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Severe acute maternal morbidity in high-income countries

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Maternal mortality in high income countries has become low in recent years and therefore analysis of severe acute maternal morbidity has been added to confidential enquiries into the causes of maternal deaths. The major drawback at the moment is the lack of universal definitions of severe acute maternal morbidity. The prevalence of severe acute maternal morbidity in high income countries is between 3.8 and 12 per 1,000 births. Case fatality rates may reflect the quality of maternal health care. Audit is the instrument to analyse whether substandard care factors are present. Guidelines and protocols to provide obstetric critical care may be improved from audit findings and skills and drills training put in place.

Severe acute maternal morbidity (SAMM) has now gained interest as a new quality indicator of obstetric care.[1–3] The most important reason is the extremely low maternal mortality ratio in high income countries. It takes years to collect the numbers needed to be able to draw valid conclusions from analysing cases of maternal mortality. Maternal deaths also tend to be more and more the result of rare complications, whereas regular life-threatening complications like major obstetric haemorrhage (MOH) are relatively underexposed as they less frequently lead to death nowadays.[1,2] In the Netherlands, for example, approximately 20 maternal deaths occur every year in approximately 190,000 births, with (pre-)eclampsia being the most frequent cause.[2] Obstetric haemorrhage is only leading to maternal mortality in exceptional cases, but was the most frequent cause of severe acute maternal morbidity in a recent nationwide survey: 1606 women (4.5 per 1000 births) had received at

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least four units of blood in 358,874 births, with a case fatality rate of 1:201. The case fatality rate in all 2552 cases of SAMM (7.1 per 1000 births) in that survey was 4 times higher (1:53).[4]

Relatively few studies have been performed on SAMM in high income countries. Studies are often facility-based and bias may include the type of hospital and the number of home births in the community.

The most important and difficult issue, however, is the definition of severe acute maternal morbidity. Different research groups have already addressed this issue and the World Health Organisation is in the process of integrating these efforts into internationally accepted criteria for SAMM.[5–13]

Definition of severe acute maternal morbidity

The most often used definition of severe acute maternal morbidity has been given by Mantel as "a very ill pregnant or recently delivered woman who would have died had it not been but luck and good quality care was on her side".[6] Different classifications are in use, however. These may be guided by disease-specific criteria (such as eclampsia or MOH), organ-system based criteria (such as respiratory, liver or renal insufficiency) or by management-based criteria (such as hysterectomy, arterial embolisation or intensive care unit (ICU) admission).

Some criteria, however, need further specification. MOH is often defined as the need for a certain number of units of blood or the need for hysterectomy or arterial embolisation. Respiratory insufficiency is further specified as the need for artificial respiration, and renal insufficiency as the need for renal dialysis. Disease-specific and organ-system based criteria thus often need management-based criteria for specification. This explains why MOH will be differently defined when the woman refuses blood (Jehovah's witnesses) or when blood is scarcely available (in resource-poor settings).

There are two recent nationwide surveys of SAMM. The first one is the Scottish population study by Brace et al. in 2001–2002 and the second is the Dutch population study, the LEMMoN-study, by Zwart et al. in 2004–2006.[4,9] The Scottish study was mainly based on disease-specific and organ-system criteria, while the Dutch study depended on disease-specific and management-based criteria (Table 1). Because most women with severe organ-system based criteria will be admitted to ICU, it may be assumed that both studies included more or less similar patients.

The difference in prevalence (3.8 in Scotland versus 7.1 per 1000 births in the Netherlands), however, appeared to be mainly explained by the different definition of "major obstetric haemorrhage"; Scotland included women only after they had received at least five units of blood, and the Netherlands used at least four units as a cut-off point.

Prevalence of severe acute maternal morbidity in high income countries

The prevalence of severe acute maternal morbidity in population-based studies has been the subject of a few studies in high income countries (Table 2). The rates range from 3.8 (95% CI 3.3–4.4) to 12 (95% CI 11.2–13.2) per 1000 births. The surveys in Canada[14], Finland[15] and the USA[16] were retrospective register-based studies, while the UK county[7], and nationwide Scottish[9] and Dutch[4] studies were prospective observational studies, using a more or less similar design. The different rates found in the three prospective studies are mainly explained by the different definition of MOH. Haemorrhage accounted for approximately half of all cases in Scotland, the Netherlands and the UK county. Blood transfusion services are of paramount importance to prevent death from haemorrhage.

Underreporting

Underreporting was only studied in the survey in the Netherlands by comparing reported cases with other registers, such as the Dutch Perinatal Registry (LVR) or the local blood transfusion registers in hospitals. During the first five months of the Dutch study, only one case of uterine rupture and two cases of eclampsia were found in the LVR that were not reported to the study, underreporting being estimated at 2 and 3%, respectively. Underreporting of MOH, however, appeared to be 29% (range