Use of Dexamethasone to Prevent Complications of Preterm Birth in Indonesia

INTRODUCTION

Figure 1. Location of sites in Indonesia

Preterm birth is defined as a live birth before 37 completed weeks of pregnancy. While a preterm infant's likelihood of survival has improved over the years, there is still a high rate of mortality and serious morbidity associated with prematurity. In Indonesia, the preterm birth rate is among the highest in the world at 15.5% (2010), meaning an estimated 32,400 babies die each year as a result of complications of preterm birth, according to the 2012 *Born Too Soon* report.[1] The Ministry of Health considers interventions to address prematurity a priority issue to reduce newborn mortality and improve newborn health. The Indonesian MOH's Newborn Action Plan (2014)[2] includes guidance for administration of ACS for preterm births between 24-34 weeks.

National maternal health guidelines provide basic guidance on the management of women at risk of imminent preterm birth and care of the preterm newborn. These guidelines include the administration of dexamethasone to women at risk of imminent preterm birth in order to help reduce the complications that newborns may experience due to prematurity.

While appropriate administration of dexamethasone to women at risk of imminent preterm birth is recommended, a recent publication in the Lancet showed that the median rate of use of ACS in 29 countries was 54%.[3]

METHODS AND IMPLEMENTATION

In Indonesia, an exercise was undertaken to assess and understand the care provided to pregnant women at risk of imminent preterm birth, especially the administration of dexamethasone in order to prevent complications of prematurity among preterm newborns. This was done through performance audit for three months at six sites and determination of potential barriers – be they knowledge/confidence or service delivery – to best practice regarding the use of dexamethasone.

The exercise was initially managed by Universitas Padjadjaran (UNPAD) and subsequently by the USAID-funded Expanding Maternal and Newborn Survival (EMAS) program, which engaged directly with the six assessment sites. Overall technical guidance for the assessment was provided by the USAID-funded Maternal and Child Health Integrated Program (MCHIP).

The work took place in six public facilities in two provinces in Indonesia. (Table 2). Facilities were purposely selected as sites with high delivery volume but also representative of different levels of hospitals within the Indonesian health system. Implementation was from November 2013 to May 2014 with data collection occurring from January – April 2014.

Table 2. Key Facility Indicators

Facility Number	City	Preterm Birth Rate (Number of Births per Month), January	Preterm Birth Rate (Number of Births per Month), February	Preterm Birth Rate (Number of Births per Month), March	Average Preterm Birth Rate (Jan.-Mar.)
1	Arjawinangun	12.7% (181)	11.9% (194)	18.4% (185)	12.9%
2	Brebes	10.4% (154)	6.6% (137)	15.2% (164)	8.3%
3	Ciawi Bogor	8.0% (249)	3.8% (240)	5.4% (261)	5.8%
4	Cilacap	13.3% (188)	8.1% (135)	10.0% (170)	8.9%
5	Karawang	7.8% (283)	18.9% (249)	12.6% (342)	11.9%
6	Bandung	3.7% (296)	3.7% (272)	5.5% (311)	3.9%

Facility-level assessments were conducted, consisting of a facility readiness review, commodity assessment and barriers analysis. This included the verification of availability and storage conditions of medications, supplies, equipment, staffing, record keeping and infrastructure related to maternal and newborn health at each of the sampled facilities. Knowledge and confidence were measured among a sample of health care providers related to screening and management of preterm birth and administration of ACS. Interviews of key informants who either made decisions or influenced decision making or policy related to maternal and newborn health in the country were conducted to identify prevailing issues regarding service provision for women with high probability of preterm birth. In addition, treatment practices were measured through chart review on a monthly basis to identify those women at risk of imminent preterm birth, and their clinical management. The tools are all available with the MCHIP office in Washington, DC.

Best practice in this situation was defined as follows, based on national and WHO clinical recommendations available at the time of the exercise:

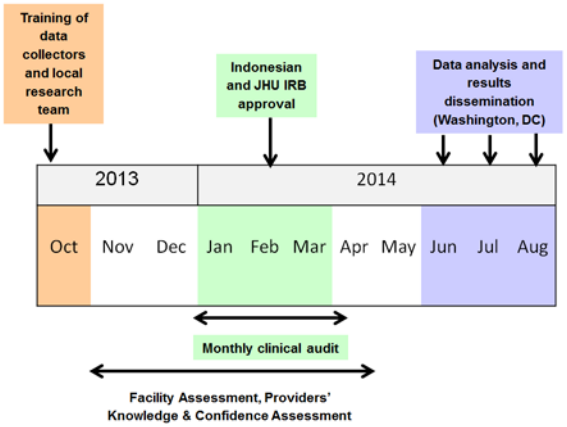
- Women with a condition that increased the probability of imminent preterm birth (i.e., preterm labor, preterm prelabor rupture of membranes, antepartum hemorrhage or severe pre-eclampsia/eclampsia) would be adequately identified by the providers;
- Gestational age would be assessed as accurately as possible;
- Women estimated to be between 24+0 and 36+6 weeks gestation, with an above-mentioned condition, would be given a course of dexamethasone (24mg in divided doses) for prevention of complications of prematurity among the newborns born preterm.

The exercise was approved by the Research Ethics Committees at UNPAD Indonesia and the Institutional Review Board of The Johns Hopkins Bloomberg School of Public Health.

Timeline

The assessment was undertaken according to the timeline below (Figure 2). Preparation and training of staff took place in October 2013. From November 2013 to April 2014, facility-level assessments and providers' knowledge and confidence scores were obtained at each of the facilities. Data collection and facility-level audit occurred monthly from January 2014 to March 2014.

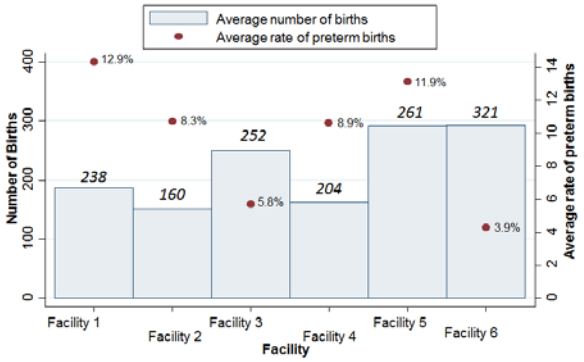
Figure 2. Timeline



Facility Volume and Preterm Birth Rates

The average number of births per month was similar among the six facilities, with the lowest number in Facility 2(160) and the highest number in Facility 6 Hospital (321) (Figure 3). The average preterm birth rate varied but was within an expected normal range. The lowest rate was in Facility 6 (4%) and the highest was in Facility 1 (13%). These differences may reflect different referral patterns with the communities.

Figure 3. Average Number of Births and Average Preterm Birth Rate during Intervention by Facility Jan-Mar)



FINDINGS AND DISCUSSION

Health Worker Knowledge and Confidence

The average knowledge score ranged from a low of 4.3 to a high of 6.9 (Figure 4). With respect to health provider confidence in the appropriate administration of dexamethasone under a wide range of clinical situations, providers at most facilities were observed to be neither "very uncomfortable" nor "very confident", but scored in the middle of the scale (Figure 5).

Figure 4. Knowledge Score by Facility

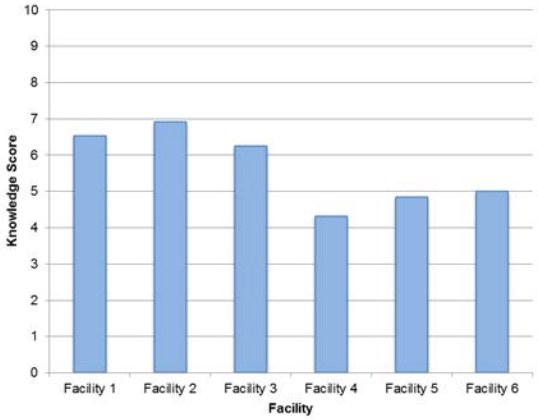
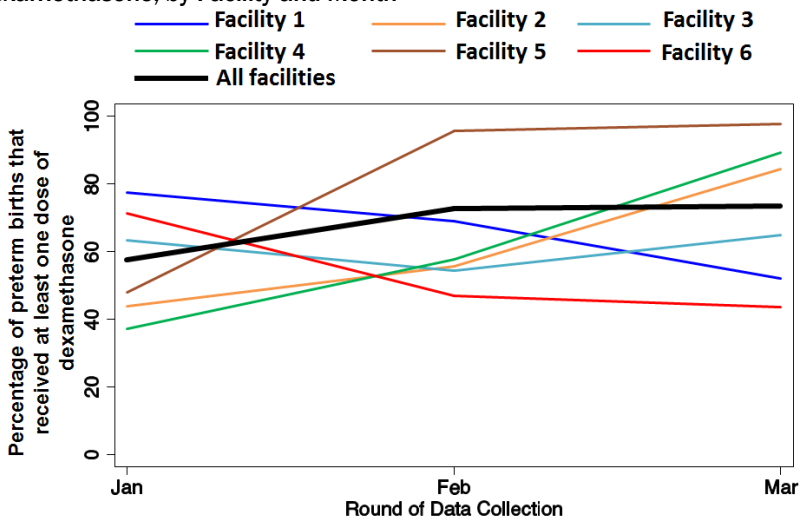


Figure 5. Confidence Level by Facility

Coverage of Dexamethasone

Overall, the data suggested an improvement in dexamethasone coverage, from 58% in January to 71% in March (Figure X). At the facility level, the changes are difficult to interpret. At Facility 1, coverage decreased from 78% to 52%. Likewise, Facility 6 decreased from 71% to 44%. Coverage improved at Facility 2 (44% to 84%), Facility 4 (37% 89%), and Facility 5 (48% to 98%). Facility 3 was unchanged, with a rate of 63% in January, 55% in February, and 65% in March.

Figure 6. Percentage of Preterm Births that Received at Least One Dose of Dexamethasone, by Facility and Month

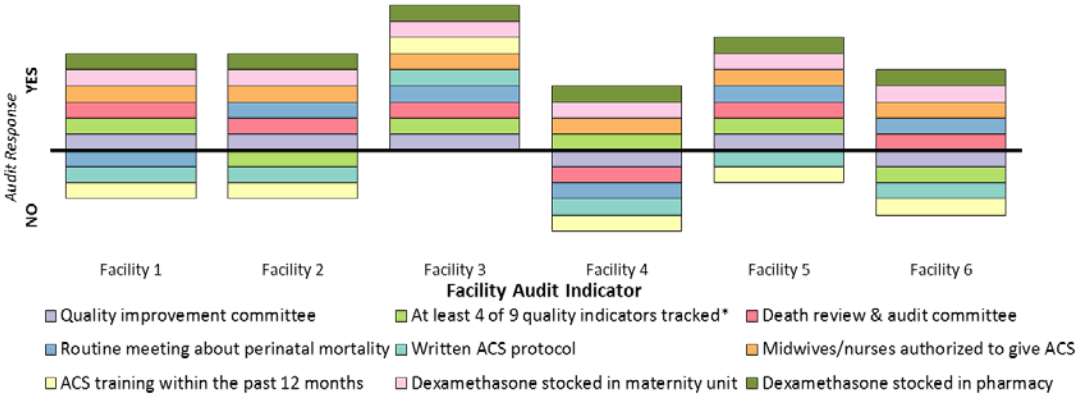


Average percentage use of dexamethasone, by month, all facilities		
Jan.	Feb.	Mar.
58.3%	68.8%	71.1%

Facility Readiness and Commodity Assessment

There was variability across facilities in their facility-level readiness and commodity indicators, with one facility observed to be meeting all nine facility audit indicators (Facility 3), while other facilities failed to meet four or five indicators (Figure 8). Only four of six facilities reported the existence of a quality improvement committee. All but one facility (Facility 4) had a death review and audit committee meeting routinely to discuss perinatal mortality, and all facilities authorized midwives and nurses to administer ACS. Only one facility (Facility 3) was observed to have a written ACS protocol. All facilities stored dexamethasone in both the pharmacy and the maternity unit, although the ampoules contained 5 mg, less than the recommended dose. With respect to quality, four of the six facilities were observed to meet at least half of the facility readiness indicators identified.

Figure 7. Facility Audit Data

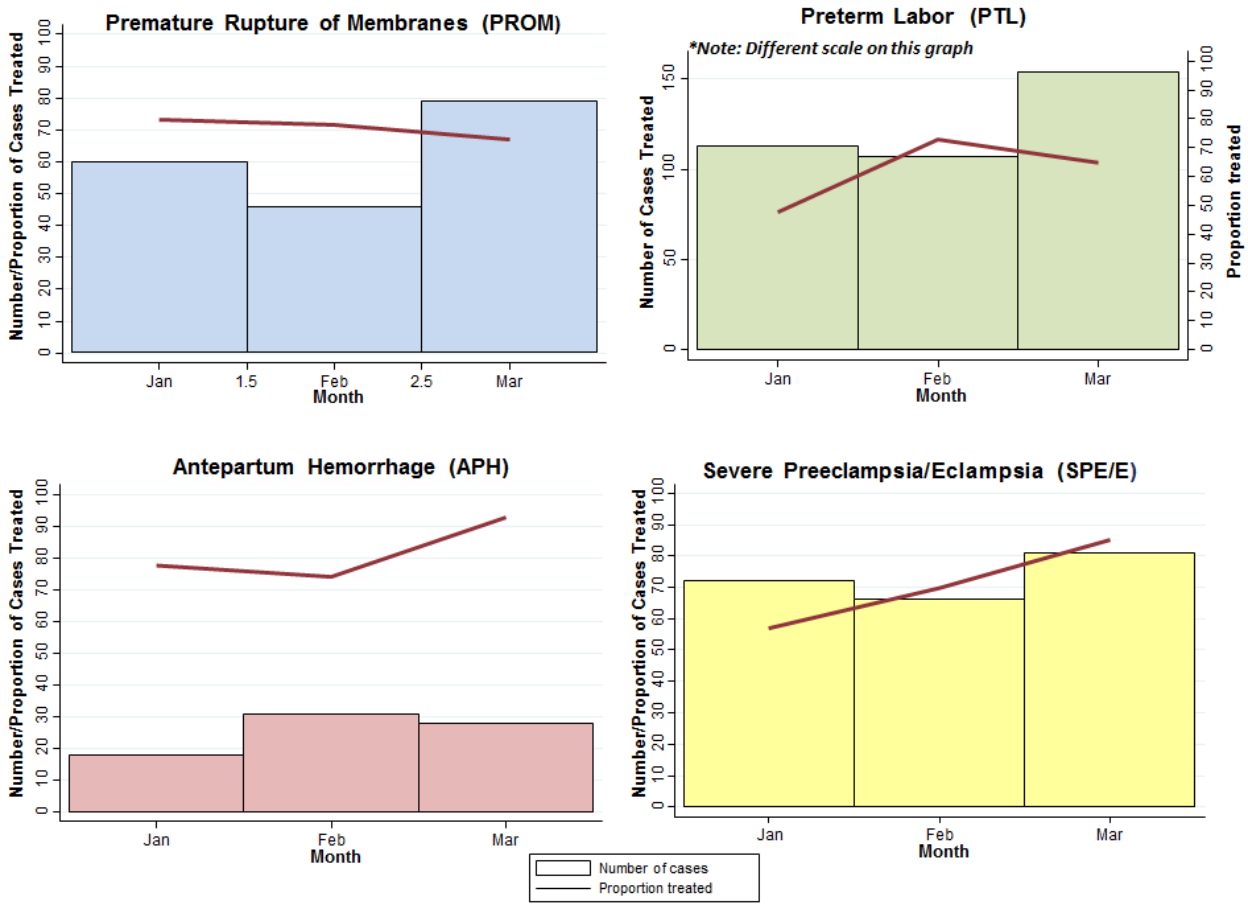


* The 9 facility readiness indicators were: cleanliness of reception areas; cleanliness of hospital grounds; availability of secure record room for storing inpatient medical records; reliability of the main source of electricity; presence of working generator for alternative power source; reliability of hospital's main water source; total number of beds in the maternity ward/unit in facility; and type of delivery area.

Treatment by Diagnosis

For all facilities combined, the number of women diagnosed with Premature Rupture of Membranes (PROM) or Preterm Labor (PTL) increased notably in March, compared to January or February (Figure 8). Consistent with the overall coverage data, the treatment rates from PTL, Antepartum Hemorrhage (APH) and Severe Pre-Eclampsia/Eclampsia (SPE/E) improved from January to March. In contrast, treatment rates from PROM remained unchanged during this time.

Figure 8. Number of Cases and Proportion Treated with ACS, by Diagnosis (Aggregate Data for all Facilities)



Although this exercise was not intended to measure health outcomes for neonates, data from the special care nursery were abstracted in aggregate to provide contextual information. The number of preterm neonates admitted to the special care nursery, approximately 100, was similar every month. The intubation rate increased, from 9% in January to 17% in February to 29% in March (Figure 9). However, the mortality rate (within assessment sites) showed no clear pattern, at 14% in January, 23% in February and 16% in March (Figure 10). In the this context, the mortality rate is calculated as the number of preterm babies who died after being admitted to the special care nursery, divided by the total number of preterm babies who were admitted to the special care nursery.

Figure 9. Number of preterm births admitted to special care nursery and intubation rate, by month

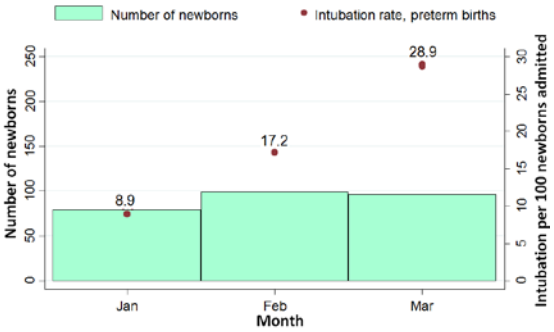
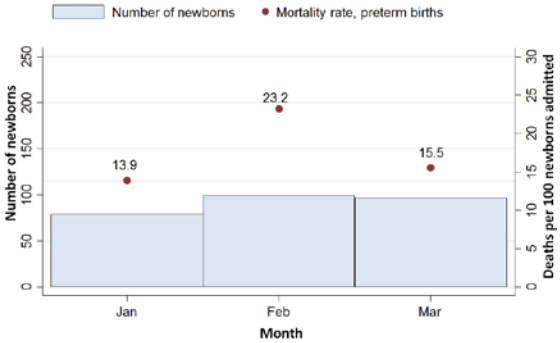


Figure 10. Number of preterm births admitted to special care nursery and mortality rate, by month



Perspectives from Maternity Ward Directors and Other Managers

The study team conducted key informant interviews to obtain contextual information about ACS use at the facilities (n=13). The key informants included both the hospital director and the maternity ward director from five facilities, along with a representative from the provincial health department, the regional midwifery association, and the regional obstetrics and gynecology association. The key informants said that cost was not a barrier to ACS use, because costs were subsidized by the government. However, they noted that ACS was administered inconsistently. Some informants proposed allowing midwives to administer at the primary health facilities.

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