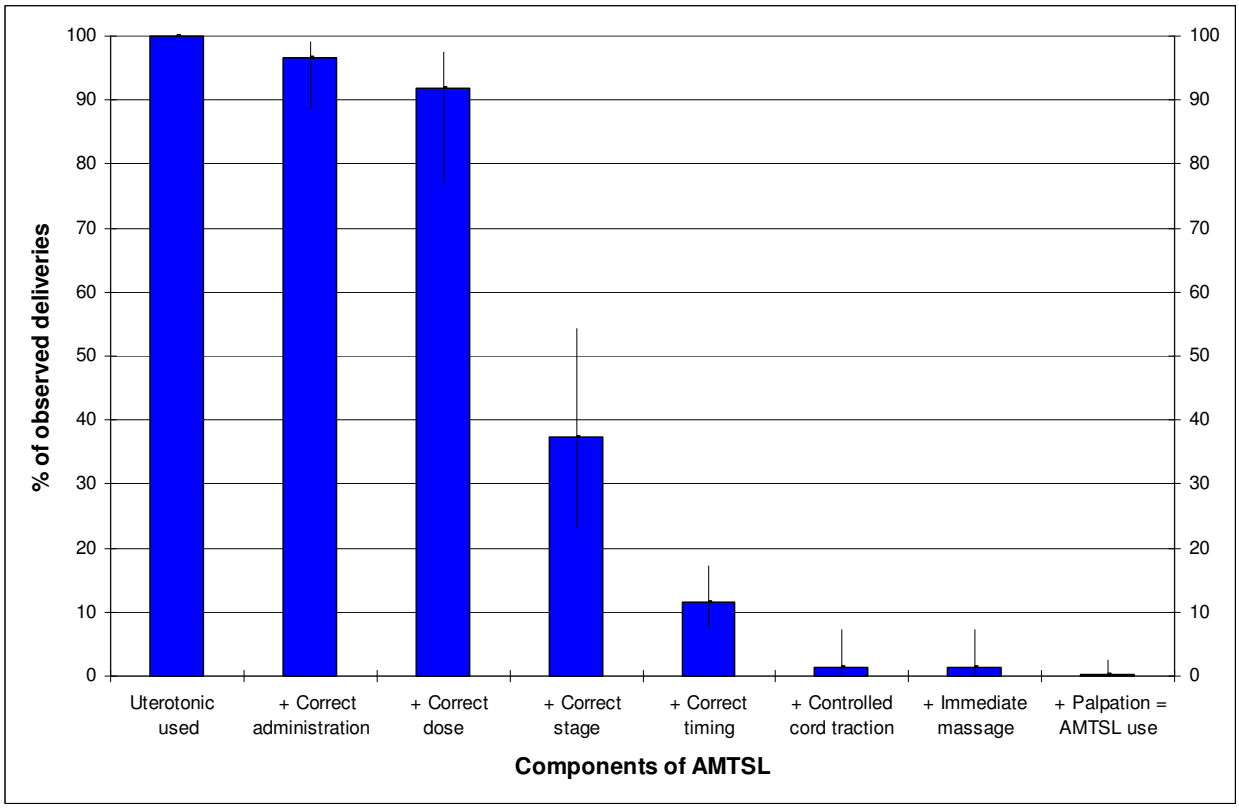
Provider qualification			
Obstetrician	29.7	5.1	20
Other physician (medical resident, general practitioner, etc.)	62.0	14.1	118
Nurse	71.4	9.5	9
Other (including intern)	35.3	0.0	33
p-value	**0.0108**	**0.2965**	
Total	54.0	10.2	180

Use of AMTSL

The results of this study show that less than two percent of public facility-based deliveries in Nicaragua benefit from AMTSL; 0.3 percent (95 percent confidence intervals: 0.0003 to 2.5 percent) using the strict definition with administration of a uterotonic within one minute of delivery of the baby and 1.7 percent (95 percent confidence intervals: 0.6 to 4.9 percent) with administration of a uterotonic within three minutes.

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 (100 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 administration of a uterotonic at an inappropriate 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 extremely low use of AMTSL in Nicaraguan facilities.

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, and debate on the best timing for cord clamping for maximum benefit of mother and baby persists. Table 4.7 shows that cord clamping in less than one minute of delivery is the norm in Nicaraguan health facilities, with 94 percent of observed deliveries having the cord clamped within one minute or less of delivery of the baby.

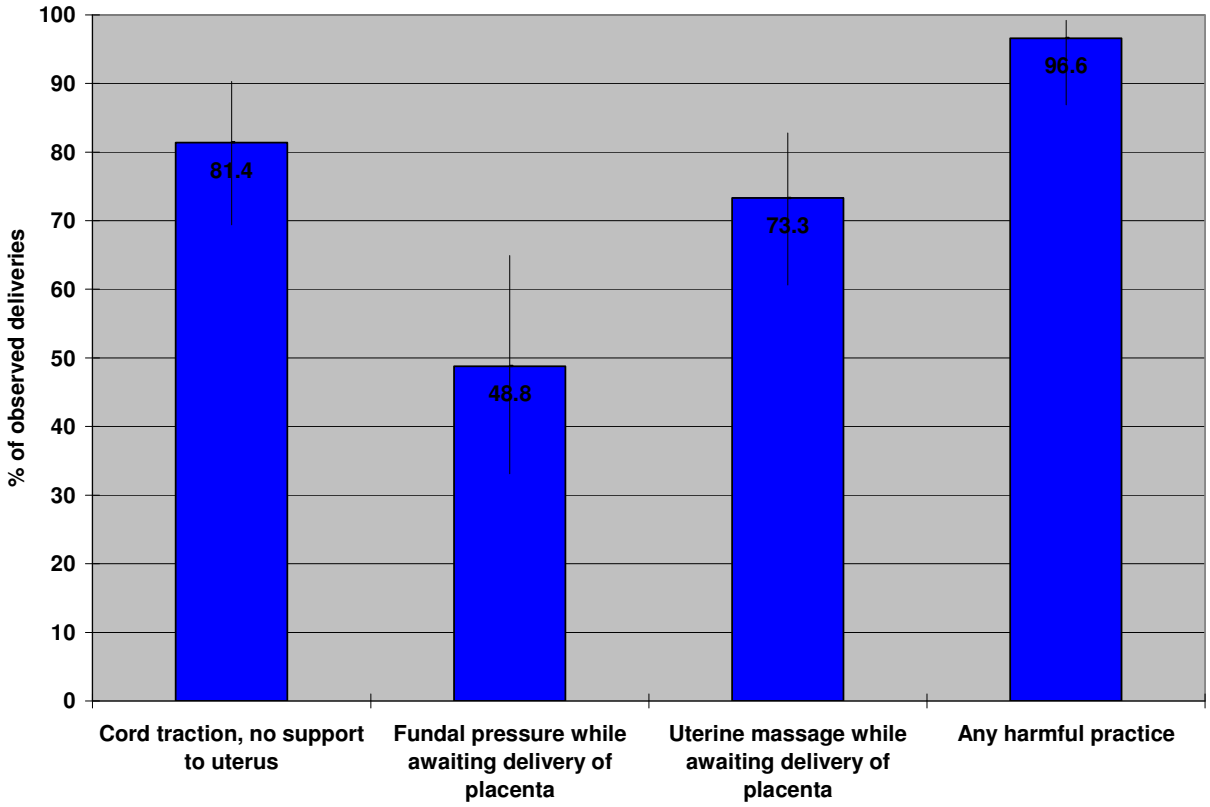
Table 4.7. Percent distribution of the duration between delivery of the baby and cord clamping

Duration	Percent of all deliveries	n of deliveries
< 1 minute	39.8	71
1 minute	53.9	97
2 minutes	4.7	8
3 minutes	1.0	2
5 minutes	0.7	1
Total	**100.0**	**180**

Potentially harmful practices

In addition to documenting AMTSL use, data from this study also identified three practices considered potentially harmful. These practices include application of cord traction without manual support of the uterus, the application of fundal pressure while awaiting the placenta, and uterine massage following delivery of the baby. All of these practices can increase the risk of postpartum hemorrhage or cause problems such as uterine inversion. As shown in Table 4.9, these practices are very common in Nicaraguan facilities. Approximately three quarters or more of observed deliveries had uterine massage following delivery of the baby and cord traction without manual support to the uterus (73 percent and 81 percent, respectively). Nearly half (49 percent) of all observed deliveries had pressure applied to the fundus while awaiting delivery of the placenta. Very little variation was seen in these practices across characteristics of the facility and the woman. The only notable differences were that fewer deliveries at the National Hospital had cord traction without manual support to the uterus as compared to district hospitals (60 percent versus 83 percent, p = 0.0068) and fewer deliveries at the National Hospital had pressure applied to the uterus while awaiting delivery of the placenta (50 percent versus 35 percent, p = 0.0787) (data not shown) than other types of facility.

Figure 4.2. Percent of potentially harmful practices and 95 percent confidence intervals.



5. Conclusions and recommendations

This study documented practices during the third and fourth stages of labor in a representative sample from Nicaraguan national public health network hospitals. The results showed that some type of uterotonic drug was used during the third or fourth stage of labor in 100 percent of the deliveries. Oxytocin was the drug most frequently used (94 percent) and a combination of oxytocin and ergometrine was used in the remaining six percent of deliveries.

Two AMTSL definitions were used in the study. The first definition strictly reflects the FIGO/ICM recommendation, including with 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 AMTSL is not correctly practiced in Nicaragua. Only 0.3 percent of the observed deliveries met the criteria for the first definition and 2 percent for the less stringent definition. This means that approximately 98 percent of women delivering vaginally in public facilities in Nicaragua do not receive adequate prevention of postpartum hemorrhage via AMTSL.

The data show that most providers do use the correct mode of administration for uterotonic drugs for the purpose of AMTSL (in 97 percent of observed deliveries, uterotonic drugs were correctly administered) and 92 percent received the correct dose. However, a quarter of observed deliveries received the uterotonic drug during delivery of the baby and 22 percent received it following delivery of the placenta versus following delivery of the baby, as recommended. Furthermore, in only 11 percent of cases was the drug administered within one minute of delivery of the baby. Controlled cord traction and immediate uterine massage upon delivery of the placenta, plus uterine palpation following delivery of the placenta was only performed in 18 and 10 percent of observed deliveries, respectively. There were no significant differences by region or type of health facility.

The national level policy environment for AMTSL is insufficient and likely contributes to the lack of AMTSL use in Nicaragua. The National Standards for Assisting Low-Risk Deliveries do not mention AMTSL; the national Health Care Protocols mention AMTSL, but limit its definition to use of a uterotonic drug following delivery of the baby and controlled cord traction; the curriculum for medical students, as well as the curriculum for post-graduate residents in gynecology and obstetrics do not mention AMTSL. Consequently, it is not surprising that only about one-third of facilities visited in this study had clinical protocols available that specifically mention and define AMTSL.

On the other hand, certain conditions in Nicaragua are very favorable to AMTSL and should be noted. The Essential Drug List includes oxytocin and ergometrine as uterotonic drugs. The Protocols for Obstetric Emergencies, developed by the MOH, SONIGOB, and UNFPA, which promote the FIGO/ICM definition of AMTSL, are now finalized and currently under review. The 2006 curriculum of the National School of Obstetric Nurses also contains and promotes this definition of AMTSL. The availability of uterotonic drugs was not raised as an issue at the national or facility level (with only one facility experiencing a recent, temporary stockout). All facilities in the study reported having offered theoretical training on AMTSL to its staff responsible for managing deliveries in the year prior to the study, using reference materials that

promote the FIGO/ICM definition of AMTSL. Further efforts are needed to disseminate and put into use these updated policy and training materials.

Besides documenting the use of AMTSL, the results of this study also identified three common practices considered potentially harmful. These practices include: pressure applied to the fundus while waiting for the delivery of the placenta, observed in 49 percent of deliveries; uterine massage after the delivery of the baby, observed in 73 percent of deliveries; and cord traction without manual support to the uterus, observed in 81 percent of deliveries. Nearly every delivery (97 percent) had at least one potentially harmful practice.

The study identified a few issues regarding the storage of uterotonic drugs at the facility level which merit attention. These include: substantial variation across drug manufacturers regarding the temperature at which oxytocin should be stored. Some recommend between 2 and 8° C, other recommendations go as high as 30° C. Not surprisingly, actual storage conditions at the facility level also vary, including 53 percent of facilities which store oxytocin at room temperature. Manufacturer recommendations regarding temperature storage of ergometrine did not vary (all recommended 2 to 8° C), though one-third of facilities stored their ergometrine at room temperature.

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. Support and promote the joint work of the MOH, SONIGOB, UNFPA, and other international cooperating agencies in the dissemination and implementation of the newly developed national Protocols for Obstetric Emergencies (*Guías de atención a las emergencias obstétricas*) throughout the entire national public health network.
2. Standardize and disseminate widely the use of these guidelines in national public health network hospitals and its promotion at private and autonomous levels.
3. Update and disseminate the National Guidelines for Low-risk Pregnancy (*Normas nacionales de atención del parto de bajo riesgo)*, to include the FIGO/ICM definition of AMTSL.
4. Promote the use of AMTSL, following the FIGO/ICM definition, as a preventive measure for postpartum hemorrhage within the curriculum for all medical staff responsible for institutional deliveries.
5. Standardize and disseminate international standards for the storage of uterotonic drugs.

Facility-level interventions

Health providers/practices

1. Ensure that all medical and paramedical personnel that participate in conducting institutional deliveries practice AMTSL, either by:

a. Providing hands-on, practice-based AMTSL training for health care providers in all the country's public network hospital units for those not skilled in the practice of AMTSL.

b. Identifying barriers, including motivation, that impede use of AMTSL and address these barriers.

2. Design posters and other job aids promoting AMTSL to be displayed in all health unit delivery rooms of national public health network facilities that assist deliveries.
3. Prioritize the regions with particularly low use of AMTSL in national planning.
4. Provide training of pharmacy personnel on the storage and handling of medical supplies.

Logistics and supplies

1. Provide the basic and necessary logistics for the storage of uterotonic drugs in all warehouses, pharmacies, and delivery rooms in all public health network units that assist in deliveries.
2. Reevaluate and update the procedures for the procurement and distribution of uterotonic drugs, particularly oxytocin, in order to ensure that all hospitals have an adequate supply of oxytocin for its use in AMTSL for every patient that has a vaginal delivery.

Supervision and monitoring

1. 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 assist deliveries.
2. Include use of AMTSL in the routine reporting of statistics for national public health network facilities that assist deliveries for monitoring and control of its implementation and use.
3. Add a column to the registration books of the delivery rooms for monitoring the practice of AMTSL.
4. Implement clinical audits focused on AMTSL.

References

1. ICM and FIGO. *Joint statement: management of the third stage of labour to prevent postpartum haemorrhage.* [joint statement] 2003.

2. WHO. MPS Technical Update: Prevention of Postpartum Haemorrhage by Active Management of Third Stage of Labour. 2006.

3. Prendiville WJ, Harding JE, Elbourne DR, Stirrat GM. The Bristol third stage trial: active versus physiological management of the third stage of labour. *British Medical Journal.* 1988; 297:1295–1300.

4. Rogers J, Wood J, McCandlish R, Ayers, S, Truesday A, Elbourne D. Active versus expectant management of third stage of labour: the Hinchingbrooke randomized controlled trial. *Lancet*. 1998;351:693–699.

5. World Health Organization. *Managing Complications in Pregnancy and Childbirth: A Guide for Midwives and Doctors*. Geneva: WHO Department of Reproductive Health and Research, 2000. WHO/RHR/00.7.

6. Prendiville WJ, Harding JE, Elbourne D, McDonald S. Active versus expectant management in the third stage of labour (Cochrane review). The Cochrane Library, 2001.

7. Festin MR, Lumbiganon P, Tolosa J, Finney K, Ba-Thike K, Chipato T, et al. International survey on variations in practice of the management of the third stage of labour. *Bulletin of the World Health Organi*zation. 2003;81:286–291.

8. Ministry of Health, Nicaragua. Indicadores Basicos de Salud. 2002. Managua, Nicaragua.

9. INEC, ORC Macro. Encuesta Nicaraguense de Demografia y Salud 2001. Managua, Nicaragua y Calverton, Maryland USA. 2002.