Active Management of the Third Stage of Labor

Data Obtained from Health Facilities in Indonesia

August-September, 2006

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Prevention of Postpartum Hemorrhage Initiative

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About POPPHI

The Prevention of Postpartum Hemorrhage Initiative (POPPHI) is a USAID-funded, three-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 Gynecologists and Obstetricians (FIGO), and the International Confederation of Midwives (ICM).

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Table of Contents

Tables and Figures

List of Acronyms

AMTSL	Active management of the third stage of labor
APN	Normal Delivery Care (Asuhan Persalinan Normal) FIGO International Federation of Gynecologists and Obstetricians
IBI	Indonesia Midwives Association
ICM	International Confederation of Midwives
IDHS	Indonesia Demographic and Health Survey
IDAI	Indonesia Pediatrics Association
IM	Intramuscular
IU	International units
IV	Intravenous
MMR	Maternal mortality ratio
MOH	Ministry of Health
NIHRD	National Institute of Health Research and Development
POGI	Indonesia Obstetrics and Gynecology Association
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. 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[1]."[1]

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 ICM/FIGO 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 the curricula for in-service and pre-service training programs were reviewed; and 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 in the vast majority of facility-based deliveries in the sample, with oxytocin used in almost all of deliveries. Use of AMTSL according to the ICM/FIGO definition was observed in 32 percent of deliveries. If the definition of AMTSL is relaxed to allow for administration of the uterotonic drug within three minutes of delivery of the fetus, the proportion receiving AMTSL increases to 42 percent. It should also be noted that the practice of AMTSL varies by province, with one province showing no deliveries for meeting the criteria for either definition. However, other than type of facility, we did not identify other characteristics of the facilities or of the women associated with more or less use of AMTSL. Our data suggest that about one in three deliveries benefit from correct AMTSL practices, but its use seems somewhat random.

The policy environment is supportive for AMTSL. At the national level, the Standard Treatment Guidelines include postpartum hemorrhage and AMTSL. However, the definition of AMTSL is slightly different from the ICM/FIGO definition with the uterotonic drug being given within two minutes. The national drug formulary describes appropriate use of oxytocin and ergometrine for the prevention of postpartum hemorrhage but misoprostol is not yet registered as uterotonic drug. This formulary also states that oxytocin should be stored at room temperature as recommended by the drug manufacturers and ICM/FIGO.

The situation regarding drugs and supplies was found to be satisfactory in most but not all facilities in the sample, with an average stock of uterotonic drugs sufficient for approximately one to three months across all facilities. However, in two and three of the 27 facilities visited, there was no stock of oxytocin and ergometrine, respectively. Families are required to buy their own uterotonic drugs in one-third of the facilities. The dosage and route of uterotonic drug administration needs to be evaluated since approximately 22% of providers used greater than the recommended dose for oxytocin and 50% of providers used greater than the recommended dose for ergometrine.

Recommendations

The following recommendations are made based on the results of this study:

National Policies

1. Update Standard treatment guidelines to comply with the FIGO/ICM recommendations for AMTSL regarding the timing of the administration of the uterotonic drug.
2. Include sufficient hands-on practice to ensure a health provider competent in AMTSL in all medical and midwifery pre-service education programs and all APN in-service training programs.

Providers/Practice

1. Increase the correct use of AMTSL by creating a plan to improve the following practices: administration of the uterotonic drug within one minute of the delivery of the baby, correct dose of the uterotonic drug, application of controlled cord traction and immediate massage of uterus after delivery of the placenta

2. Evaluate the overuse of uterotonics to determine the extent of the problem and the reasons for overuse. Ensure that all providers have information on the correct dosage of uterotonic drugs.

3. Prioritize regions with particularly low use of AMTSL.
4. Prioritize provider types with particularly low use of AMTSL.
5. Develop/revise a national-level, standardardized, competency-based reproductive health/safe motherhood training document for use by all regions.

Logistics and Supplies

6. Review and update procedures for procurement and distribution of uterotonic drugs, particularly oxytocin, to ensure that all facilities have adequate supplies of oxytocin to provide AMTSL to all women having a vaginal birth.
7. Make oxytocin, a life-saving drug, available to all women. If women can not pay for oxytocin for AMTSL purposes, it should be provided to them at no cost.

8. Improve drug storage conditions in hospital drug storage facility, especially for ergometrine.

Monitoring and Evaluation

9. Develop a monitoring system for facilities that monitors the routine use of AMTSL should be developed. Supervisors should be trained in AMTSL, and supervision checklists should be included as an indicator of quality.
10. Add a column to labor and delivery logbooks to monitor the use of AMTSL.
11. Implement clinical audits focused on AMTSL .

In summary, AMTSL has a strong foothold in Indonesia, with between 30 and 40 percent of births benefiting from this practice. Yet there is substantial room for improvement. Given that there are numerous providers implementing this practice correctly, these providers constitute an important resource that can be used to expand the practice to additional providers and to facilities in regions where AMTSL is not the norm.

1. Background

Postpartum hemorrhage is one of the world's leading causes of maternal mortality.
WHO has estimated that 24% of maternal mortality globally is caused by post partum hemorrhage1[2] Maternal mortality remains one of the most serious health problems in Indonesia. The 2002-2003 Demographic & Health Survey (IDHS) reported a maternal mortality ratio (MMR) of 307/100,000 live births[3]. The previous (1997) IDHS showed a MMR of 334/100,000, suggesting no significant change in the MMR[4]. A 2001 mortality study by the Indonesian National Institute of Health and Development (NIHRD) showed that 77% of maternal deaths were due to direct causes. Of these direct causes, the main causes were: post partum hemorrhage (33%); pre/eclampsia (25%); infection (12%); unsafe abortion (5%); and prolonged labor (5%)[5].

Most of these causes of maternal death could be managed by simple and cost-effective drugs and procedures. Active management of the third stage of labor (AMTSL) is a highly effective procedure for the prevention of post partum hemorrhage and could help save hundreds of thousand of women's lives.

AMTSL involves three main components:

- The use of a uterotonic agent within 1 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) and the World Health Organization (WHO). This definition differs from the original research protocol in the frequently cited Bristol[6] and Hinchingbrooke[7] trials as these original protocols include immediate cord clamping, but do not include massage of the uterus.

Clinical trials in developed countries have shown that the use of AMTSL, in contrast to physiologic management of the third stage of labor—in which oxytocic drugs are not used and the placenta separates spontaneously (delivered by gravity and maternal effort)—significantly reduces postpartum hemorrhage. 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 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[8].

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."[9] 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[10].

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[11] 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, 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 also underway in Uganda and Ghana. This report includes the results from Indonesia where the institutional birth rate was 40% in 2002 (9% in public facilities and 31% in private)[3.] The report focuses on policy, provider-related factors, and supplies and logistics related to the management of the third stage of labor. When viewed together, these components provide important insights on routine use of AMTSL (Figure 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 United Kingdom. In addition, effective leaders from national or international agencies may have been able to influence national policies, such as the inclusion of uterotonic drugs in the essential drug list and the content of country-specific formularies, and the content of the curriculum for regarding AMTSL for health care providers. In turn, such training may influence facility-based policies and behavioral expectations.

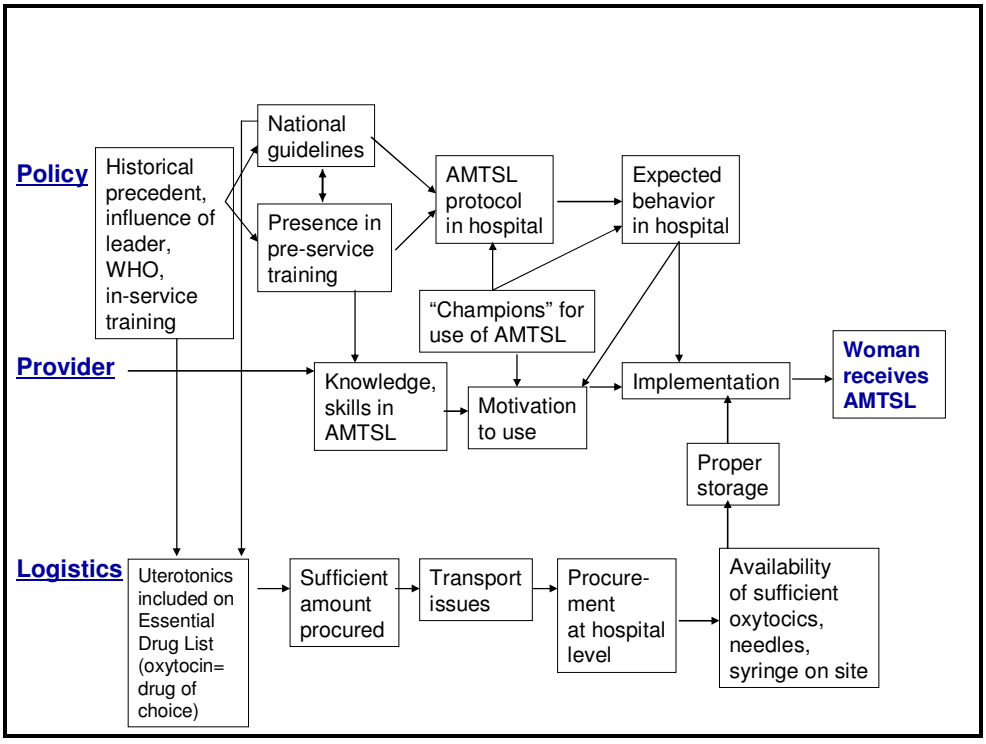
Provider-related factors

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 implies appropriate conditions during transport and storage to ensure the use of chemically active drugs and safe, sterile needles and syringes.

Figure 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 and provide policymakers with the information they need to promote skilled attendance at birth. A third aim of this study is to produce tools and a method that others could employ to document the current practice 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 (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 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 a planning workshop in El Salvador in February 2006 to further refine the protocol and questionnaires before the beginning of data collection in El Salvador, Honduras, Nicaragua, Guatemala and Indonesia.

Questionnaire development

The processes and outcomes identified in the conceptual framework for the study (Figure 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- and in-service training curricula, procurement practices for uterotonic drugs and supply, 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 questionnaire.
- **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 STGs 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 unit as well as storage conditions for uterotonic drugs. Members of the data collection team completed the questionnaire, which required observing deliveries, during their visit to selected facilities.

Ethical Review

Prior to the data collection, the study protocol was submitted to and approved by the Ethical Review Board of The School of Public Health, University of Indonesia. Following country approval, the protocol was submitted to the Committee for Human Research at the Johns Hopkins Bloomberg School of Public Health in Baltimore, Maryland. In this study, informed consent consisted of describing the study and requesting participation from women at admission to the health facility. No personal identifiers were recorded. 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.

Training for data collectors

A team of fifteen midwives was recruited to administer the facility-level and observation of deliveries questionnaire. The country coordinator, assisted by one obstetrician and 3 midwives, provided a 3-day training (2-4 August 2006) in Jakarta. The training involved lectures, a CD-based visual presentation on AMTSL, demonstrations and practice using an anatomical model, and field practice that provided an opportunity for pre-testing the questionnaires and supervised experience for the data collectors. Based on the pre-test results, the investigators made minor modifications to the questionnaires before beginning the fieldwork.

Sample design

A nationally-representative sample of approximately 200 facility-based deliveries was required to meet study objectives described in Chapter 1. Sample size calculations assumed a prevalence of 30 percent, a 90% response rate and a design effect of two. Due to budgetary and logistical concerns, the sample was restricted to public facilities with at least 500 deliveries per year to prevent facility visits with few or no observations. In Indonesia, there were 40 such facilities and 28 were randomly selected with probability proportional to each facility's annual number of deliveries. This approach assured that public facilities in the country were adequately represented.

The Indonesia Demographic & Health Survey 2002-2003 showed 9.2 percent of deliveries occurred in public health facilities while 30.5 occurred in private health facilities and 59.0 percent occurred at home. Consequently, this study does not represent all facility-based deliveries. However, selecting a representative sample of private facilities and observing deliveries in private facilities was not considered to be feasible. A separate survey was conducted observing the third stage of labor in home-based deliveries with a village or community midwife (bidan di desa) and have reported it separately.

A team of three observers visited each selected health facility for 5 days. Each observer observed all deliveries over an eight hour period in 5 days, thus ensuring observation for 24 hours per day for five days. A total of 408 deliveries were observed in 27 facilities.

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 five days period is not proportional to the reported annual number of deliveries in that facility, weights will correct for this over or under-representation. The tables in this report all present weighted n's.

Fieldwork

The country coordinator accompanied by MOH staff visited selected health facilities in advance to get permission for the facility to participate in the study. Five teams of observers conducted the fieldwork from August to September 2006. Within each team, the senior member was assigned additional duties as supervisor. These duties included initiating contact with hospital administrators and reviewing all questionnaires daily.

Data entry and analysis

Using Epi Info (version 6), the team adapted data-entry programs developed for the global study for use in Indonesia. Two School of Public Health students did double data entry and assisted the data cleaning process which was led by PATH's senior research assistant. Final data cleaning was accomplished through a team effort during a data analysis workshop held at Baltimore, from

December 11–19, 2006. The team carried out the data analysis using STATA 9 statistical software.

3. Results

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

The National Policy Environment

Standard treatment guidelines

The study team reviewed the National Normal Delivery Care Standards (Asuhan Persalinan Normal/APN), which were prepared in 2003 and revised in 2006 by the Ministry of Health (Directorate of Maternal & Child Health), the World Health Organization, the Indonesia Obstetric & Gynecologic Association (POGI), the Indonesia Pediatric Association (IDAI) and the Indonesia Midwives Association (IBI). Postpartum hemorrhage is specifically listed among the common obstetric and gynecological illnesses in this manual. In this APN and also in the national drug formulary, prepared by the Ministry of Health, the use of both oxytocin and ergometrine as a means of preventing postpartum hemorrhage is described in some detail. The information provided in those documents is quite similar to the current FIGO/ICM recommendations for use of oxytocin and ergometrine for the prevention of postpartum hemorrhage. The only area of disagreement is the timing of administration for the uterotonic drug. The APN mentions that oxytocin should be given within *two* minutes after delivery of the fetus, as opposed to one minute as is recommended by FIGO/ICM.

Essential drug list

Oxytocin and ergometrine are registered as a uterotonic drug for in-country use. Misoprostol is also registered, though as a drug for gastric ulcer. The last revision of the essential drugs list was completed in 2004. This list contains both ergometrine and oxytocin (by both oral and injectable administration) but not the combination drug (syntometrine) or prostaglandins.

Drug registration process

All distributed drugs in Indonesia must be registered with the Food and Drug Administration Office. The team reviewed written guidelines for drug evaluation and registration. This process involves assessing the safety, efficacy, and quality of products through clinical and pharmaco-chemical data evaluation as well as through laboratory quality control. Submission of a WHO pre-qualification certificate is required for products to be imported into Indonesia. A United States Food and Drug Administration, European or Japanese approval certificate should be attached if the drug is approved in those countries. This registration process is linked to the Good Manufacturing Practice requirements, which also includes inspection of manufacturing plants.

Source, selling, and procurement processes

The public sector, private sector, nongovernmental organizations (NGOs), and international organizations import and sell or freely distribute uterotonic drugs. The Ministry of Health

(Directorate of Pharmaceutical Products) is the major supplier for public facilities. The Ministry of Health purchasing practices are based on historical consumption and occasional needs-assessment surveys.

Availability and storage of uterotonic drugs

The study team found both oxytocin and ergometrine in adequate amounts at the central drugstore. The study team observed that both oxytocin and ergometrine are stored according to the manufacturers' recommendations in a cold room with a temperature range of 2°C to 8°C at the central drug storage site. Misoprostol is not found in the central drug storage site, since it is not yet registered as a uterotonic drug.

Pre- Service and In-service Training in AMTSL

Pre-service training

The pre-service curriculum for medical doctors, midwives, and nurses include detailed descriptions of AMTSL. The Asuhan Persalinan Normal (APN) module was used in the curriculum, therefore the injection of uterotonic drugs could be up to 2 minutes after delivery of the baby, instead of 1 minute as FIGO/ICM standard. Staff from all training institutions where interviews were conducted reported that their instruction was based on APN, but they never observed or evaluated their students practicing AMTSL using a detailed check list, nor did they measure the timing of when the uterotonic injection was administered.

In-service training

Of the 27 hospitals surveyed, 21 (78%) reported their midwives had participated in in-service training that included AMTSL during the past year; 14 (52%) reported that their doctors had participated in the same training. However, findings suggest that all of the health facilities conducting in-service training lack standard curricula, making assessment of the contents or quality of the training difficult. Although the APN has been accepted as the national standard guideline, the use of this guideline for in service training in hospitals has just gotten underway.

The Facility-level Policy Environment

Availability of clinical guidelines specific to AMTSL

Table 3.1 shows the availability of clinical guidelines at the facility level and the components of AMTSL cited in these guidelines. In almost all 27 facilities surveyed (96%), the guidelines for normal delivery were available and AMTSL is specifically mentioned. All components of AMTSL were included in these guidelines and there are no facility level policies that might restrict the practice of AMTSL.

Table 3.1 Percent of facilities by the availability of clinical guidelines for delivery and the inclusion of AMTSL practices in the guidelines

AMTSL in the guidelines	%	N
Availability of guidelines		
Available	96.3	26
Not available	3.7	1
AMTSL specifically cited in the guidelines		
Yes	96.3	26
No	0.0	0
N/A	3.7	1
Uterotonic mentioned in the guidelines		
Oxytocin	92.6	25
Ergometrine	37.0	10
Misoprostol	22.2	6
Controlled cord traction mentioned in the guidelines		
Yes	96.3	26
No	0.0	0
N/A	3.7	1
Uterine massage mentioned in the guidelines		
Yes	96.3	26
No	0.0	0
N/A	3.7	1
Facility level policy that restrict the practice of AMTSL		
Yes	0.0	0
No	100.0	27

Accessibility of the Pharmacy and Pharmaceuticals at the facility-level

All of the health facilities in this study had a pharmacy on site and are open everyday, 24 hours a day. Families are asked to purchase uterotonic drugs and syringes in 16 of 27 facilities (59%). During the survey period, oxytocin and ergometrine were available in the pharmacies of all 27 facilities. However, misoprostol was available in only 63% of the health facilities. All of the health institutions surveyed estimate their future needs using the historical consumption method plus some additional stock as a cautionary measure.

The mean months of stock on hand was 1 for oxytocin (range: 0-5 months), 2 for ergometrine (range 0-24 months) and 3 for misoprostol (range: 0-16 months). There were 2 facilities with zero stock of oxytocin and 3 facilities with zero stock for ergometrine. There were 5 facilities (19%) with a history of stock-outs of oxytocin and ergometrine in the last 3 months. In 4 of the 5 facilities, the stock-out periods ranged from 1-4 days, whereas in one facility, the stock-out lasted for 30 days. The two most common reasons for stock out were delay in ordering the supplies and consumption exceeding expectation.

Health facilities purchase uterotonic drugs from local wholesalers, but may also receive free donations from the MOH or non-governmental organizations. When a facility is out of stock, patients are asked to buy and bring the drugs from private facilities.

The survey findings show that the average purchase and selling prices are as follows:

- For **oxytocin,** the average purchase price was Rp 4,800 (US$ 0.53) per ampoule, and the average selling price was Rp. 6,500 ($ 0.71) per ampoule of 10 IU.
- For **ergometrine,** the average purchase price was Rp. 3,800 (US$ 0.42) per ampoule, and the average selling price was Rp. 4,900 (US$ 0.54) per ampoule of 0.5mg.

Storage conditions for uterotonic drugs at the facility-level

Most (85%) of the manufacture's recommendations found in health facility pharmacies stated a storage temperature for oxytocin in line with the FIGO/ICM recommendation, which is less than 30°C, but only 63 percent of facilities correctly mentioned that ergometrine should be stored at 2-8°C. Around 75 percent of the facilities mentioned that both uterotonic drugs should be stored in a dark place or away from direct sunlight.

Most of the storage conditions found in the 27 health facilities visited comply with FIGO/ICM recommendations for oxytocin, but only 25 percent of the facilities stored ergometrine at 2-8°C, and only two thirds stored ergometrine in the dark. Table 3.2 shows the manufacturer's recommendation and actual storage conditions found in the 27 selected health facilities.

Table 3.2. Manufacturer's recommendations and actual storage conditions for uterotonic drugs

	Uterotonic Drugs		
	% of facilities with oxytocin n=27	% of facilities with ergometrine n=27	% of facilities with misoprostol n=27
Storage temperature recommended by manufacturer:			
2-8 °C	55.6	63.0	0.0
<15 °C	7.4	18.5	0.0
15-25 °C	22.2	0.0	40.7
Others	14.8	18.5	22.2
Not available	0.0	0.0	37.1
Light conditions recommended by manufacturer:			
Not stated	11.1	11.1	14.8
Store away from light	85.23.7	77.7	14.8
Others	0.0	11.1	33.3
Not available		0.0	37.1
Storage temperature which drug is actually stored:			
2-8 °C	29.6	25.9	0.0
<15 °C	29.6	25.9	0.0
15-25 °C	40.8	48.20.00.0	62.90.037.1
Others	0.00.0		
Not available			
Light conditions which drug is actually stored:			
Dark	66.7	63.0	7.5
Indirect sunlight	33.30.0	37.00.0	44.4
Others			11.0

Not available			37.1

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 utertonic drugs; (2) the timing, mode of administration, and dose of these drugs; (3) practices in use of the individual components of AMTSL; (4) the correct use of AMTSL; (5) the observation of potentially harmful practices and (6) the occurrence of postpartum hemorrhage.

Description of the study sample

The study team observed a total of 408 deliveries in 27 health facilities. Table 4.1 describes the characteristics of the facilities and women associated with these deliveries.

Over half of the observed deliveries took place in district hospitals, another one third were in provincial hospitals and the rest were in central referral hospitals. Due to sampling procedures that restricted the selection of facilities to those with at least 500 deliveries per year, hospitals in only 11 of 30 provinces were selected. The observations are equally distributed across facilities with 500-1000, 1001-1500, 1501-2000 and more than 2000 deliveries per year.

The study teams observed seven types of health care provider. Midwives were responsible for nearly forty percent of the observed deliveries, general physicians for nearly 35% of the deliveries, and medical students for nearly 16% of the deliveries. Obstetricians are only responsible for a small fraction of the observed deliveries (2.5%). Forty percent of the observed deliveries occurred among primiparous women, and 3 percent of deliveries were represented by women with five or more deliveries. Just under half of all deliveries received uterotonic drugs prior to the third stage of labor; 26 percent were induced and 18 percent were augmented.

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

	%	N
Facility characteristics		
Type of facility		
Central referral hospital	10.3	42
Provincial hospital	32.4	132
District hospital	57.3	234
Deliveries per year		
500-1000	17.3	71
1001-1500	19.6	80
1501-2000	34.6	141
>2000	28.5	116
Province		
South Sumatra	2.5	10
Lampung	5.4	22
Banten	7.1	29
Jakarta	19.8	81
West Java	6.4	26
Central Java	21.9	89
East Java	18.8	77

West Kalimantan	3.5	15
East Kalimantan	4.9	20
West Nusatenggara	4.2	17
East Nusatenggara	5.3	22
Area		
Urban	58.5	239
Rural	41.5	169
Provider qualification		
Obstetrician	3.3	14
Other physician	31.6	129
Midwife	40.3	164
Medical student	17.9	73
Midwifery student	6.9	26
Others	0.5	2
Women's characteristics		
Mother's age (years)		
<20	4.5	18
20-34	76.8	314
35+	18.7	76
Parity		
0	42.4	173
1	30.9	126
2	15.3	63
>2	11.3	46
Received uterotonic drugs prior to third stage of labor		
For induction	25.5	104
For augmentation	18.3	75
No drugs prior 3rd stage	56.2	229
Received uterotonic drugs at 3rd or 4th stage of labor		
Oxytocin only	74.5	304
Ergometrin only	1.1	4
Oxytocin & ergometrine	13.0	53
Oxytocin & misoprostol	8.3	34
Ergometrin & misoprostol	0.3	2
Oxytocin, ergometrin & misoprostol	2.5	10
No uterotonic drug	0.3	1

Components of AMTSL

The study used three definitions of AMTSL:

- **Definition A** is the FIGO/ICM definition, which involves administration of 10 IU of oxytocin/ergometrine within 1 minute following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.
- **Definition B** is the APN definition, which involves administration of 10 IU of oxytocin/ergometrine within 2 minute following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.
- **Definition C** is the FIGO/ICM definition, which involves administration of 10 IU of oxytocin/ergometrine within 3 minute following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.

Definition A is the strictest of the three definitions and reflects all aspects of the ICM/FIGO definition. Definitions B and C are more flexible and extend the timing of the uterotonic to within two and three minutes of the delivery of the fetus. Table 4.2 provides the percentage of observed deliveries using both all three definitions of AMTSL by background characteristics. In this table, only AMTSL use with oxytocin is included, as AMTSL with ergometrine was negligible. Overall, 32 percent (95% confidence interval: 23%-41%) of observed deliveries received AMTSL following the strict version of the FIGO/ICM definition. The percentage increases to 40 percent (95% confidence interval: 24-50%) when using APN standard, and increases to 42 percent (95% confidence interval: 30%-52%) when using the definition allowing administration of oxytocin within 3 minutes of delivery of the fetus.

With the exception of the qualification of the provider and province, there is very little variation in the use of AMTSL across the characteristics of both the facility and the woman. For example, obstetricians were the least frequent practitioners of AMTSL in this sample (10%) compared to general physicians, midwives, medical students and midwifery students (32%, 44%, 33% and 28% of observed deliveries, respectively). However this difference is only borderline statistically significant (p=0.0926). The pattern of AMTSL use by province shows some variation, though it does not always follow the pattern of uterotonic use shown in Table 4.2. For example, oxytocin was used among 100 percent of deliveries in Lampung, but there was no correct use of AMTSL among these deliveries.

Table 4.2. Percentage of AMTSL use by characteristics of the facility and the woman

	AMTSL			
	Definition A (%)	**Definition B (%)**	**Definition C (%)**	**N**
Total	31.8	39.6	41.1	408
95% CI	23.0-40.7	28.8-50.3	30.3-51.8	
Age of women				
<20 years	36.8	33.6	36.8	18
20-34 years	37.6	41.6	48.9	314
35+ years	28.8	32.6	41.3	76
p value	0.4344	0.3731	0.4760	
Parity				
0	38.6	42.6	48.8	173
1	35.5	36.9	46.0	126
2	33.8	34.2	47.1	63
>2	30.0	42.7	42.0	46
p value	0.6645	0.6393	0.7892	
Time of deliveries				
6 pm to 6 am	32.7	36.9	44.2	207
6 am to 6 pm	39.0	42.3	49.5	201
p value	0.2968	0.4168	0.3977	
Facility type				
Central referral hospital	32.9	32.9	44.3	42
Provincial hospital	44.4	41.0	51.30	132
District hospital	32.3	40.0	45.3	234
p value	0.6890	0.8438	0.9111	
Provider qualification				
Obstetrician	10.0	10.0	10.0	14
General physician	32.1	32.8	39.3	129
Midwife	43.6	50.9	54.6	164
Medical student	32.8	39.1	48.4	73
Midwifery student	27.6	41.4	48.3	26
Other	0.0	0.0	50.0	2
p value	0.0926	0.0550	0.0690	
Province				
South Sumatra	50.0	56.3	56.3	10
Lampung	0.0	0.0	0.0	22
Banten	28.6	39.3	39.3	29
West Java	32.5	48.8	51.3	81
DKI Jakarta	13.6	20.5	27.3	26
Central Java	29.0	33.3	35.5	89

East Java	35.2	42.3	42.3	77
West Kalimantan	28.6	28.6	35.7	15
East Kalimantan	28.6	28.6	28.6	20
West Nusatenggara	50.0	50.0	50.0	17
East Nusatenggara	69.6	95.6	95.6	22
p value	0.2474	0.1058	0.1196	
Area				
Urban	39.6	39.6	48.8	239
Rural	30.4	39.9	44.1	169
p value	0.7483	0.9547	0.8962	
Deliveries per year				
500-1000	29.9	32.8	38.8	71
1001-1500	28.9	32.8	36.9	80
1501-2000	34.6	40.2	48.9	141
>2000	49.0	49.0	59.8	116
p value	0.6444	0.6394	0.7278	
In service AMTSL training				
For midwives				
Yes	36.0	36.7	45.2	313
No	36.8	49.0	51.8	95
p value	0.4225	0.2077	0.1698	
For doctors				
Yes	38.3	38.3	49.3	212
No	33.3	33.3	37.8	166
p value	0.4343	0.9285	0.7487	

Correct use of uterotonic drugs for AMTSL

In this sample of observed deliveries, almost every woman (99.7%) was given a uterotonic drug during the third or fourth stage of labor. Oxytocin was given to almost all deliveries (99%), and ergometrine was given in 18 percent. Some women (14%) received both drugs. There was no evidence of the use of combination drugs, such as Syntometrine.

As compared with their counterparts, providers in provincial and district hospitals were more likely to use oxytocin only than they were to use ergometrine or a combination of drugs during the third and fourth stages of labor. Obstetricians are more likely to use ergometrine and a combination of drugs than other providers. For example, ergometrine and a combination of drugs were used in about 70 percent of deliveries by obstetricians.

Table 4.3 presents the distribution of observed deliveries by the timing, mode and dose of uterotonic administration during the third and fourth stages of labor. Almost all uterotonics were administered following the delivery of the fetus. Oxytocin was primarily administered via intramuscular (IM) injection, as recommended, whereas 75% of the deliveries in which ergometrine was administered was by intravenous (IV) push/injection. Ten international units (IU) of oxytocin was administered in almost 80% of all the deliveries; 0.2 mg of ergometrine was administered in half the deliveries receiving this drug, again reflecting the FIGO/ICM dosage recommendations. The remaining 50 percent were administered 0.4 mg of ergometrine.

Table 4.3. Percent distribution of the timing, mode of administration, and dose of uterotonic drugs.

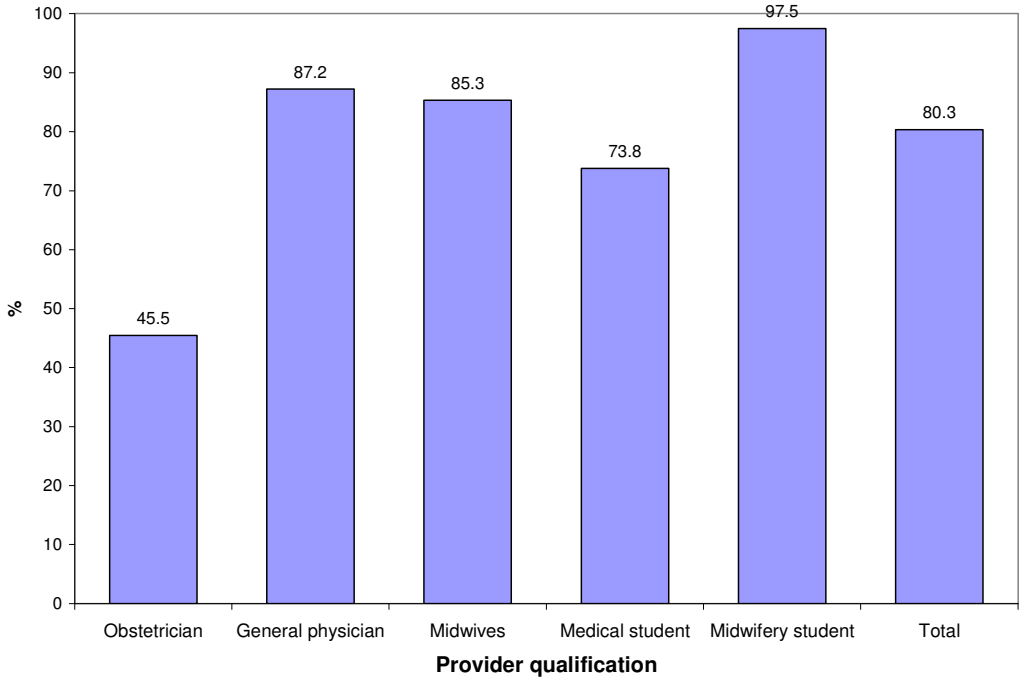
	Among cases receiving oxytocin only		Among cases receiving ergometrine only	
Timing of administration (%)				
During delivery of the fetus		4.5		0.0
After delivery of the fetus		93.3		100.0
During delivery of the placenta		0.2		0.0
After delivery of the placenta		2.0		0.0
Total		100.0		100.0
Mode of administration (%)				
IM		79.2		25.0
IV push/injection		2.5		75.0
IV drip		2.5		0.0
IM and IV drip		15.9		0.0
Total		100.0		100.0
Dose (%)				
Dose of:	<10 IU	1.0	0.20 mg	50.0
Dose of:	10 IU	77.2	0.40 mg	50.0
Dose of:	11-20 IU	13.4		
Dose of:	21-30 IU	6.7		
Dose of:	>30 IU	1.7		
Total		100.0		100.0
Number		403		4

IM = intramuscular administration; IV = intravenous administration.

Controlled cord traction

Controlled cord traction, which includes gentle traction of the cord and manual support of the uterus, was practiced in 80 percent of observed deliveries. Figure 4.1 presents the use of controlled cord traction by provider qualification. Use of controlled cord traction is less common among obstetricians (45 percent) compared to general physicians, midwives, medical students and midwifery students (87%, 85%, 74% and 98%, respectively; $p < 0.001$).

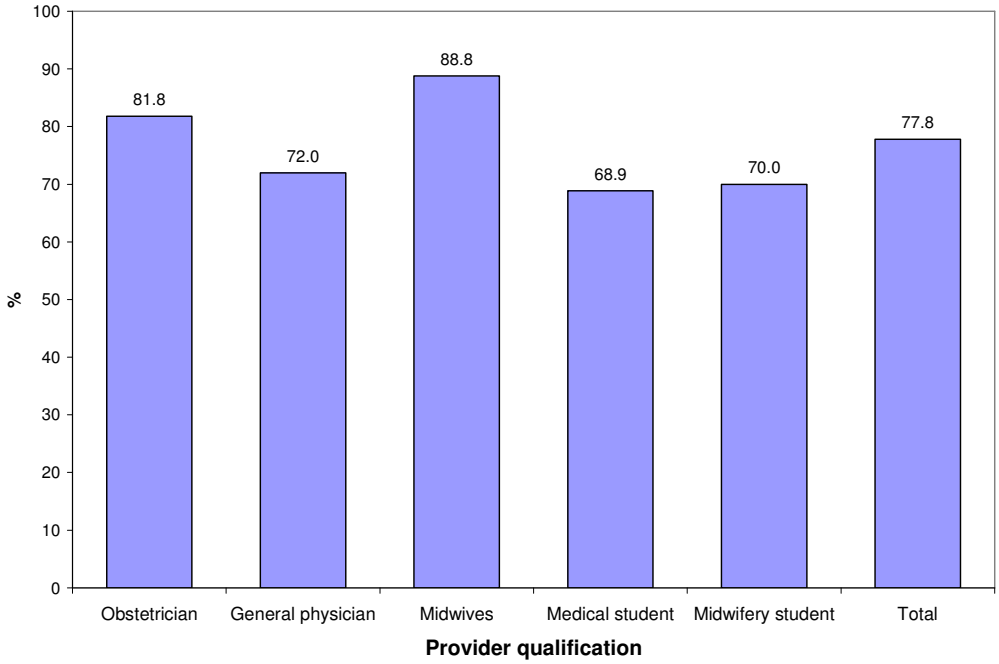
Figure 4.1. Percent of deliveries with controlled cord traction, by qualification of the provider



Uterine massage

Overall, 78 percent of all deliveries benefited from uterine massage immediately following delivery of the placenta. Figure 4.2 presents the use of massage by provider qualification. Overall there is no difference in uterine massage by provider qualification.

Figure 4.2. Percent of deliveries receiving immediate uterine massage following delivery of the placenta, by qualification of provider

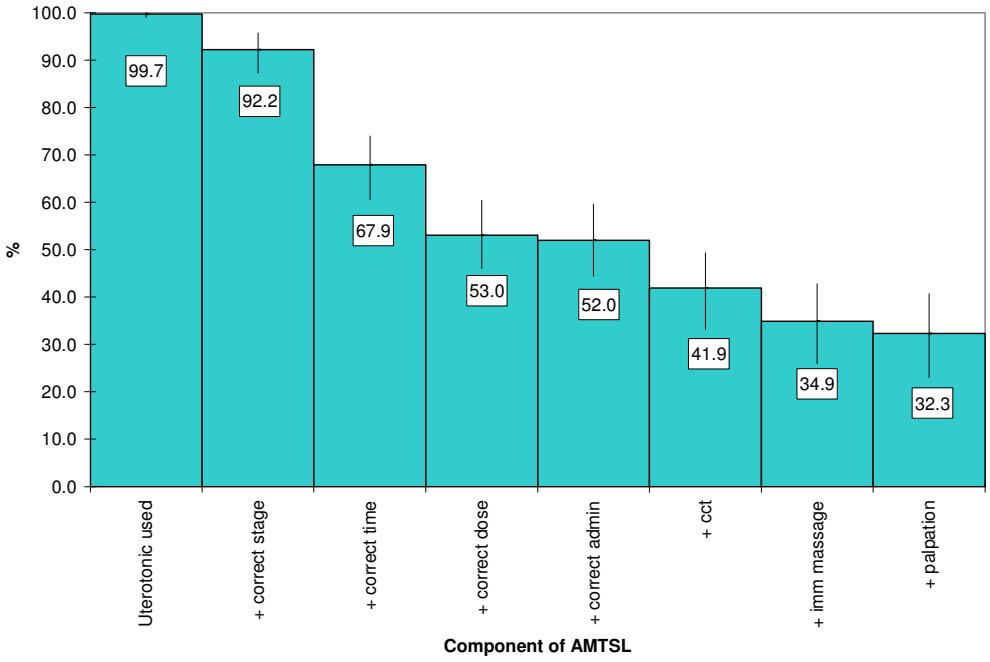


Use of AMTSL

The study team was surprised to find that correct use of AMTSL was so low in this study, given that the use of uterotonic drugs was nearly universal in facility-based deliveries, that approximately 80 percent of observed deliveries received controlled cord traction, and that 78 percent received immediate uterine massage.

To isolate which practice or practices are responsible for the relatively low percentage of deliveries meeting the criteria for correct use of AMTSL, Figure 4.3 shows the practice by the individual components of AMTSL. A uterotonic was given during the third or fourth stage of labor to almost all deliveries (99.7%); 92 percent of all deliveries received a uterotonic after delivery of the fetus. After adding the time criteria, only about 68% of all deliveries received a uterotonic in less than or equal to one minute after delivery of the fetus, reflecting a substantial decrease. When correct dosage was added, the percentage dropped again to 53%. Another decrease is shown when control cord traction and immediate massage are added. Palpation every 15 minutes for the first 30 minutes causes only a very small decrease, resulting in the overall use of AMTSL at 32 percent. Thus, aside from use of a uterotonic, all components of AMTSL could be improved, and timing within one minute of the delivery of the fetus and correct dosage appear to be the practices most in need of improvement.

Figure 4.3 Percent and 95% confidence interval for deliveries with use of uterotonic drugs during the 3rd stage of labor (oxytocin and ergometrine), plus additional elements 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 4.4 shows that cord clamping in less than 1 minute of delivery is the norm in facility-based deliveries in Indonesia. The cord was clamped within 1 minute of fetal delivery in 96 percent of observed deliveries. The remaining deliveries had the cord clamped in less than 2 minutes and a small percentage had the cord clamped in 3 minutes.

Table 4.4. Percent distribution of time elapsed between delivery and cord clamping.

Time	% of subjects	n
< 1 minute	80.7	330
1 minute	15.9	64
2 minutes	3.1	13
3 minutes	0.3	1
Total	100.0	408

Duration of the third stage of labor

Table 4.5 presents the time elapsed between the delivery of the fetus and the placenta. The average duration of the third stage of labor among deliveries in which AMTSL was used was 5.8 minutes, compared to 7.3 minutes among deliveries in which AMTSL was not used. Using APN standard or more relaxed time requirement for oxytocin administration , the difference between deliveries with and without AMTSL use is 6.4 and 7.1. The difference is statistically significant only for the strict definition of AMTSL.

Table 4.5. Average duration of the third stage of labor among deliveries, with and without use of AMTSL.

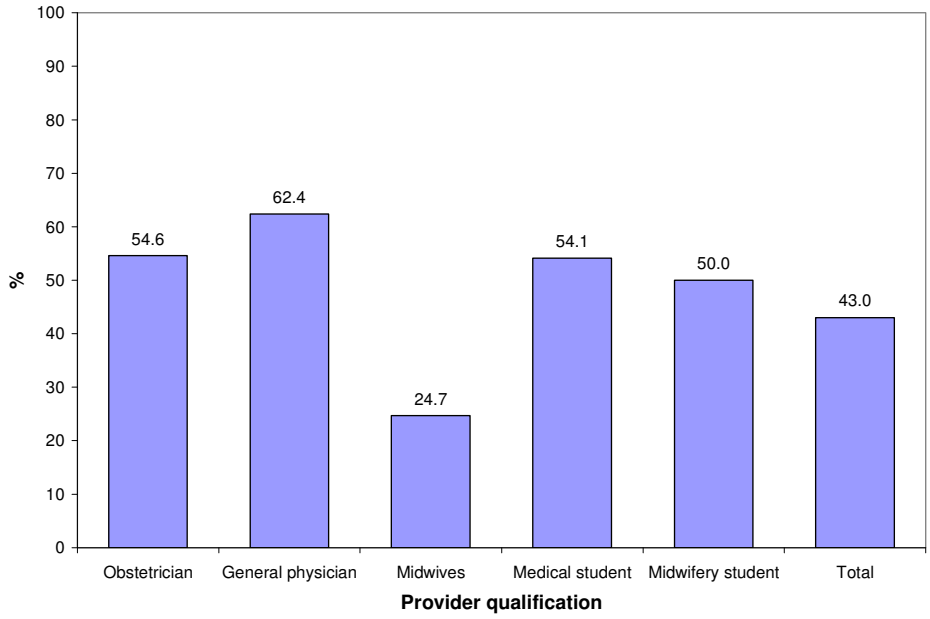
Use of AMTSL	Average duration of third stage of labor	95% confidence intervals	n	P value
Definition A: **Administration of 10 IU of oxytocin/ergometrine <u>within 1 minute</u> following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.**				
Use of AMTSL	5.77 minutes	4.62–6.92	130	0.050
Non-use of AMTSL	7.25 minutes	6.30–8.20	278	
Definition B: **Administration of 10 IU of oxytocin/ergometrine <u>within 2 minute</u> following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.**				
Use of AMTSL	6.32 minutes	5.07-7.59	162	0.329
Non-use of AMTSL	7.06 minutes	6.14-7.98	246	
Definition C : **Administration of 10 IU of oxytocin/ergometrine <u>within 3 minutes</u> following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.**				
Use of AMTSL	6.32 minutes	5.11–7.52	168	0.291
Non-use of AMTSL	7.06 minutes	6.15–8.05	240	

Potentially harmful practices

In addition to documenting AMTSL use, data from this study also identified three practices considered potentially harmful. These practices include the uterine massage following delivery of the fetus (43%), application of cord traction without manual support of the uterus (10%), and application of cord traction without having administered a uterotonic drug to contract the uterus (0.3%). All of these practices can increase the risk of postpartum hemorrhage or cause problems such as uterine inversion.

Figure 4.4 shows the practice of uterine massage following delivery of the fetus by qualification of the provider. This practice is quite similar across all providers, except for midwives. Half or more of the deliveries by all other types of health care provider received uterine massage following delivery of the fetus. In contrast, this practice was observed for only one in four deliveries assisted by midwives.

Figure 4.4 Percent of deliveries with the potentially harmful practice of uterine massage after delivery of the fetus by qualification of the providers.



Postpartum Hemorrhage

The occurrence of postpartum hemorrhage in this study was measured qualitatively, using a definition of two sheets full of blood after delivery of the fetus, as observed by the data collector. In general, postpartum hemorrhage occurred in 6% of the deliveries. Using the strictest definition of AMTSL, postpartum hemorrhage is five times more likely to occur in deliveries without AMTSL. These data suggest that 86 percent of the postpartum hemorrhage cases among facility-based deliveries without AMTSL and 80 percent of postpartum hemorrhage cases among all facility-based deliveries could be prevented by AMTSL.

Table 4.6 Postpartum hemorrhage cases among all deliveries, with and without use of AMTSL

	Postpartum hemorrhage	n	Relative Risk	95% Confidence interval of RR
Definition A: **Administration of 10 IU of oxytocin/ergometrine <u>within 1 minute</u> following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.**				
Use of AMTSL	1.5%	130	1	
Non use of AMTSL	8.3%	278	5.4	1.3 - 23.5
Total	6.0%	408		
Definition B: **Administration of 10 IU of oxytocin/ergometrine <u>within 2 minute</u> following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.**				
Use of AMTSL	3.7%	162	1	
Non use of AMTSL	7.7%	246	2.1	0.8-5.1
Total	6.0%	408		
Definition C: **Administration of 10 IU of oxytocin/ergometrine <u>within 3 minute</u> following the delivery of the fetus, controlled cord traction, immediate uterine massage following delivery of the placenta and palpation of uterus every 15 minutes.**				
Use of AMTSL	3.6%	168	1	
Non use of AMTSL	7.9%	240	2.2	0.9 – 5.4
Total	6.0%	408		

5. Conclusions and recommendations

This study documented practices during the third and fourth stages of labor in a nationally representative sample of public facility-based, vaginal births in Indonesia. The results show that almost 100 percent of such births receive a uterotonic drug during the third stage of labor, with almost no use during the 4th stage (2%). Oxytocin was used in almost all of the deliveries, and ergometrine was used in less than a one fifth of the deliveries.

Use of AMTSL according to the recommendations of FIGO/ICM was observed in 32 percent of deliveries, virtually all of which used oxytocin. A variety of factors account for the relatively low use of AMTSL as compared to the overall use of oxytocin. These include the delayed administration of oxytocin following the delivery of the fetus, incorrect dose, lack of controlled cord traction, and lack of uterine massage immediately following delivery of the placenta. If the definition of AMTSL is relaxed to allow administration of the uterotonic drug within the first 3 minutes (as opposed to 1 minute) following delivery of the fetus, 43 percent of deliveries received AMTSL. The use of AMTSL using the correct or adequate definition varies by province, with 1 province showing no deliveries for either definition. The use of AMTSL does not vary by type of facility nor by characteristics of the mother, suggesting that providers are not restricting the practice of AMTSL to high risk women. A finding of potential concern is that approximately 22% of providers using oxytocin give greater than 10 IU and 50% of the providers using ergometrine give greater than 0.2mg. Further evaluation of this data is needed to determine the reasons for the over-dosage as well as the safety and cost implications.

In Indonesia, the policy environment is very supportive of AMTSL. At the national level, the standard treatment guidelines (Asuhan Persalinan Normal/APN) include postpartum hemorrhage, and provide recommendations regarding its prevention that differ only slightly from the FIGO/ICM definition of AMTSL; that is, it recommends administration of the uterotonic drug within two, as opposed to one minute of the delivery of the baby. The national drug formulary also describes appropriate use of oxytocin and ergometrine for the prevention of postpartum hemorrhage, putting oxytocin as first-line drug. This formulary also states that oxytocin should be stored at 2-8°C as recommended by the drug manufacturers and FIGO/ICM. Misoprostol is not yet in the formulary since this drug is not yet registered as a uterotonic, but it has been stocked in 17 of 27 facilities as a uterotonic drug and is used in 11 percent of the deliveries in combination with oxytocin or ergometrine. Given this policy environment, one could expect the correct use of AMTSL to be high, although our results show only one in three deliveries meeting all the criteria for correct use of AMTSL.

AMTSL is already included in medical and midwifery school curricula as these curricula followed the APN. Nevertheless there is no systematic and detailed observation of AMTSL practices among the students during their pre-service education..

Regarding drugs and supplies, the mean months of stock on hand within drug storage was 1 month for oxytocin (range: 0-5 months) and 2 months for ergometrine (range: 0-16 months), but two facilities had no stock of oxytocin, and three facilities had no stock for ergometrine. The stock-out periods ranged from 1 to 30 days, with the most common reasons for stock out (in order of their frequency): the delay in ordering the supplies and consumption exceeding expectation. In addition, families were requested to buy uterotonic drugs and syringes in 16 of 27 facilities in our sample.

The storage of uterotonic drugs is less problematic for oxytocin than for ergometrine, as most of the manufacturers recommend the correct temperature and light conditions for oxytocin whereas only 65% of them correctly recommend appropriate storage conditions for ergometrine. Regardless of the manufacturer's recommendation, almost all facilities stored oxytocin under correct conditions, but only 25% of them stored ergometrine at the correct temperature.

Measuring the effect of AMTSL implementation to prevent post partum hemorrhage, our observations showed women who received AMTSL experienced a shorter third stage of labor. Women who did not receive AMTSL are 5 times more likely to experience post partum hemorrhage compared to women who received AMTSL, based on our qualitative assessment of postpartum hemorrhage. Given these results, if AMTSL could be applied to every delivery, approximately 80% of post partum hemorrhage cases could be prevented.

Recommendations

Based on the findings from this national study, the study team proposes the following recommendations.

Policy

1. Update Standard treatment guidelines to comply with the FIGO/ICM recommendations for AMTSL regarding the timing of the administration of the uterotonic drug.
2. Include sufficient hands-on practice to ensure a health provider competent in AMTSL in all medical and midwifery pre-service education programs and all APN in-service training programs.

Providers/practice

3. Increase the correct use of AMTSL by creating a plan to improve the following practices: administration of the uterotonic drug within one minute of the delivery of the baby, correct dose of the uterotonic drug, application of controlled cord traction and immediate massage of uterus after delivery of the placenta.

4. Evaluate the overuse of uterotonics to determine the extent of the problem and the reasons for overuse. Ensure that all providers have information on the correct dosage of uterotonic drugs.

5. Prioritize regions with particularly low use of AMTSL.
6. Prioritize provider types with particularly low use of AMTSL.
7. Develop/revise a national-level, standardardized, competency-based reproductive health/safe motherhood training document for use by all regions.

Logistics

8. Review and update procedures for procurement and distribution of uterotonic drugs, particularly oxytocin, to ensure that all facilities have adequate supplies of oxytocin to provide AMTSL to all women having a vaginal birth.

9. Make oxytocin, a life-saving drug, available to all women. If women can not pay for oxytocin for AMTSL purposes, it should be provided to them at no cost.

10. Improve drug storage conditions in hospital drug storage facility, especially for ergometrine.

Monitoring and evaluation

11. Develop a monitoring system for facilities that monitors the routine use of AMTSL should be developed. Supervisors should be trained in AMTSL, and supervision checklists should be included as an indicator of quality.
12. Add a column to labor and delivery logbooks to monitor the use of AMTSL.
13. Implement clinical audits focused on AMTSL .

In summary, AMTSL has a strong foothold in Indonesia, with between 30 and 40 percent of births benefiting from this practice. Yet there is substantial room for improvement. Given that there are numerous providers implementing this practice correctly, these providers constitute an important resource that can be used to expand the practice to additional providers and to facilities in regions where AMTSL is not the norm.

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