

# Characteristics of Obstetric Near-miss Cases in Indonesia

Asri Adisasmita & Trisari Anggondowati

<sup>1</sup>*Department of Epidemiology, Faculty of Public Health Universitas Indonesia, Depok, Indonesia*

<sup>2</sup>*Center for Family Welfare, Universitas Indonesia, Depok, Indonesia*

*Correspondence author: aadisasmita@gmail.com*

Maternal mortality remains a public health burden. However, studies on maternal death are mostly challenged by the difficulty in ‘capturing’ the cases, which could largely be missed by the health system. Obstetric near-miss, which refers to survived woman who went through life-threatening complications, has been suggested to complement maternal death investigation. The present study is a retrospective analysis aimed to describe the characteristics of obstetric near-miss. Data on obstetric admissions in 2005-2006 were collected from two public hospitals in Indonesia (n=1.840). We identified 378 obstetric near-misses; 67% of them had suffered the life-threatening conditions when arrived at the hospitals. The majority of the near-miss cases were from rural/remote areas (65.8%), and more than half were beneficiaries of insurance for the poor (56.6%). More than one-third of the cases were aided by traditional-birth-attendants before arriving at the hospital (38.6%). Women living in rural/remote areas and those of low socio-economic were disproportionately affected by the maternal health problem. The study indicates that delay in seeking care may largely contribute to near-miss cases. Characteristics of the near-miss cases were consistent with those of maternal deaths in general, suggesting near-miss is appropriate to serve as a proxy of maternal death.

**Keywords:** *Obstetric near-miss; maternal health; maternal death*

## INTRODUCTION

Maternal health remains a significant public health issue in most developing countries. Despite the reduction of maternal mortality ratio by nearly half in the developing regions (United Nations 2015), hundreds of women die every day from pregnancy and childbirth-related complications (World Health Organization 2015). This situation calls for continuous targeted interventions, which need to be based on a well-established understanding about factors contributing to the deaths. However, investigation of maternal death is mostly challenged by the large sample size and difficulty to ‘capture’ the death cases, especially when many of the deaths occur in the community, as is the case for Indonesia. To overcome this problem, obstetric near-miss, referred as women who nearly died but survived obstetric-related complications (World Health Organization 2011), has been suggested to complement maternal death investigation. It

is considered that the near-miss cases go through a similar pathway of maternal complications as the maternal death cases. The fact that they survived implies much can be learned from the near-miss cases. Also, the incidence of near-miss is higher than the maternal deaths, allowing for more robust analysis. It is estimated that in addition to 529,000 maternal deaths worldwide, 1.4 million of them survived life-threatening complications (so called obstetric near-miss) (Filippi et al. 2006; Pattinson, and Gulmezoglu 2004). At the facility level, an investigation on obstetric near-miss could serve as a tool to measure the quality of obstetric care and inform the need for healthcare resource (Chhabra 2014). Despite the growing interest of research in obstetric near-miss, such study in Indonesia is very limited. The present study described the characteristics of obstetric near-miss in two public hospitals in Indonesia.

## **METHOD**

The present study is a descriptive analysis using data on obstetric-related inpatient admissions between 2005 and 2006 in two public hospitals in Serang and Pandeglang District of Indonesia. At the time of the study, the two hospitals are the main referral hospitals in the study districts. We analyzed secondary data originally collected by a parent study funded through the Initiative for Maternal Mortality Programme Assessment (Impact) project (Adisasmita et al. 2008). In the parent-study, data were collected prospectively through medical chart extraction, as well as patient registers from all wards, included delivery ward, obstetric ward, surgery, and Intensive Care Unit, and non-obstetric wards.

In brief, near-miss cases were defined as cases of life-threatening complications in women admitted during pregnancy, labor or postpartum who survived (Mantel et al. 1998). The criteria to define the near-miss were based on organ dysfunction, using clinical criteria related to specific disease entities as well as management criteria. In the parent study, final criteria for near-miss were determined through expert panel workshops incorporating obstetricians, midwives and epidemiologists from Indonesia (including the two districts where the study was conducted) and the United Kingdom. Detailed criteria of the near-miss have been described elsewhere (Adisasmita et al. 2008).

Descriptive statistics were used to describe the characteristics of near-miss cases. Comparisons between near-miss and non-near-miss, as well as maternal death cases, were done using a chi-square test with significance level at 0.05. Ethical approval was obtained by the parent study from the ethic committee of the Universitas Indonesia prior to field work.

## RESULTS

A total of 1840 obstetric-related hospitalizations were identified between 2005 and 2006 in the study hospitals. Thirty-four of the women died (1.8%). Out of the 1806 women who survived, 378 met the criteria of near-miss (21%). Information about the timing when the life-threatening complications occurred in respect to hospital admission was available for 348 patients. Based on the information, we classified the near-miss cases in to 'at admission' and 'after admission.' The majority of the near-miss cases (67.2%) were near-miss at admission, which implies that the women had suffered life-threatening conditions when arrived at the hospital.

Table 1 describes the characteristics of the study subjects and comparison between those who were near-misses and those who were not. Characteristics of the near-miss cases were significantly different with non-near-miss cases ( $p < 0.05$ ). A higher proportion of the near-miss cases were at the age range considered at high risk for pregnancy outcomes, i.e. less than 20 years (7.1%) and older than 35 years (18.3%), compared to the non-near-miss cases (4.3% and 14.5%, respectively). More than half of the women in the near-miss group (56.6%) were beneficiaries of insurance for the poor, which was about twice the proportion in the non-near-miss group (28.8%). Among women whose detailed address was recorded in the medical chart, the proportion of women who lived in either rural or remote areas was substantially higher in the near-miss group (65.8%) than the non-near-miss (49.2%). However, this finding should be interpreted with caution considering that nearly a quarter of the study subjects did not have information about their residence or the information was insufficient to define urban/rural classification. With respect to the obstetric history, a higher proportion of grand multipara was found among near-miss (23.9%) than non-near-miss (12.6%). About 21% of the near-miss cases were admitted to the hospital after childbirth (post-partum) while this proportion was only 5.3% in the non-near-miss. The proportion of women in the near-miss group who were aided by a traditional birth attendant (TBA) before being referred to the hospital (38.6%) was nearly double than the non-near-miss group (19.9%).

Table 1. Patients' characteristics by near-miss status

Characteristics	Total women who survived (n=1806)	Near-miss status		p value
		Near-miss (n=378)	Non near-miss (n=1428)	
Age				0.009
<20 years	88 (4.9)	27 (7.1)	61 (4.3)	
20 - 35 years	1442 (79.8)	282 (74.6)	1160 (81.2)	

Characteristics	Total women who survived (n=1806)	Near-miss status		p value
		Near-miss (n=378)	Non near-miss (n=1428)	
>35 years	276 (15.3)	69 (18.3)	207 (14.5)	
Payment method				<0.001
Insurance for government-employees /private insurance	170 (9.4)	32 (8.5)	138 (10.1)	
Insurance for the poor	604 (33.4)	213 (56.6)	391 (28.8)	
Self-pay	962 (53.3)	131 (34.8)	831 (61.1)	
<i>Missing</i>	<i>70 (3.9)</i>			
Residence				<0.001
Urban	665 (36.8)	115 (34.1)	550 (50.7)	
Rural	636 (35.2)	175 (51.9)	461 (42.5)	
Remote	120 (6.6)	47 (13.9)	73 (6.7)	
<i>Missing</i>	<i>385 (21.3)</i>			
Parity				<0.001
Nulliparous	668 (37.0)	93 (25.8)	575 (43.1)	
Parity 1 – 3	773 (42.8)	181 (50.3)	592 (44.3)	
Grand multipara (>=4)	254 (14.1)	86 (23.9)	168 (12.6)	
<i>Missing</i>	<i>111 (6.1)</i>			
Pregnancy status when admitted to the hospital				<0.001
Trimester 1-2	406 (22.5)	95 (25.1)	311 (21.9)	
Trimester 3	301 (16.7)	76 (20.1)	225 (15.9)	
In labour	934 (51.7)	126 (33.3)	808 (56.9)	
Post-partum	156 (8.6)	81 (21.4)	75 (5.3)	
<i>Missing</i>	<i>9 (0.5)</i>			

Characteristics	Total women who survived (n=1806)	Near-miss status		p value
		Near-miss (n=378)	Non near-miss (n=1428)	
Aided by traditional birth attendant prior hospitalization				<0.001
Yes	359 (19.9)	124 (38.6)	235 (19.9)	
No	1144 (63.3)	197 (61.4)	947 (80.1)	
Missing	303 (16.8)			
Complications*				
Ante-partum hemorrhage (APH)	157 (8.7)	69 (18.3)	88 (6.2)	<0.001
Post-partum hemorrhage (PPH)	141 (7.8)	106 (28.0)	35 (2.5)	<0.001
Hypertensive disorder in pregnancy (HDP)	193 (10.7)	86 (22.8)	107 (7.5)	<0.001
Non-obstetric complication	80 (4.4)	61 (16.1)	19 (1.3)	<0.001
Method of delivery**	n=1145	n=960	n=185	<0.001
Normal without instrument	525 (45.9)	65 (35.1)	460 (48.0)	
Per vaginam with instrument	273 (23.8)	34 (18.4)	239 (24.9)	
C-section	346 (30.2)	86 (46.5)	260 (27.1)	
Missing	1 (0.1)			

\*non-mutually exclusive; the chi-square test results compared patients with and without the individual complication

\*\*among women who had delivery in the study hospitals

Comparison of patients' characteristics between near-miss and maternal death cases showed non-significant differences ( $p>0.05$ ), except for non-obstetric complication, as presented in Table 2. The proportion of women experiencing non-obstetric complication was substantially higher in maternal death group (52.9%), than near-miss (16.1%). The proportions of near-miss cases who were beneficiaries of insurance for the poor, who lived in non-urban areas, or who were nulliparous relatively mimicked the maternal death cases.

Table 2. Characteristics of the near-miss and maternal death cases

Characteristics	Near-miss (n=378)	Maternal death (n=34)	p value
Age			0.260
<20 years	27 (7.1)	4 (11.8)	
20 - 35 years	282 (74.6)	21 (61.8)	
>35 years	69 (18.3)	9 (26.5)	
Payment method			0.459
Insurance for government-employees /private insurance	31 (8.5)	1 (2.9)	
Insurance for the poor	213 (56.6)	19 (55.9)	
Self-pay	131 (34.8)	14 (41.2)	
Residence			0.400
Urban	115 (34.1)	6 (30.0)	
Rural	175 (51.9)	13 (65.0)	
Remote	47 (13.9)	1 (5.0)	
Parity			0.607
Nulliparous	181 (50.3)	13 (46.4)	
Parity 1 – 3	93 (25.8)	6 (21.4)	
Grand multipara (>=4)	86 (23.9)	9 (32.2)	
Pregnancy status when admitted to the hospital			0.134
Trimester 1-2	95 (25.1)	6 (18.2)	
Trimester 3	76 (20.1)	3 (9.1)	
In labour	126 (33.3)	12 (36.4)	
Post-partum	81 (21.4)	12 (36.4)	
Aided by TBA prior hospitalization	124 (38.6)	14 (48.3)	0.309
Complications*			
Ante-partum hemorrhage (APH)	69 (18.3)	5 (14.7)	0.606

Characteristics	Near-miss (n=378)	Maternal death (n=34)	p value
Post-partum hemorrhage (PPH)	106 (28.0)	5 (14.7)	0.093
Hypertensive disorder in pregnancy (HDP)	86 (22.8)	8 (23.5)	0.918
Non-obstetric complication	61 (16.1)	18 (52.9)	<0.001

\*non-mutually exclusive; the chi-square test results compared patients with and without the individual complication

## DISCUSSION

Obstetric near-miss has emerged as one of the quality of care measures in obstetric care (World Health Organization 2011; Pattinson, and Gulmezoglu 2004; Chhabra 2014). Given the pathway of near-miss and maternal death are similar, review on near-miss has been suggested to complement maternal death investigation, especially in the developing countries where many maternal deaths are not captured by the health system (Pattinson and Hall 2003). The present study described the characteristics of obstetric near-miss and compared them with those of maternal death cases in Indonesia setting, where research in this field is limited.

During the 2-years period reviewed, the obstetric near-miss to maternal death ratio was 11:1. This ratio is somewhat higher than what have been found in previous studies in developing countries. A study in Mozambique that classified near-miss based on the clinical diagnoses found a near-miss to maternal death ratio of 8:1, while another study in India that used WHO criteria found a ratio of 6:1 (David et al. 2014; Ps et al. 2013). The difference could indicate a better quality of care in our study setting or merely affected by differences in the near-miss criteria. As mentioned earlier, our study used the criteria that were refined through an expert panel and accommodate the local context (Adisasmita et al. 2008).

To some extent, our study confirmed the similarities of patients' characteristics between near-miss and maternal death cases in general. The findings indicate that women who were at the high-risk age for pregnancy, grand multipara, lived in rural/remote areas, and of marginalized socio-economic are more likely to experience near-miss. Consistent with other studies, we found that hemorrhage and hypertensive disorder of pregnancy are common among near-miss cases (Ps et al. 2013; Kaye et al. 2003; Oladapo et al. 2005). Although direct comparison between near-miss and maternal death cases in this study show non-significant differences statistically, a few characteristics are somewhat different. For instance, the proportion of PPH is substantially higher in the near-miss group, while the proportion of non-obstetric complication

is higher in maternal death cases. However, this direct comparison should be interpreted with caution given the maternal death cases captured in this study do not represent the overall maternal death in this setting (Qomariyah et al. 2009).

The fact that majority of the near-miss cases arrived at the hospitals with life-threatening conditions ('near-miss at admission') suggests a delay in reaching care. Barriers to accessing care, such as cost and distance, have been known to cause such delay (Ronsmans, Graham, and Lancet Maternal Survival Series steering group 2006). However, this study also highlights the fact that a large number of women who experienced near-miss sought care from the traditional birth attendant before being referred to the hospital. Such practice not only could prolong the delay in seeking health care, but could also contribute to the severity of the complications, causing the women to arrive at hospitals in a poor health state. On the other hand, the 'near-miss after admission' cases (24.9%), implying the life-threatening conditions were developed during hospitalization, provides useful insight on the status of health care quality in the study hospital.

This study adds to the evidence on the usefulness of obstetric near-miss review to identify maternal health problems. The main strength of this study was in the comprehensive review of medical chart and registries from multiple wards done by the parent study team. Despite the attempts made by the parent study team, a few variables remain to have a large missing data, such as residence and TBA aid, which limit the study interpretation. In addition, the study was conducted in time when universal health coverage for obstetric care has not been implemented in the country. Thus, barriers associated with cost may have been reduced, and health care seeking behavior may have improved gradually since the implementation of the new nationwide health insurance scheme. However, we strongly believe that the results remain relevant because studies conducted in more recent years still indicate problems in utilization of the improved health insurance scheme (Achadi et al. 2014).

## **CONCLUSION**

This study provides significant information about characteristics of near-miss cases that are useful to identify maternal health problems. Delay in seeking care contributes largely to the incidence of near-miss, suggesting improvement in access to care remain pivotal to address the problem. This study also highlights the opportunity of improving the quality of obstetric care through a review of near-miss. Hospitals could use the near-miss to maternal death ratio to routinely monitor their quality. Future studies should focus on testing the feasibility of routine facility-based near-miss review.

## ACKNOWLEDGMENT

The authors wish to thank the research team of the Initiative for Maternal Mortality Programme Assessment (Immpect) and the Center for Family Welfare Universitas Indonesia who have granted access to the data for this publication; the Serang and Pandeglang Districts Hospitals who have supported the implementation of the parent study; and the data collectors too numerous to mention all by name. The authors acknowledge the support from the Bill & Melinda Gates Foundation, the Department for International Development, the European Commission and USAID who funded the Impact program, and have made this work possible. The funders have no responsibility for the information provided or views expressed in this paper. The views expressed herein are solely those of the authors.

## REFERENCES

- Achadi, Endang L., Anhari Achadi, Eko Pambudi, and Puti Marzoeki. 2014. *A Study on the Implementation of Jampersal Policy in Indonesia*. Health, Nutrition, and Population (HNP) Discussion Paper. Washington, DC: World Bank Group.
- Adisasmita, Asri A., PE Deviany, F. Nandiaty, S. Stanton, and C. Ronsmans. 2008. "Obstetric Near Miss and Deaths in Public and Private Hospitals in Indonesia." *BMC Pregnancy and Childbirth* 8 (10): 10; 10.
- Chhabra, P. 2014. "Maternal Near Miss: An Indicator for Maternal Health and Maternal Care." *Indian Journal of Community Medicine : Official Publication of Indian Association of Preventive & Social Medicine* 39 (3): 132-137.
- David, E., F. Machungo, G. Zanconato, E. Cavaliere, S. Fiosse, C. Sululu, B. Chiluvane, and S. Bergstrom. 2014. "Maternal Near Miss and Maternal Deaths in Mozambique: A Cross-Sectional, Region-Wide Study of 635 Consecutive Cases Assisted in Health Facilities of Maputo Province." *BMC Pregnancy and Childbirth* 14: 401-014-0401-3.
- Filippi, V., C. Ronsmans, O. M. Campbell, W. J. Graham, A. Mills, J. Borghi, M. Koblinsky, and D. Osrin. 2006. "Maternal Health in Poor Countries: The Broader Context and a Call for Action." *Lancet (London, England)* 368 (9546): 1535-1541.
- Kaye, D., F. Mirembe, F. Aziga, and B. Namulema. 2003. "Maternal Mortality and Associated Near-Misses among Emergency Intrapartum Obstetric Referrals in Mulago Hospital, Kampala, Uganda." *East African Medical Journal* 80 (3): 144-149.
- Mantel, G. D., E. Buchmann, H. Rees, and R. C. Pattinson. 1998. "Severe Acute Maternal Morbidity: A Pilot Study of a Definition for a Near-Miss." *British Journal of Obstetrics and Gynaecology* 105 (9): 985-990.

- Oladapo, O. T., A. O. Sule-Odu, A. O. Olatunji, and O. J. Daniel. 2005. "'Near-Miss' Obstetric Events and Maternal Deaths in Sagamu, Nigeria: A Retrospective Study." *Reproductive Health* 2: 9.
- Pattinson, R. C. and M. Hall. 2003. "Near Misses: A Useful Adjunct to Maternal Death Enquiries." *British Medical Bulletin* 67: 231-243.
- Ps, R., S. Verma, L. Rai, P. Kumar, M. V. Pai, and J. Shetty. 2013. "'Near Miss' Obstetric Events and Maternal Deaths in a Tertiary Care Hospital: An Audit." *Journal of Pregnancy* 2013: 393758.
- Qomariyah, Siti Nurul. 2009. "A Practical Approach to Identifying Maternal Deaths Missed from Routine Hospital Reports: Lessons from Indonesia." *Global Health Action* 2 (0).
- Ronsmans, C., W. J. Graham, and Lancet Maternal Survival Series steering group. 2006. "Maternal Mortality: Who, when, Where, and Why." *Lancet (London, England)* 368 (9542): 1189-1200.
- Say, L., R. C. Pattinson, and A. M. Gulmezoglu. 2004. "WHO Systematic Review of Maternal Morbidity and Mortality: The Prevalence of Severe Acute Maternal Morbidity (Near Miss)." *Reproductive Health* 1 (1): 3.
- United Nations. 2015. *The Millenium Development Goals Report 2015*.
- World Health Organization. 2011. *Evaluating the Quality of Care for Severe Pregnancy Complications: The WHO Near-Miss Approach for Maternal Health*. Geneva, Switzerland: WHO Press.
- . "Maternal Mortality (Fact Sheet no 348)." World Health Organization Media Centre. Available from <http://www.who.int/mediacentre/factsheets/fs348/en/>. [Accessed Oct 20, 2016].