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Professional assistance during birth and maternal mortality in two Indonesian districts

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Objective To examine determinants of maternal mortality and assess the effect of programmes aimed at increasing the number of births attended by health professionals in two districts in West Java, Indonesia.

Methods We used informant networks to characterize all maternal deaths, and a capture-recapture method to estimate the total number of maternal deaths. Through a survey of recent births we counted all midwives practising in the two study districts. We used case-control analysis to examine determinants of maternal mortality, and cohort analysis to estimate overall maternal mortality ratios.

Findings The overall maternal mortality ratio was 435 per 100 000 live births (95% confidence interval, CI: 376–498). Only 33% of women gave birth with assistance from a health professional, and among them, mortality was extremely high for those in the lowest wealth quartile range (2303 per 100 000) and remained very high for those in the lower middle and upper middle quartile ranges (1218 and 778 per 100 000, respectively). This is perhaps because the women, especially poor ones, may have sought help only once a serious complication had arisen.

Conclusion Achieving equitable coverage of all births by health professionals is still a distant goal in Indonesia, but even among women who receive professional care, maternal mortality ratios remain surprisingly high. This may reflect the limitations of home-based care. Phased introduction of fee exemption and transport incentives to enable all women to access skilled delivery care in health centres and emergency care in hospitals may be a feasible, sustainable way to reduce Indonesia's maternal mortality ratio.

Une traduction en français de ce résumé figure à la fin de l'article. Al final del artículo se facilita una traducción al español. الترجمة العربية لهذه الخلاصة في نهاية النص الكامل لهذه المقالة.

Introduction

The fifth Millennium Development Goal (MDG 5) is to reduce the maternal mortality ratio worldwide by 75% between 1990 and 2015.¹ An essential strategy for achieving MDG 5 is to ensure that all births are managed by skilled health professionals. This strategy requires high population coverage and an enabling environment, including 24-hour access to effective emergency obstetric care.^{2,3}

Ecological studies have shown an inverse correlation between the number of health professionals per unit of population and the proportion of births attended by a health professional on the one hand, and maternal mortality on the other.^{4–6} However, causal inferences cannot be robustly drawn.² Few studies have assessed whether the percentage of births assisted by a health professional within a population correlates with maternal mortality,^{2,7} and even fewer studies have checked for a correlation between an individual woman's use of a health professional at birth and her risk of maternal death.^{2,8} Thus, the size of the effect that a given strategy to promote skilled birth attendance could have on maternal mortality is unclear.³

Indonesia is one of the few countries that have implemented initiatives to provide midwifery care in the community. In 1989, the Indonesian Government launched a safe motherhood programme that aimed to assign a midwife to every village.⁹ Within seven years, more than 54 000 midwives

had been posted,¹⁰ and the proportion of births managed by a midwife or other health professional had nearly doubled (from 35% in the late 1980s to 69% in 2000).¹¹

In response to the economic crisis in 1997,¹² the government introduced a social safety net programme that exempts the poor from paying health service fees. In 2005, a new health insurance scheme called ASKESKIN (*asuransi kesehatan untuk keluarga miskin* or health insurance for the poor)¹³ made the poorest families eligible for fee exemption for routine and emergency care. Under ASKESKIN, midwives are paid to manage deliveries, either in their own home or in the pregnant woman's home.

In this paper we evaluate Indonesia's safe motherhood programme by examining whether differences in the availability and use of midwives and other health professionals at birth can explain differences in the risk of maternal mortality in two districts in West Java.^{14,15}

Methods

Safe motherhood programme and study population

As part of an international research initiative known as the Initiative for Maternal Mortality Programme Assessment (Immact),¹⁶ we measured maternal mortality, assessed the provision of midwifery care, and determined the levels of uptake of professional delivery care in the Serang and Pandeglang districts of Banten Province, Java, Indonesia. Serang is 72 km

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from Jakarta, the capital of Indonesia, and moderately urbanised, with three hospitals and 36 health centres for its 1.8 million people. Pandeglang, more remote, has one district hospital and 30 health centres for its 1.1 million people. Serang and Pandeglang districts have 55 and 23 urban villages and 318 and 312 rural villages, respectively. In these two districts, the uptake of professional care at birth is lower than the national average.¹⁵

Data sources

Informant-based identification of maternal deaths

A double informant-based approach based on Maternal Deaths from Informants (MADE-IN) and Maternal Death Follow-on Review (MADE-FOR)¹⁷ was used to identify all maternal deaths that occurred in the two study districts between January 2004 and December 2005. MADE-IN uses existing village administrative systems to collect information about women's deaths. Village informants held "listing meetings" during which they listed the details of deaths in village women 15 to 49 years of age that occurred over the previous 2 years. The informants were health post volunteers (*kaders*) and unpaid village officials (*rukun tetangga* or RT heads), both of which were used in all urban villages and in a random sample of 78 rural villages. In the remaining 552 rural villages, only *kaders* were used. A maternal death was defined as any death during pregnancy or within 42 days after pregnancy, regardless of the cause. Once all maternal deaths were identified, the MADE-FOR team visited the family of each deceased woman to collect information about the circumstances of her death, and her use of health services during pregnancy and near the time of death. The team also collected information on the household's assets, the woman's education and the source of payment for medical care.

Population-based survey

We conducted a stratified cluster random sample survey in the two districts between April and June 2006.¹⁵ Villages were stratified as urban, rural or rural-remote. Remote villages exist only in Pandeglang and are defined as those that lie further than 33.3 km

(the median distance to non-urban villages in this district) from the nearest government hospital in the study area. Although some villages in Serang are further than 33.3 km from a government hospital, they are not classified as remote because they lie close to neighbouring suburban or industrial areas and are well served by transport and service infrastructure. A total of 150 villages were sampled with probability proportional to size and with replacement. Within each sampled village, a randomly-selected administrative unit provided a list of the members of all households by which to identify all women with a live birth or stillbirth between April 2004 and March 2006. Eight births per village were then randomly selected, and information was collected from the families on the same background variables as for maternal deaths.

Midwife census

In September 2005, each midwife in the two districts completed a questionnaire that included questions on personal and professional characteristics, including age, parity, training, type of employment contract and workload. Each was also asked if she had been assigned responsibility to particular villages for pregnancy, delivery and postpartum care.¹⁴

Data analysis

Determinants of maternal mortality

We performed a case-control analysis to examine the determinants of maternal mortality. Cases were all maternal deaths between January 2004 and December 2005; unmatched controls were all women who reported a birth between April 2004 and March 2006 in the population-based survey previously described. By means of logistic regression, with allowance for village clustering and stratification, we examined the associations between maternal death and asset ownership, maternal education, type of health insurance, district, urban or rural residence, local midwife density (number of midwives per 10 000 population) and the presence of a health professional during birth or near the time of death. We calculated crude and adjusted odds ratios (ORs) with their 95% confidence intervals (CI) and repeated the analysis

after excluding women who died during pregnancy.

Health professionals were defined as midwives (community or health centre midwives) or physicians. Wealth was ascertained by an asset index derived using principal component analyses.¹⁸ To construct an asset score for the cases, the values assigned to each asset from the principal component analysis of the controls were applied to the assets of each case. The wealth quartile ranges were derived from the first principal component based on recent births only. For insurance, the categories were none, insurance for the poor (ASKESKIN) and other insurance (private or employer-based). All recent births from the survey were linked with the village where the mother lived to obtain information on the local midwife density.

Maternal mortality ratios

For a random sample of villages, linked data on deaths from the two different informant networks (*kaders* and RT heads) enabled us to use a capture-recapture method¹⁹ to gauge misreporting, estimate the proportion of maternal deaths identified and re-estimate the true total number of maternal deaths for the two districts. Thus, capture-recapture methods allowed an assessment of the completeness of reporting of the two informant networks. For example, if only half of the cases identified by the *kaders* were identified by the RT heads, the completeness of the *kader* reporting was estimated as approximately 50%. These techniques are becoming more widely used in public health.²⁰ The expected number of births in each of five geographical strata (urban and rural in each district and rural-remote area in Pandeglang) were estimated from the population in each village (based on the 2004 national census), and stratified crude birth rates were estimated from the population-based survey.

To estimate maternal mortality ratios (maternal deaths per 100 000 live births) by women's characteristics, the birth data from the population-based survey were used to estimate the number of births with the desired characteristic (within strata), on the assumption of a binomial distribution. Analyses were performed using WinBUGS.²¹

Table 1. Distribution of maternal deaths according to sociodemographic variables, Serang and Pandeglang districts, Java, Indonesia, 2004–2006

Sociodemographic variables	Births with health professional ^a %	Maternal mortality			
		Case-control study ^b			Population-based study ^c
		Cases (<i>n</i> =458) %	Controls (<i>n</i> =1234) %	Crude OR (95% CI)	Maternal deaths per 100 000 live births (95% CI)
Birth with health professional					
Yes		47.5	32.8	1.85 (1.4–2.5)	703 (580–848)
No		52.5	67.2	1	341 (285–406)
Wealth quartile range					
Poorest	10.3	38.7	25.1	3.02 (1.9–4.7)	706 (567–869)
Lower middle	16.7	24.1	25.0	1.89 (1.2–2.9)	417 (322–532)
Upper middle	33.2	24.5	25.1	1.91 (1.3–2.9)	423 (328–535)
Wealthiest	71.1	12.7	24.9	1	232 (171–305)
Mother's education					
None or some primary	13.7	37.0	29.7	2.20 (1.4–3.5)	543 (436–668)
Complete primary	25.2	43.6	42.1	1.83 (1.2–2.9)	458 (376–553)
Some secondary	49.2	12.4	15.8	1.38 (0.8–2.3)	361 (259–485)
Secondary +	82.7	7.0	12.4	1	274 (182–388)
Health insurance					
None	30.7	82.0	83.7	1	431 (370–500)
Insurance for poor	20.8	15.0	10.2	1.50 (1.0–2.3)	641 (456–875)
Other insurance	80.9	3.0	6.1	0.50 (0.3–0.9)	260 (144–423)
Residence					
Urban	62.0	14.2	24.6	1	270 (206–344)
Rural	24.3	64.1	58.9	1.88 (1.2–3.0)	446 (374–528)
Rural-remote	19.7	21.7	16.6	2.26 (1.3–3.8)	633 (492–798)
District					
Serang	33.9	55.4	62.3	1	379 (317–450)
Pandeglang	31.0	44.6	37.8	1.32 (0.9–2.0)	525 (435–629)
Midwife density^d					
No midwife	23.1	60.8	50.8	1	523 (436–624)
0.01–1.99	32.8	5.2	11.9	0.36 (0.2–0.8)	211 (132–315)
2.00–3.99	32.0	20.0	16.0	1.01 (0.6–1.8)	563 (427–725)
4.00–5.99	47.9	7.0	11.0	0.53 (0.3–1.0)	308 (206–436)
6.00+	65.3	7.0	10.3	0.56 (0.3–1.0)	328 (219–465)

CI, confidence interval; OR, odds ratio.

^a Among 1234 recent births (controls) from the population-based survey.

^b Sixteen maternal deaths were excluded because of missing information on wealth and education. Data on health professional birth attendance were missing in 12 cases.

^c Based on enumeration of all deaths and expected number of births in each village.

^d Per 10 000 population.

Results

Most births (83%) in the two districts took place at home, and only one-third of births (32.8%) were attended by a health professional (90.4% by a midwife, 7.0% by both a midwife and doctor, and 2.7% by a doctor). Few births took place in a health centre, clinic or hospital (5.8%); 11.2% of births took place in a midwife's home. There were 474 maternal deaths, for an overall maternal mortality ratio of 435 per

100 000 (95% CI: 376–498). Nearly half (47.6%) of the women who died had been managed by a health professional before death. Of the 355 women who died during labour, delivery or the postpartum period, 43.4% had been managed by a health professional during the birth. Of the 107 women who died during pregnancy, 61.7% had been attended by a health professional during the illness leading to death (data were missing for 12 women). The odds of having a health professional present

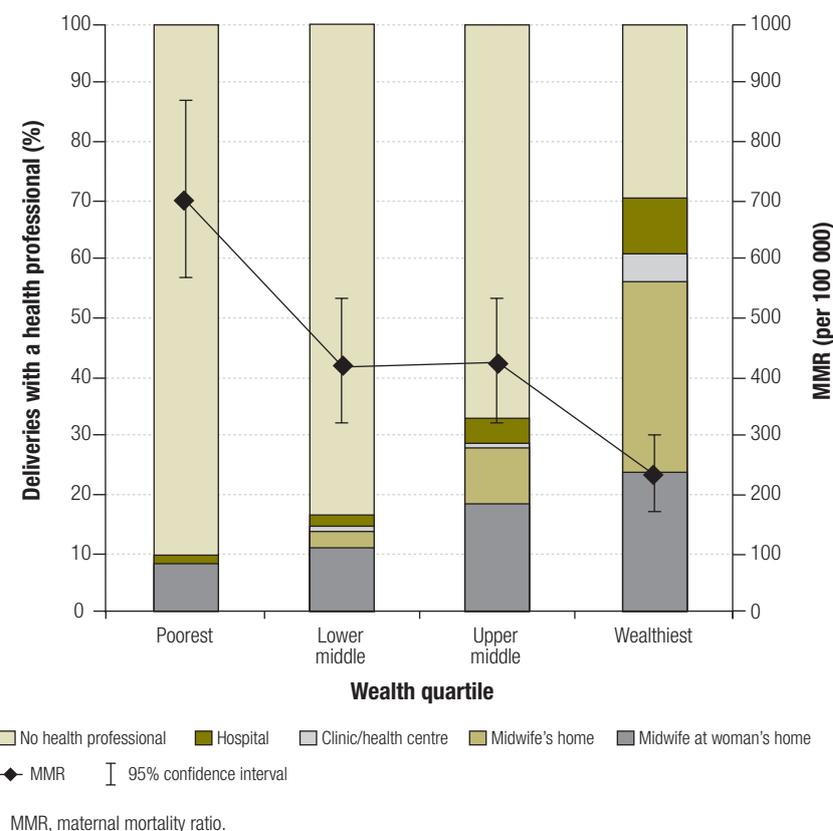
during delivery or around the time of death was 1.9 times higher (95% CI: 1.4–2.5) among women who died than among women who survived (Table 1). Excluding deaths during pregnancy reduced the OR slightly, to 1.53 (95% CI: 1.1–2.1).

Among women in the poorest quartile range, only 10.3% gave birth with assistance from a health professional, and the maternal mortality ratio was 706 per 100 000 (Table 1). The women in the highest quartile range

had lower maternal mortality, although the ratio remained surprisingly high (232 per 100 000) given the high coverage of professional care at birth (71.1%) (Table 1, Fig. 1). Most births with a health professional in this group took place outside the woman's home (44.6% in the midwife's home, 7.2% in a health centre and 13.5% in hospital). Insurance for the poor had been accessed by 10% of the study population, and mortality in this group was very high (641 per 100 000) (Table 1). Only 21% had given birth with a health professional. Conversely, birth with a health professional was substantially higher in those with private or employment insurance, 23% of whom gave birth in hospital, but maternal mortality in this group remained high (260 per 100 000). Professional attendance at birth was higher in villages with four or more midwives per 10 000 population, but patterns of maternal mortality were inconsistent (Table 1).

Adjusting the analysis for all variables attenuated the ORs, and only the wealth quartile range remained significantly associated with maternal mortality; the adjusted OR for women in the poorest quartile range was 2.28 (95% CI: 1.3–4.0) when compared with women in the wealthiest quartile range. In all groups except the highest wealth quartile range, a health professional was much more likely to have been present for women who died than for those who survived (Fig. 2). The interaction between wealth quartile range and the presence of a health professional at birth was of borderline statistical significance ($P = 0.058$). Mortality was extremely high among the poorest women who gave birth with a health professional (2303 per 100 000), and it remained very high for women in the two middle wealth quartile ranges who gave birth with a health professional (1218 per 100 000 and 778 per 100 000 for the lower and upper middle quartile ranges respectively) (Table 2, Fig. 3). Only in the highest wealth quartile range was mortality equal among those who gave birth with and without a health professional (257 and 202 per 100 000 respectively; OR: 1.41; 95% CI: 0.7–2.9). Adjusting this analysis for other variables did not change the findings (Table 2). Excluding deaths during pregnancy attenuated the ORs, but the conclusions remain unchanged (data not shown).

Fig. 1. Births assisted by a health professional at home or in a health facility and maternal mortality ratio, by wealth quartile range, Serang and Pandeglang districts, Java, Indonesia, 2004–2006



In the population-based survey, 19 Caesareans were reported, which resulted in a population-based Caesarean rate of 1.2% (95% CI: 0.7–2.2). The number was too small to allow detailed analysis, but Caesarean rates were extremely low for the three lowest wealth quartile ranges (0.6%); the wealthiest quartile range had a rate of 3.1% ($P = 0.003$ compared with the other three quartile ranges). Those who accessed insurance for the poor had higher Caesarean rates than those who did not (3.1% versus 0.4%, $P < 0.001$). Caesareans were more common among those with private or employment insurance (8.9%, $P < 0.001$) compared to those without health insurance. Women who died during or after delivery were 6.2 times more likely to have had a Caesarean than women who survived (95% CI: 3.1–12.5; adjusted OR: 8.7; 95% CI: 3.4–22.3).

Discussion

The maternal mortality ratios reported here are considerably higher than Indonesia's overall ratio of 307 per 100 000.²²

Among the poorest women, a mere 10% gave birth with a health professional, and their mortality reached a staggering 2303 per 100 000, a level 13 times higher than that found in the wealthiest women. Similar patterns were seen in Nepal, where only 8% of births were managed by a health professional.⁸ Nonetheless, in our study mortality was twice as high among those who gave birth with a health professional (mostly midwives) than among those who did not.

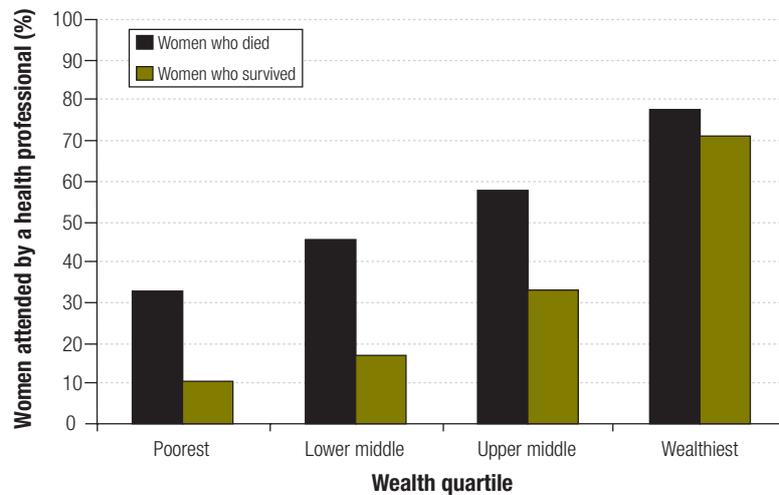
The high levels of mortality among those receiving professional care is perhaps not surprising in light of the fact that only one-third of all births were managed by a health professional. When uptake of professional birth attendance is low, women only seek professional care when they are ill, perhaps too late for a midwife or doctor to be able to save their lives. This is particularly the case when timely access to emergency obstetric care is limited. As coverage improves, women at lower risk of complications are more likely to seek care, so that average mortality in those seeking care will decrease. In this study,

mortality only fell substantially when nearly three-quarters of the population sought professional delivery care, a rate seen among the wealthiest women. The maternal mortality ratio for the wealthy (232 per 100 000) remained surprisingly high, however, given the high coverage of professional care at birth.

Why has the uptake of professional delivery care remained so low in the two districts? The overall midwife density of 2.2 per 10 000 population is similar to that in Malaysia and Sri Lanka, neighbouring countries that have achieved nearly universal professional attendance, with midwife densities of 3.4 and 1.6 per 10 000 population, respectively.²³ In the two districts examined in this study, midwife density was much lower in rural and remote villages than in urban areas,¹⁴ but the uptake of professional care remained relatively low even in urban areas. The strong attachment of women to birth traditions is often cited as the main reason for low use of professional care.¹⁴ However, the wealthiest women and those with access to health insurance clearly received more professional care than the poorest women, which suggests that economic barriers are the key deterrents. The direct costs to households for a delivery with a midwife are high, whether in the woman's home (43 United States dollars, US\$) or the midwife's home (US\$ 55).²⁴ The costs of a Caesarean are even higher,²⁵ so that only the wealthy can afford one without catastrophic consequences to the family.¹¹

The Indonesian Government's efforts to exempt the poor from paying

Fig. 2. Mothers who died or survived among those assisted by a health professional during delivery or during the illness leading to death, by wealth quartile range, Serang and Pandeglang districts, Java, Indonesia, 2004–2006



user fees have not yet improved access or reduced their burden of maternal death. Mortality was three times greater among the poorest women than among the wealthiest, and the same gap between rich and poor has been found using Demographic and Health Survey (DHS) data.²⁶ Many families were unaware of the insurance scheme, some midwives only had a partial understanding of it, and families reported delays in receiving care owing to the need to gather various documents. Eliminating user fees for pregnant women or offering cash incentives or vouchers to selected groups can increase service uptake, but it is unknown whether these strategies reduce the burden of maternal mortality or inequalities in

the maternal mortality ratio.^{27–29} Our results suggest that increasing the uptake of skilled care at delivery is a necessary, if not sufficient, condition for achieving lower levels of maternal mortality, but the word to emphasize here is “skilled”. The persistently high levels of maternal mortality among wealthier women who give birth with a health professional are worrying. Some of these women will have sought care too late for the midwife or doctor to be able to prevent death. However, midwives may not be skilled enough at managing complications, even when women seek help early.^{30,31}

Most midwives perform many tasks (including providing nutrition advice and immunizations) and attend

Table 2. Maternal deaths distributed by wealth quartile range and by presence or absence of a health professional at delivery, Serang and Pandeglang districts, Indonesia, 2004–2006

Wealth quartile range	Delivery with health professional	Population-based study ^a		Case-control study	
		Maternal deaths ^b (95% CI)	Crude OR (95% CI)	Adjusted OR (95% CI) ^c	
Poorest	Yes	2303 (1487–3292)	12.73 (5.7–28.4)	11.16 (4.6–27.4)	
	No	541 (420–684)	3.02 (1.4–6.3)	2.45 (1.1–5.6)	
Lower middle	Yes	1218 (773–1830)	6.71 (3.0–14.8)	6.67 (2.8–15.8)	
	No	278 (201–373)	1.61 (0.8–3.3)	1.36 (0.6–3.0)	
Upper middle	Yes	778 (541–1076)	4.41 (2.0–9.5)	5.25 (2.3–11.8)	
	No	280 (195–388)	1.61 (0.8–3.3)	1.43 (0.7–3.1)	
Wealthiest	Yes	257 (181–351)	1.41 (0.7–2.9)	2.04 (0.9–4.5)	
	No	202 (107–334)	1	1	

CI, confidence interval; OR, odds ratio.

^a Based on enumeration of all deaths and expected number of births in each village.

^b Per 100 000 live births.

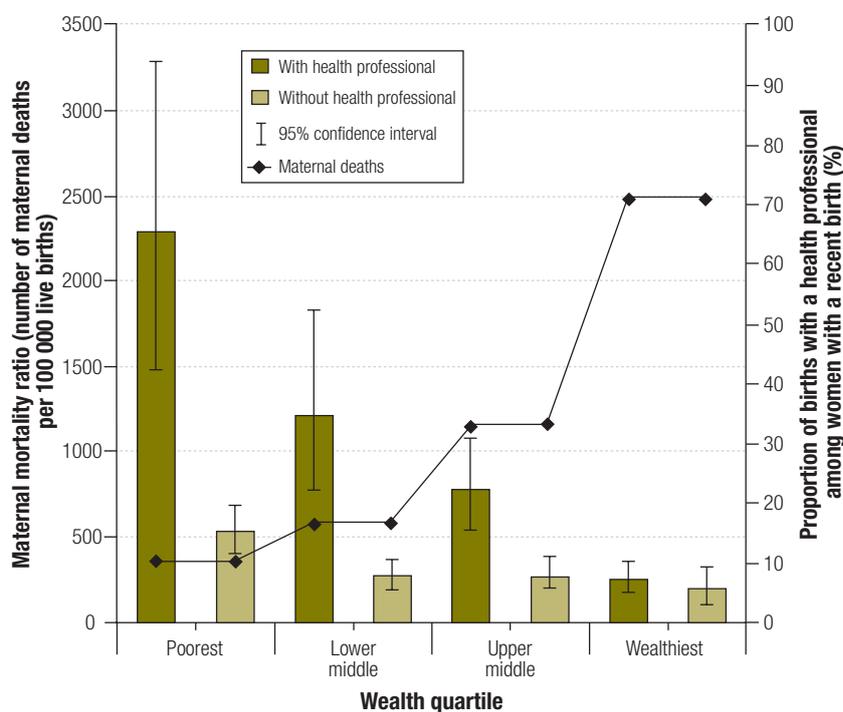
^c Adjusted for all other variables shown in Table 1.

few births, so their capacity to manage complications and recognize the need for referral may be compromised because they come across these situations so infrequently.¹⁴ Midwifery training focuses on normal births, which may restrict the midwives' capacity to manage complications.³¹ More importantly, barriers to life-saving emergency obstetric care are substantial,²⁵ even when a midwife is present.

This study has some limitations. First, women's reports of the health professionals attending delivery may be inaccurate.³² However, this limitation is less relevant in the Indonesian context, where birth attendants are usually midwives or doctors, than in countries where traditional birth attendants are common. Second, estimates of maternal deaths produced by the capture–recapture method are likely to be less biased than the crude death count based on two informant networks, but there may still have been some bias. In particular, the informants may have missed some maternal deaths in early pregnancy or due to sensitive causes. Finally, this study's asset-based classification of the population into wealth quartiles may not overlap with the method the government uses to determine who receives insurance for the poor. The usefulness of asset-based approaches for determining relative wealth in specific cultural contexts has also been questioned;³³ such doubts would also apply to our findings.

Midwifery provision in Indonesia has focused on increasing the number of midwives, rather than on creating a supporting environment. This close-to-client focus promotes care in the woman's or midwife's home, but evidence from Bangladesh suggests that conditions in these locations can be basic.³⁴ Moreover, this strategy for intrapartum care is inefficient in terms of the midwife's time and does not help her to cope with emergencies.³ While Indonesia has trained and posted a remarkable number of midwives, it is unclear whether universal coverage will be possible with a continued community focus.^{8,35} Midwives prefer to serve the population in the urban and more accessible areas.¹⁴ Data from Bangladesh

Fig. 3 Maternal mortality ratio by presence or absence of a health professional and wealth quartile range, and proportion of births with a health professional by wealth quartile range, Serang and Pandeglang districts, Java, Indonesia, 2004–2006



also indicate that midwives deployed in the community provide few outreach services.³⁶ Midwives working in health facilities can clearly assist more births because they can provide care to more than one woman in a given period and because they work in teams. A shift from home births to health centre births is possible even in settings with strong attachment to home births,³⁶ and such a strategy may ultimately be efficient, effective and sustainable in reaching out to women.

The Indonesian Government has already recognized the potential of health centres to increase the number of births attended by health professionals. An intrapartum care strategy focused on health centres could represent the next phase in Indonesia's progress towards universal skilled attendance. The phased introduction of fee exemption and transport incentives, with initial targeting of underserved areas, to enable all women to access skilled delivery care in health centres and emergency care in hospitals may be

one feasible and sustainable option to enable the Indonesian Government to make further progress towards achieving MDG 5. ■

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Competing interests: None declared.

Résumé

Assistance professionnelle pendant la naissance et mortalité maternelle dans deux districts indonésiens

Objectif Etudier les déterminants de la mortalité maternelle et évaluer l'effet de programmes visant à accroître le nombre de naissances assistées par des professionnels de santé dans deux districts de l'Ouest de Java, en Indonésie.

Méthodes Nous avons utilisé des réseaux informateurs pour caractériser l'ensemble des décès maternels et une méthode de capture-recapture pour estimer le nombre total de ces décès. Par le biais d'une enquête sur les naissances récentes, nous avons recensé toutes les sages-femmes exerçant dans les deux districts étudiés. Nous avons fait appel à une étude cas-témoins pour examiner les déterminants de la mortalité maternelle et à une étude de cohorte pour estimer le taux global de mortalité maternelle.

Résultats Le taux global de mortalité maternelle était de 435 pour 100 000 naissances vivantes (intervalle de confiance à 95 %, IC : 376-498). N'ont bénéficié de l'assistance d'un professionnel de santé pendant l'accouchement que 33 % des femmes, et parmi ce groupe, la mortalité était extrêmement élevée chez les mères appartenant au quintile de richesse le plus bas (2303 pour

100 000) et restait très forte dans les quintiles moyen-inférieur et moyen-supérieur (1218 et 778 pour 100 000 naissances vivantes, respectivement). La raison de cette mortalité excessive est peut être que les femmes, notamment les plus pauvres, ne sollicitent de l'aide qu'après l'apparition d'une complication grave.

Conclusion L'obtention d'une couverture équitable de la totalité des naissances par des professionnels de santé est encore un objectif lointain en Indonésie, mais même chez les femmes bénéficiant de soins professionnels, les taux de mortalité maternelle restent étonnamment élevés. Cette situation reflète peut être les limites des soins à domicile. La mise en place par étapes d'une exemption de paiement des actes et de mesures incitatives en matière de transport pour permettre à toutes les femmes d'accéder à des soins obstétricaux qualifiés dans un centre de santé ou à des soins d'urgence dans un hôpital pourrait être un moyen praticable et durable de réduire le taux de mortalité maternelle en Indonésie.

Resumen

Atención profesional en el parto y mortalidad materna en dos distritos de Indonesia

Objetivo Analizar los factores determinantes de la mortalidad materna y evaluar el efecto de los programas encaminados a aumentar el número de partos atendidos por profesionales de la salud en dos distritos de Java occidental, Indonesia.

Métodos Nos servimos de redes de informantes para caracterizar todas las defunciones maternas, y empleamos un método de captura-recaptura para estimar el número total de tales defunciones. A través de una encuesta sobre nacimientos recientes, contabilizamos el número de parteras que ejercían en los dos distritos estudiados. Realizamos un análisis de casos y controles para examinar los determinantes de la mortalidad materna, y un análisis de cohortes para estimar las razones de mortalidad materna globales.

Resultados La razón de mortalidad materna global fue de 435 por 100 000 nacidos vivos (intervalo de confianza del 95%: 376-498). Sólo un 33% de las mujeres dieron a luz con la asistencia de un profesional sanitario, y entre ellas la mortalidad fue muy alta en las situadas en el intervalo intercuartílico inferior de riqueza (2303 por 100 000), pero también bastante alta en las

situadas en los intervalos intercuartílicos medio-bajo y medio-alto (1218 y 778 por 100 000, respectivamente). Ello se debe quizá a que las mujeres, especialmente las de las capas pobres de la población, pueden haber buscado ayuda sólo después de haber sufrido una complicación grave.

Conclusión El logro de una cobertura equitativa de todos los nacimientos por profesionales sanitarios sigue siendo una meta lejana en Indonesia, pero, incluso entre las mujeres que reciben atención profesional, las razones de mortalidad maternas se mantienen sorprendentemente altas, debido quizá a las limitaciones de la asistencia domiciliaria. La introducción escalonada de medidas de exención del pago de honorarios y de incentivos al transporte para permitir a todas las mujeres acceder a atención obstétrica especializada en los centros de salud y a los servicios de urgencias en los hospitales podría ser una alternativa factible y sostenible para reducir la razón de mortalidad materna en Indonesia.

ملخص

المساعدة المهنية خلال الولادة ووفيات الأمهات في مقاطعتين في إندونيسيا

الموجودات: كان المعدل الإجمالي لوفيات الأمهات 435 لكل مئة ألف ولادة حية (بفاصلة ثقة 95% إذ تراوحت بين 376 و498). وقد تمت الولادة لدى 33% من النساء فقط بمساعدة أحد المهنيين الصحيين، ومن بين هؤلاء، كانت معدلات الوفيات مرتفعة للغاية لدى من هن في المدى الأدنى من حيث الغنى (2303 لكل مئة ألف) وكان مرتفعاً جداً لدى من هن في المدى المتوسط الأقرب للانخفاض (1218 لكل مئة ألف) ولدى من هن في المدى المتوسط الأقرب للارتفاع (778 لكل مئة ألف). وقد يعود ذلك إلى أن النساء، ولاسيما الفقيرات منهن، لا يلتمس المساعدة إلا بعد حدوث المضاعفات الخطيرة.

الهدف: دراسة محددات وفيات الأمهات وتقييم أثر البرامج التي تهدف إلى زيادة عدد الولادات التي يحضرها مهنيون صحيون في مقاطعتين غرب جاوه في إندونيسيا.

الطريقة: استخدم الباحثون شبكات المعلومات للتعرف على صفات جميع وفيات الأمهات وتقدير إجمالي عدد وفيات الأمهات بأسلوب إعادة فحص العينات. ومن خلال مسح للولادات أُجري مؤخراً قام الباحثون بإحصاء جميع القابلات اللاتي يمارسن عملهن في المقاطعتين اللتين خضعتا للدراسة. واستخدم الباحثون تحليل الحالات والشواهد لدراسة محددات وفيات الأمهات وتحليل الأثر لتقدير المعدلات العامة لوفيات الأمهات.

وإعطاء حوافز للانتقال قد يمكن جميع النسوة من الوصول إلى الرعاية الحاذقة لحالات الولادة في المراكز الصحية ورعاية الطوارئ في المستشفيات، وهي وسيلة ممكنة ومستدامة لتقليل معدل وفيات الأمهات في إندونيسيا.

الاستنتاج: لا يزال الوصول إلى تغطية عادلة لجميع الولادات بالمهنيين الصحيين هدفاً بعيد المنال في إندونيسيا؛ إلا أن معدلات وفيات الأمهات لا يزال مرتفعاً بدرجة تثير الاستغراب حتى لدى النساء اللاتي يتلقين رعاية مهنية؛ وقد يوضح ذلك القصور في الرعاية المنزلية. وإن الإدخال المتدرج للإعفاء من دفع الأجر

References

- Sachs JD, McArthur JW. The Millennium Project: a plan for meeting the Millennium Development Goals. *Lancet* 2005; 365:347-53. PMID:15664232
- Graham W, Bell J, Bullough C. Can skilled attendance at delivery reduce maternal mortality in developing countries? In: DeBrouwere V, Van Lerberghe W, eds. *Safe motherhood strategies: a review of the evidence* (Studies in Health Services Organisation and Policy). ITG Press; 2001. pp. 91-131.
- Campbell OMR, Graham WJ. on behalf of The Lancet Maternal Survival Series steering group. Strategies for reducing maternal mortality: getting on with what works. *Lancet* 2006;368:1284-99. PMID:17027735 doi:10.1016/S0140-6736(06)69381-1
- Anand S, Bernighausen T. Human resources and health outcomes: cross-country econometric study. *Lancet* 2004;364:1603-9. PMID:15519630 doi:10.1016/S0140-6736(04)17313-3
- Ronsmans C, Etard JF, Walraven G, Høj L, Dumont A, de Bernis L, et al. Maternal mortality and access to obstetric services in West Africa. *Trop Med Int Health* 2003;8:940-8. PMID:14516306 doi:10.1046/j.1365-3156.2003.01111.x
- McClure EM, Goldenburg RL, Bann CM. Maternal mortality, stillbirth and measures of obstetric care in developing and developed countries. *Int J Gynaecol Obstet* 2007;96:139-46. PMID:17274999 doi:10.1016/j.ijgo.2006.10.010
- Campbell O, Gipson R, Issa AH, Matta N, El Deeb B, El Mohandes A, et al. National maternal mortality ratio in Egypt halved between 1992-93 and 2000. *Bull World Health Organ* 2005;83:462-71. PMID:15976898
- Christian P, Katz J, Wu L, Kimbrough-Pradhan E, Khatry SK, LeClerc SC, et al. Risk factors for pregnancy-related mortality: a prospective study in rural Nepal. *J R Inst Public Health* 2008;122:161-72.
- The World Bank. *Indonesia's health work force: issues and options*. Washington, DC: WB; 1994 (Report No. 12835-IND).
- Indonesia, Ministry of Health. *Indonesia: health profile*. Jakarta: Centre for Health Data; 1997.
- Hatt L, Stanton C, Makowiecka K, Adisasmita A, Achadi E, Ronsmans C. Did the skilled attendance strategy reach the poor in Indonesia? *Bull World Health Organ* 2007;85:774-82. PMID:18038059 doi:10.2471/BLT.06.033472
- Frankenberg E, Thomas D, Beegle K. *The real costs of Indonesia's economic crisis: preliminary findings from the Indonesia Family Life Surveys*. Santa Monica, CA: Rand Corporation; 1999.
- GTZ-ILO-WHO consortium. *Social health insurance development as an integral part of the national health policy: recent reform in Indonesian health insurance system*. Jakarta: Ministry of People's Welfare and Ministry of Health; 2005.
- Makowiecka K, Achadi E, Izati Y, Ronsmans C. Midwifery provision in two districts in Indonesia: how well are rural areas served? *Health Policy Plan* 2008;23:67-75. PMID:17971368 doi:10.1093/heapol/czm036
- Achadi E, Scott S, Pambudi ES, Makowiecka K, Marshall T, Adisasmita A, et al. Midwifery provision and uptake of maternity care in Indonesia. *Trop Med Int Health* 2007;12:1490-7. PMID:18076557
- Graham WJ. Now or never: the case for measuring maternal mortality. *Lancet* 2002;359:701-4. PMID:11879885 doi:10.1016/S0140-6736(02)07817-0
- Impact toolkit: a guide and tools for maternal mortality programme assessment. Aberdeen: University of Aberdeen. Available from: <http://www.impact-international.org> [accessed on 6 March 2009].
- Filmer D, Pritchett LH. Estimating wealth effects without expenditure data or tears: an application to educational enrolments in states of India. *Demography* 2001;38:115-32. PMID:11227840
- Laska EM. The use of capture-recapture methods in public health. *Bull World Health Organ* 2002;80:845. PMID:12481204
- Methodological guidelines to estimate the prevalence of problem drug use on the local level*. Lisbon: European Monitoring Centre for Drugs and Drug Addiction; 1999. Available from: http://www.emcdda.europa.eu/attachements.cfm/att_1422_EN_guidelines_local_pdu.pdf [accessed on 6 March 2009].
- Lunn DJ, Thomas A, Best N, Spiegelhalter D. WinBUGS – a Bayesian modeling framework: concepts, structure, and extensibility. *Stat Comput* 2000;10:325-37. doi:10.1023/A:1008929526011
- Indonesia Demographic and Health Survey. Calverton, MD: Macro International; 2004.
- The world health report 2006: working together for health*. Geneva: World Health Organization; 2006.
- Quayyum Z, Ensor T, Nadjib M, Sucahya PK, Pambudi E. *Inequality in access to and financing of obstetric care in two districts of Indonesia: are the poor benefiting from Bidan Di Desa programme and public provision of care?* Aberdeen: IMMPACT; 2006.
- Ronsmans C, Achadi E, Supratikto G, Zazri A, McDermott J, Koblinsky M, et al. Evaluation of a comprehensive home-based midwifery programme in South Kalimantan, Indonesia. *Trop Med Int Health* 2001;6:799-810. PMID:11679128 doi:10.1046/j.1365-3156.2001.00780.x
- Ronsmans C, Graham WJ on behalf of the Lancet Maternal Survival Series steering group. Maternal mortality: who, when, where and why. *Lancet* 2006;368:1189-200. PMID:17011946 doi:10.1016/S0140-6736(06)69380-X
- Borghi J, Ensor T, Somanathan A, Lissner C, Mills A. on behalf of The Lancet Maternal Survival Series steering group 2006. Mobilising financial resources for maternal health. *Lancet* 2006;368:1457-65. PMID:17055948 doi:10.1016/S0140-6736(06)69383-5
- Ensor T, Ronoh J. Effective financing of maternal health services: a review of the literature. *Health Policy* 2005;75:49-58. PMID:16298228 doi:10.1016/j.healthpol.2005.02.002
- Initiative for Maternal Mortality Programme Assessment. *Implementation of free delivery policy in Ghana* [Impact policy brief]. Aberdeen: Impact; 2005. Available from: http://www.impact-international.org/uploads/files/Implementation_of_Free_Delivery_Policy_in_Ghana_1.pdf [accessed on 6 March 2009].
- Iskandar MB. *Health and mortality (1997) in Indonesia. Assessment: population and human resources*. Canberra and Singapore: Australian National University and Institute of Southeast Asian Studies; 1997.
- McDermott J, Beck D, Buffington ST, Annas J, Supratikto G, Prenggono D, et al. Two models of in-service training to improve midwifery skills: how well do they work? *J Midwifery Womens Health* 2001;46:217-25. PMID:11603633 doi:10.1016/S1526-9523(01)00137-4
- Hussein J, Bell J, Nazzar A, Abbey M, Adjei S, Graham W. The skilled attendance index: proposal for a new measure of skilled attendance at delivery. *Reprod Health Matters* 2004;12:160-70. PMID:15626206 doi:10.1016/S0968-8080(04)24136-2
- Morris SS, Carletto C, Hodinott J, Christiaensen LJM. Validity of rapid estimates of household wealth and income for health surveys in rural Africa. *J Epidemiol Community Health* 2000;54:381-7. PMID:10814660
- Blum LS, Sharmin T, Ronsmans C. Performing home-based deliveries: understanding the perspective of skilled birthing attendants. *Reprod Health Matters* 2006;14:51-60. PMID:16713879 doi:10.1016/S0968-8080(06)27234-3
- Koblinsky M, Matthews Z, Hussein J, Mavalankar D, Mridha MK, Anwar I, et al. on behalf of The Lancet Maternal Survival Series steering group. Going to scale with professional skilled care. *Lancet* 2006;368:1377-86. PMID:17046470 doi:10.1016/S0140-6736(06)69382-3
- Chowdhury ME, Ronsmans C, Killewo J, Anwar I, Gausia K, Das-Gupta S, et al. Equity in use of home-based or facility-based skilled obstetric care in rural Bangladesh: an observational study. *Lancet* 2006;367:327-32. PMID:16443040 doi:10.1016/S0140-6736(06)68070-7