Program Brief: Retrospective Review of Cases and Factors Associated with 112 Maternal Deaths in 12 Hospitals

May 2015

BACKGROUND:

Decades of supportive policies and programs focused on reducing maternal deaths led to declines in Indonesia's maternal mortality ratio (MMR) beginning in the early 1990s. Data shows declines in MMR from 330 per 100,000 births in 1991 to 228 by 2007[1]. Yet, further reductions in maternal deaths since this time have not materialized. Current estimates indicate stagnant – or by some accounts increases– in mortality rates over the last decade, with the most recent Indonesia Demographic and Health Survey (2012) indicating an MMR of 359 per 100,000 live births.

The challenges of delivering adequate maternal health care in Indonesia are well known and include limited access to quality facilities, limited availability of health staff capable of managing complications, lack of awareness and cultural constraints regarding safe motherhood, low nutritional and health status of women, unmet need for contraception, and a frail system for recording maternal deaths[2]. Policies and programs intended to address some of these challenges have been in place for some time, yet these investments have not yet resulted in expected declines in maternal deaths.

The limited availability of data has made it challenging to fully understand the reasons behind persistently high maternal death rates. Data recording and reporting structures are inadequate in many cases and are believed to not fully capture all deaths. Further, record keeping within facilities is most often inadequate.

EMAS PROGRAM

In 2011, USAID launched the Expanding Maternal and Neonatal Survival (EMAS) Program to contribute to reductions in maternal and newborn mortality by improving the quality of care within health facilities and strengthening the referral system to ensure efficient and effective referrals from the health center to the hospital. EMAS is a 5-year program implemented across the six provinces in Indonesia with the largest burden of maternal and newborn mortality. EMAS works directly with 150 hospitals, 300 puskesmas and with governmental and other stakeholders in 30 districts.

Now in its fourth year of programming, EMAS has been implementing quality improvement interventions within target facilities for a number of years –activities have been implemented for approximately three years in Phase 1 facilities and for approximately 1.5 years in Phase 2 facilities. In this time, significant strides have been made in achieving high coverage of priority, life-saving maternal interventions, including provision of magnesium sulfate to treat pre-eclampsia/eclampsia and the use of a uterotonic in the third stage of labor to manage post-partum hemorrhage. By the end of program year three, at least one dose of a uterotonic in the third stage of labor was provided in nearly all deliveries (more than 97 percent) and 94 percent of women presenting with pre-eclampsia/eclampsia were treated with MgSO4[3]. Although, provision of magnesium sulfate (MgSO4) before referral in EMAS target facilities has increased through time, coverage of this intervention has remained relatively low, with less than one-third of pre-eclampsia/eclampsia cases treated with MgSO4 prior to

[1] World Health Organization. Trends in Maternal Mortality: 1990 to 2010

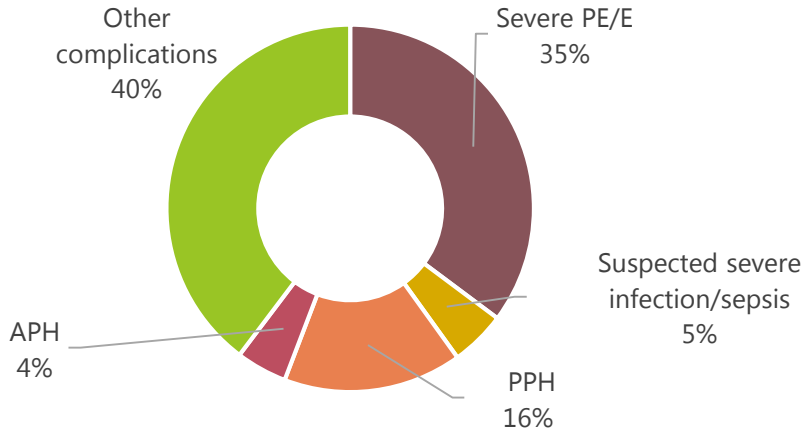
[2] (BAPPENAS) MoNDPNDPA. Report on the Achievement of the Millennium Development Goals Indonesia 2010 Jakarta, Indoensia: Ministry of National Development Planning/National Development Planning Agency (BAPPENAS), 2010:10160.

[3] EMAS Year Three Annual Report. December 2014.

referral by the end of year three[4]. Despite high coverage of these life-saving interventions, overall, virtually no changes have occurred in case fatality rates in these facilities.

Nationwide, post-partum hemorrhage (PPH), pre-eclampsia/eclampsia (PE/E), and sepsis dominate as the three major causes of maternal death. Pre-eclampsia/eclampsia is responsible for 32.4% of all maternal deaths while PPH is the second major cause of maternal deaths in Indonesia (20.3% of maternal deaths).[5] In EMAS-supported hospitals, data shows similar rates, with eclampsia as the leading cause of death, followed by hemorrhage. Figure 1 below shows the complications associated with maternal mortality in EMAS Phase 1 and Phase 2 target hospitals. In these hospitals, deaths are most commonly associated with severe PE/E, followed by PPH and sepsis. A large proportion of deaths is also associated with "other" causes.

Figure 1: Complications associated with maternal mortality in EMAS-supported hospitals, January – June 2014 (Hospitals: n=49; Deaths: n=267)



PURPOSE OF REVIEW

EMAS, in collaboration with the Indonesia Obstetric and Gynecological Association (POGI), conducted a retrospective review of individual charts in selected EMAS-supported hospitals to better understand the contextual and other factors associated with barriers to improved care – and impacts on maternal death - in EMAS facilities.

The chart review sought to assess whether conclusions could be drawn regarding the contextual factors associated with maternal death based only on a review of medical records. Contextual factors the review was intended to shed light on included the source of referral and pre-hospital care condition, the quality of care provided (to the extent possible) and related barriers that may have contributed to maternal death, such as timeliness of care, availability of personnel or equipment, or appropriate administration of treatment and monitoring. The review also sought to provide more information regarding hospital data, including the extent to which the data recorded in the facility standard register accurately reflected the patient chart and more information regarding the large proportion of maternal death cases where the cause of death was designated as "other".

The scope of the review was focused on gaining information relevant to inform programming, strategies and approaches for the EMAS program. The review was limited in that it was retrospective and based only on available chart documentation. The completeness of the charts varied by case and not all data was available in all charts. In most cases, there were significant data gaps in the charts regarding pre-referral care and

[4] EMAS Year Three Annual Report. December 2014.
[5] UNFPA Review of Maternal Deaths in Five Regions (Disparitas vs Akses serta Kualitas), 2012

information. The cases were reviewed only in EMAS-supported hospitals and the deaths that were reviewed included only those that occurred in the hospital.

PROCESS OF REVIEW:

Hospitals that were receptive to participating in the review and that had higher ratios of in-hospital maternal deaths and live births were included in the review[6]. In total, 12 hospitals took part in the review process, representing 57 percent (124/217) of maternal death cases reported across the 49 EMAS-supported hospitals during the time period reviewed. Where feasible, the case review process took place during routine mentoring visits as part of the EMAS program.

In total, individual charts from 90% (112/124) of the maternal death cases had sufficient information to be included in the review. Charts were reviewed at 11 RSUDs and one private hospital in Bogor, Jombang, Karawang, Bandung, Cirebon, Labuhan Batu, Bulukumba, Brebes, Tegal and Sidoarjo districts.

The review process was undertaken in two stages:

Stage 1: September-October 2014

- Using a set of standardized tools to categorize case characteristics[7] and contextual factors across cases[8], teams of at least two physicians[9] reviewed individual case level records for deaths that occurred in the 12 targeted hospitals from January to June 2014[10].
- Review teams interpreted available chart information and made an initial determination regarding the factors associated with maternal death for each case reviewed.
- A synopsis of each case was also developed based on the chart.

Stage 2: November 2014

- POGI convened a team of twenty-four Ob/Gyns to discuss and review the 112 indexed cases and the case synopses.
- Based on their clinical interpretation, a final expert opinion regarding the factors associated with the 112 maternal deaths was made.

FINDINGS:

At the beginning of the process, it was unclear whether EMAS would be able to access the charts and whether the information could be used in a meaningful way. However, access did not prove to be an issue and the review resulted in several key findings. It should be noted that the availability of information in charts did not allow for all cases to be categorized according to all characteristics that the review sought to understand and classify. Nevertheless, the process has highlighted several important insights into the common characteristics of these 112 cases which can be used to focus future investigations and inform programming.

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[6] Death data was drawn from EMAS's routine monitoring data for the time period January to June 2014.

[7] Case characteristics included data on patient demographics (age, district, payment source, referral source), medical information (weeks gestation, obstetric history, vital signs, method of delivery), and date and time of admission, death and birth of baby (if applicable).

[8] Contextual factors were categorized according to the "three delays": delay in care seeking, delay in reaching care in time and delay in receiving adequate and appropriate care.

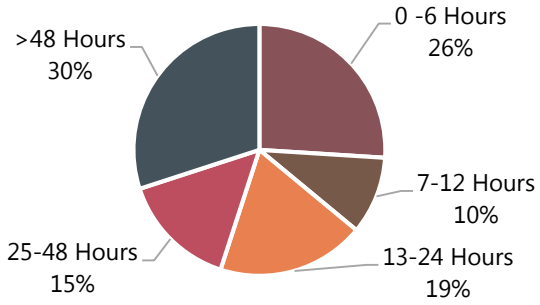
[9] None of the participating physicians in the initial review were trained Ob/Gyns. However, all reviewers were knowledgeable about emergency maternal care. The second stage of the review was conducted by Ob/Gyns.

[10] Hospital staff provided varying degrees of assistance navigating the chart, and provided additional context or clarification from other sources of data or memory when possible. However, the chart served as the primary source of data for this review.

BASIC CASE CHARACTERISTICS

- *Age of women:* The median age of all women was 31 years old. The majority of women (69 percent) were between the ages of 20 and 35 years old; only 6 percent were younger than 20 and 24 percent were older than 35 at the time of death.
- *Number of pregnancies*: 81 percent of women had between 1 and 3 pregnancies, while 19 percent had four or more.
- *Payment Type*: 66 percent used social insurance, 30 percent were self-pay
- *Patterns of referral to hospital*: 80 percent of all cases were referred by a qualified medical provider (including 26 percent from a private midwife and 36 percent from a puskesmas). 95 percent of cases were referred within the same district (in the cases where district data was available in the record)
- *Day of admission*: The majority of patients were admitted to the hospital during the week (79 percent). Approximately 21 percent were admitted over the weekend.
- *Time spent in hospital before death (Figure 2):* One-quarter of women died within 6 hours of being admitted to the hospital. More than one-half (55 percent) died within the first 24 hours after admission, while almost one-third (30 percent) of women were in the hospital for more than two days before death occurred.

Figure 2: Amount of time passed between admission to hospital and death



CARE SEEKING BEHAVIOR

- Only 7 percent of cases reviewed involved care provided by a TBA at some point. In the majority of cases, care was provided by a qualified and trained health provider when the woman initially sought care. At some point in the course of treatment, Ob/Gyns were present in at least 45 percent of the cases (36 percent of case files had insufficient information to assess Ob/Gyn participation).
- In 32 percent of cases, families/women were delayed in seeking care on time. In 40 percent of cases, families/women sought care in a timely fashion. While in 28 percent of cases, there was not enough information to be able to draw a conclusion about the timely decision to seek care.
- In only 2 percent of cases was it clear that a family/woman had rejected a referral at some point in the process of seeking care. In the vast majority of cases, referrals were accepted by the family/woman.

CARE BEFORE REFERRAL AND REFERRAL PROCESS

- Stabilization before referral appears to be low. Only 9 percent of women received some type of stabilization before being referred. In nearly 50 percent of cases, it was clear that no stabilization had occurred prior to referral. It is important to note that in roughly 40 percent of the charts, there was no information in the chart regarding pre-referral stabilization and care. The clinical decision-making regarding the quality of stabilization was not assessed.

- In 38 percent of cases, a decision to make a referral was made too late by the medical provider. In about a third (30 percent) of cases, medical providers were found to make a timely decision to refer. For the remaining third of cases, there was insufficient information to make a clear determination regarding the decision-making process.
- Of women referred, only 14 percent of women experienced multiple referrals, while 56 percent of women were referred only once.

QUALITY OF CLINICAL CARE PROVIDED AT THE HOSPITAL

- Inaccuracies in clinical decision-making was found to be common. In 53 percent of cases, it was determined that clinical decision-making in the hospital was not appropriate. In only 15 percent of cases was the course of clinical care found to be appropriate. There was insufficient information available to make a determination about the appropriateness of clinical care provided in 32 percent of cases.
- Delay in providing care was also frequent. The decision to provide care was made in a timely manner in only 19 percent of cases. In nearly half of the cases (47 percent) a delay in clinical decision making or the provision of care was identified as a problem.
- Patient monitoring and appropriate follow up was cited as a problem in almost half of cases (47 percent). Only 14 percent of cases were found to have evidence of good monitoring and follow up. However, data could not be assessed in over one-third of the cases.

MOST DEATHS FOUND TO BE PREVENTABLE

- Overall, based on the expert opinion of the twenty-four Ob/Gyns who conducted the final review of the cases, almost three-quarters of deaths (72%) were cited as being preventable. Only 2 percent of deaths were deemed unpreventable. In approximately one-quarter of the cases, no definitive determination could be made with the available information.

DATA RECORDING AND CAUSES OF "OTHER" MATERNAL DEATHS

- The review determined that the distribution of the causes of death identified as part of the chart review process were nearly identical to the distribution of deaths indicated as the primary causes of deaths (PE/E, PPH and sepsis) in the facility standard registers in the 49 EMAS-supported hospitals (Figure 1) over the same time period. However, data discrepancies between the individual patient chart and the facility standard register were noted in some areas.
- Similar to the monitoring data from the EMAS program regarding the cause of death, a significant number deaths were identified as being associated with "other" causes. The case review process determined that approximately one-third of deaths were attributed to "other non-obstetric" causes.

112 VOICES: SYNOPSES OF SELECTED CASES

As discussed above, a summary of the information contained in each patient chart was documented as part of the review process. The case synopses captured from these charts adds a richness to the review process that cannot be captured by looking only at the findings presented above. In many instances, the case synopses portray a variety of contextual factors influencing maternal deaths. Below are selected case synopses captured during this review.

Case synopsis 1: 16 year old woman, 8 months pregnant

A 16 year old, who is 8 months pregnant, has been having difficulty breathing for 5 days. She visits her midwife and experiences some temporary relief. Yet, her condition soon worsens. For reasons which are unclear, the young woman goes to one hospital, then another and finally another before being admitted. When admitted, she is not very responsive. Her blood pressure is high at 190/90, she is breathing quickly and her heart rate is fast (120/min). Her temperature is normal. No fetal heart rate is detected.

She is scheduled for a cesarean section, but the anesthesiologist decides to delay the surgery, indicating that the young woman should be more stable. The next day, the anesthesiologist again delays the procedure, now indicating that an internal medicine consult is needed. However, the internist cannot be reached for consult.

Thirty-five hours after being admitted, the she undergoes a cesarean section. She delivers a macerated stillbirth.

Later the same day, her temperature is recorded at 38.6 degrees. She is placed on a ventilator. Two days later, the young woman dies with a diagnosis of sepsis.

Case synopsis 2: 31 year old woman, 39 weeks pregnant

A 31 year old woman is 39 weeks pregnant with her first child. She has just been referred from one hospital with severe pre-eclampsia (BP 230/140). She needs a cesarean section. When she arrives at the second hospital, her blood pressure is high at 187/120. She is lethargic, but has no fever. The heart rate of her unborn baby is low at 60 -100 beats per minute.

An Ob/Gyn is contacted but cannot be reached. A second Ob/Gyn is consulted and decides to admit the woman to the ICU. The next day, the fetal heart rate registers 70 beats per minute. A cesarean section is delayed, awaiting improvement in the mother's condition. The following day, the woman develops a fever (39.6 degrees). Another day passes. Four days after she was admitted, a cesarean section is conducted. The chart does not indicate whether the baby survived.

After the surgery, the mother's temperature registers at 40 degrees and then 41.8 degrees. Two days after the cesarean section and six days after being admitted, the woman dies.

Case synopsis 3: 31 year old woman, 34 weeks pregnant

For the past month, a 31 year old woman has been having trouble breathing. She is 34 weeks pregnant with her second child. The woman has attended regular ANC visits, but within the past two weeks, breathing has become even more difficult. She visits the hospital to get help. When admitted she has high blood pressure and protein in her urine.

An Ob/Gyn is called twice, but is unreachable. A second Ob/Gyn is contacted and suggests that she is moved to the ICU and that an internist be consulted. The woman is placed in the ICU. For the next four days it is unclear what occurs or what treatment is provided – the patient chart is empty.

For unclear reasons, the woman is moved out of the ICU on the sixth day. An Ob/Gyn is consulted, who indicates that a different Ob/Gyn should be contacted if a cesarean section will be conducted. The second Ob/Gyn advises that treatment (unknown) should be continued until the woman's condition improves.

The next evening, six days after she is admitted, the woman goes into labor. She is still having trouble breathing. The following afternoon, her Ob/Gyn consults with the cardiologist who agrees to move forward with the cesarean section. However, the anesthesiologist does not agree to move forward and the following day, the surgery is postponed again. One day passes and the Ob/Gyn is called twice, but is unreachable. They are also unable to reach the anesthesiologist. Eventually both are consulted and they agree to postpone the surgery again.

Ten days after being admitted, the cesarean section is finally scheduled. However, the anesthesiologist is unreachable. The same day the woman delivers her baby vaginally. But the afternoon after she delivers, the woman dies.

Case synopsis 4: 36 year old woman, 11 weeks pregnant

For the past two days, a 36 year old woman, who is two months pregnant has been suffering from upper abdominal pain. She was hospitalized earlier for the same symptoms. She goes to the hospital again for help. Her blood pressure is high (180/110), she has an elevated white blood count (28,900) and her hemoglobin is low (Hb 6.7).

She is diagnosed as pregnant and suffering from gallstones and an inflamed gallbladder. The following day the internist is consulted, who orders an echo cardiogram be conducted. It is unclear what happens on the third day.

By the fourth day, there is a recommendation for an intrauterine sonogram. On day five, the Ob/Gyn is consulted. The following day (day 6), a sonogram confirms an extra-uterine pregnancy at approximately 10-11 weeks gestation. The woman's hemoglobin is still low (Hb 6.6) and her white blood count measures 15,900. On the seventh day, the Ob/Gyn advises to check the labs again and to conduct a pregnancy test. If the test is positive, a cesarean section will be planned for the following day. The anesthesiologist is also consulted and two units of blood are prepared.

However, no surgery is conducted that day. Day eight passes, with no updated information in the chart. On day nine, the woman develops a fever. On day ten, her fever remains. Two days later, twelve days after being admitted to the hospital, the woman dies.

Case synopsis 5: 30 year old woman, Full term

A 30 year old woman is pregnant with her third child. She is full term, but she is not in labor. After having difficulty breathing for the past day, she visits the puskesmas for help. She is referred from the puskesmas to a hospital and then referred again (for unclear reasons) to a second hospital, where she is admitted.

Her blood pressure is low. The chart notes that she is suffering from congestive heart failure, with lung edema. Lab results show that she has renal failure and her white blood count is 38,000.

The doctor plans to put her in the ICU and terminate the pregnancy via cesarean section. Thirteen hours pass, but the women has not undergone surgery. The Ob/Gyn wants to wait until she is more stable. Her blood pressure does improve, but again the cesarean section is deferred. The woman delivers a macerated stillbirth vaginally.

Nineteen hours after she is admitted, the woman's temperature spikes to 40.5 degrees. Her midwife calls for a resident, but the doctor is unavailable. Twenty-three hours after being admitted, the woman dies.

Case synopsis 6: 22 year old, 35 weeks pregnant

A 22 year old woman is 35 weeks pregnant with her first child. One month earlier she had been unwell and was advised to go to the hospital. She didn't go to the hospital and didn't take the medicine (unknown) that was prescribed. When she arrives at the hospital, she is unconscious, has labored breathing and her blood pressure is extremely high at 210/120.

She is quickly admitted to the ER. The fetal heart beat is difficult to detect. She is treated for pre-eclampsia. A neurologist, internist and anesthesiologist all quickly agree that the woman should be admitted to the ICU. The family debates whether or not the woman should be sent to the ICU. A bedside monitor is used to closely monitor the woman's vital signs. Soon after, the woman seizes, has difficulty breathing, and dies.

CONCLUSIONS:

- **A large proportion of women sought care in a timely fashion and with qualified providers, yet delays in care seeking are still a challenge.** While delays in initially seeking care were seen in 30 percent of cases, at least 40 percent of women did seek care in a timely fashion. When they did seek care, the vast majority visited a qualified medical provider, not a traditional birth attendant or other untrained provider.
- **Pre-referral decision-making and care appears to be inadequate, even though a high percentage of deaths occurred in women who initially sought care from a trained medical provider**. In 80 percent of all cases, women were referred by a midwife or doctor. Yet, in at least half of the cases, no treatment was provided prior to referral. The decision to refer was made too late in more than one-third of the cases.
- **Medical providers at the hospital are not providing timely care.** In nearly half of cases, delays in the provision of care and clinical decision-making once in the hospital were found to have contributed to death.
- **Clinical care provided in hospitals is often of poor quality**. In more than half of the deaths, the course of clinical treatment and care was found to be inappropriate or inaccurate. Monitoring and follow up of women throughout their stay in the hospital was also found to be poor.
- **A majority of maternal deaths are preventable**. While a third of women appeared to be quite sick upon arrival at the hospital (and subsequently died within 6 hours), equally large proportions of women were in the hospital for more than two days before they died. Expert opinion by the review committee determined that 72% of the deaths could and should have been prevented, and that an additional 26% of the deaths may have been prevented with appropriate care in the hospital. For 2% of the cases, the review committee determined that the mother's condition was too severe upon arrival to be saved.
- In lieu of a more formal and comprehensive death review process, **it is possible to gain valuable insights retrospectively from individual charts in a relatively short time period, but missing data and documentation within the chart is a barrier to being able to draw comprehensive conclusions.** Obtaining access to the case files was not found to be a barrier and overall, hospitals were open to being included in the process. Despite missing and incomplete case files (especially pre-referral documentation), important insights were found using this process.

NEXT STEPS

POGI and EMAS continue to focus on examining cases of maternal deaths. A provincial point person within POGI has been identified to continue to review charts of maternal deaths on an ongoing basis. Additionally, EMAS will more comprehensively examine the quality of care as part of the planned EMAS program evaluation to provide further and more conclusive evidence in this regard. In April 2015, EMAS also initiated the process

for conducting a similar review of newborn deaths in collaboration with the Indonesian Pediatric Association (IDAI). These ongoing reviews and analyses will enable POGI, MOH, and EMAS to determine what additional targeted inputs are required to improve care-seeking behavior, pre-referral processes, and hospital care and follow up.