

# The World Health Organization Multicountry Survey on Maternal and Newborn Health project at a glance: the power of collaboration

In the early 2000s, the World Health Organization (WHO) initiated an ambitious research project aimed at establishing a global network of health facilities providing maternity services. This network would not only enable WHO to generate knowledge related to maternal and perinatal health at the global level, but also aimed to foster collaboration and strengthen research capacity across the world. Between 2004 and 2008, the first round of research was implemented in 24 countries from Africa, Asia, and Latin America. The 2004–2008 Global Survey on Maternal and Perinatal Health resulted in a strong worldwide collaboration that produced over 25 research papers, several local and global policy briefs, and a number of master's and doctorates at various universities around the world.<sup>1,2</sup>

Considering the success of the Global Survey project and the network's momentum and motivation, preparations for a second round of research were initiated in 2008. The project steering committee, together with the project coordinators at the country and regional levels, opted to focus on issues related to severe maternal and newborn morbidity and mortality, and to expand the network. Through a participatory process, a research protocol was developed and, between May 2010 and December 2011, data collection for the Multicountry Survey on Maternal and Newborn Health (WHOMCS) was implemented in 359 hospitals from 29 countries located in five WHO regions (i.e. Africa, the Americas, Eastern Mediterranean, South East Asia, and the Western Pacific).<sup>3,4</sup>

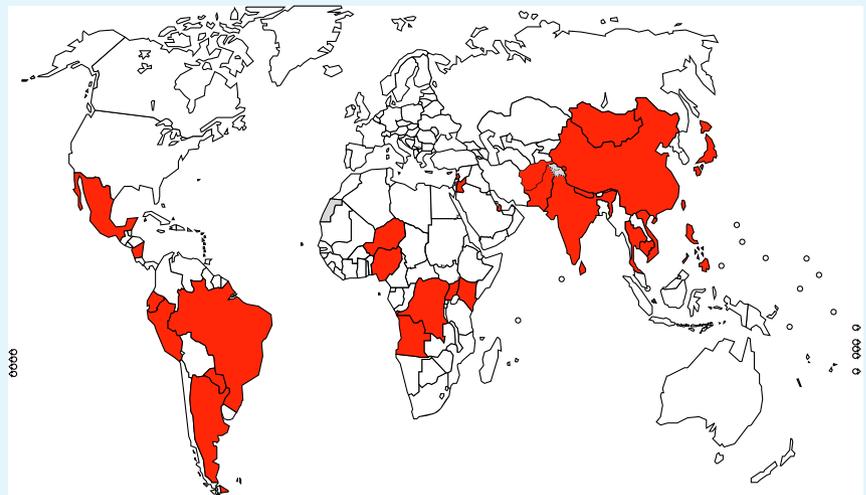
The WHOMCS included over 314 000 women and their newborn infants.<sup>5</sup> It is the largest study to date assessing the management of severe maternal complications and the prevalence of maternal near miss. Figure 1 shows the individual countries that participated in

the WHOMCS. Implementing a study of this magnitude was a considerable challenge. Internal challenges included, for instance, a relatively small budget and the need to standardise research processes across all research sites. External challenges involved major events such as civil unrest, armed conflict, labour strikes, and disease outbreaks that affected the implementation of the project in some countries; however, the motivation of over 1500 collaborators and the essential contribution of several WHO offices, partners, and donors led to the successful completion of this project.

The first research output of the WHOMCS was published in May 2013. This publication sent a strong message to the international community of researchers, policy makers, and other stakeholders: in order to achieve a sub-

stantial reduction in maternal mortality, it is necessary to adopt a comprehensive approach to emergency obstetric care together with overall improvements in the quality of maternal health care.<sup>5</sup> In parallel with the publication of this first peer-reviewed article, the network carried out a coordinated and decentralised effort to conduct several analyses of the study data set covering a wide range of issues, including social determinants of health, major causes of maternal mortality and morbidity, newborn care, and other aspects of maternal and perinatal health. One commentary and 12 scientific papers have been published in this *BJOG* special supplement dedicated to maternal and perinatal health.<sup>6–18</sup> The main conclusions of these analyses are summarised in Box 1.

This supplement demonstrates the strengths of an effective global collabo-



**Figure 1.** Participating countries and territories (Afghanistan, Angola, Argentina, Brazil, Cambodia, China, Democratic Republic of the Congo, Ecuador, India, Japan, Jordan, Kenya, Lebanon, Mexico, Mongolia, Nepal, Nicaragua, Niger, Nigeria, Occupied Palestinian Territory, Pakistan, Paraguay, Peru, Philippines, Qatar, Sri Lanka, Thailand, Uganda, and Vietnam).

ration of clinicians, researchers, Ministries of Health, and WHO offices. Further efforts will be needed to continue the analytical work of this data set, including the combination of the 2004–2008 Global Survey and the 2010–2011 WHOMCS data sets: together,

these databases have recorded data for more than 600 000 women and their newborns. Nevertheless, beyond the scientific articles, greater efforts will be required to put these findings and other valuable information into action, in order to improve the health of families,

women, and children around the world. While acknowledging the obstacles, we are confident that with focus, persistence, and collaboration, science and health policy can work together to bring better lives to the most vulnerable populations.

#### Box 1. Key findings of 12 secondary analyses of the WHOMCS

##### **Postpartum haemorrhage**

The use of uterotonics for the prevention and treatment of postpartum haemorrhage is widespread among the health facilities participating in this study, yet additional interventions are often necessary for the management of severe maternal outcomes. Even among hospitals that reported the capacity to provide all of the essential interventions, including emergency obstetric services, disparities in the rates of maternal death and other severe outcomes persist.

##### **Pre-eclampsia and eclampsia**

The analysis of this large database provides estimates of the global distribution of the incidence of hypertensive disorders of pregnancy, and information about the most frequent complications (including organ dysfunctions) associated with pre-eclampsia and eclampsia. This information can be used for developing health systems strategies related to the management of severe complications arising from pre-eclampsia and eclampsia.

##### **Abortion**

Young women (<20 years of age), single women, and women undergoing abortions at later gestational ages presented a higher risk of maternal death. The highest burden of abortion-related severe maternal outcomes was seen in low or medium Human Development Index countries.

##### **Indirect causes of maternal mortality**

Indirect causes were responsible for about 20 and 25% of severe maternal outcomes and maternal deaths, respectively. Women with underlying indirect medical conditions during pregnancy had significantly increased risks of obstetric complications, severe maternal outcomes, maternal near miss, maternal death, and perinatal morbidity and mortality.

##### **Adolescent pregnancy**

Adolescent pregnancy is associated with higher risks of adverse pregnancy outcomes. Preventive strategies in early pregnancy, in conjunction with improvement of healthcare interventions, are crucial to reduce adverse pregnancy outcomes among adolescent women in low- and middle-income countries.

##### **Advanced maternal age**

Advanced maternal age significantly increases the risk of maternal near miss, maternal death, and severe maternal outcomes. It also slightly increases the risk of fetal and perinatal mortality.

##### **Maternal education**

Women with lower levels of education are at greater risk for severe maternal outcomes, even after adjustment for key confounding factors. This is particularly true for women in countries that have poorer markers of social and economic development.

##### **Infection and caesarean section**

Prophylactic antibiotic coverage for caesarean delivery may be related to the importance attributed to guidelines and clinical audits in the health facility. There may also be a tendency to use prophylactic antibiotics when caesarean delivery has been scheduled, and the use of antibiotic prophylaxis was already included in the routine clinical protocol.

##### **Intrapartum-related perinatal mortality**

The prevention of intrapartum-related perinatal death goes beyond caesarean section coverage, requiring a comprehensive approach to quality intrapartum care. The majority of perinatal deaths occur in women with complications: early identification and management could improve both maternal and perinatal outcomes. Improving the continuum of care between the community-based antenatal identification of maternal complications (such as pre-eclampsia and severe anaemia) and the quality of intrapartum care is therefore essential.

##### **Twin pregnancy**

The pre-labour caesarean delivery rate for twins varied largely between countries, probably because of the overuse of caesarean delivery in wealthier countries, as well as its lack of availability in low-income countries. Pre-labour delivery may be beneficial when the first twin is non-vertex or when pregnancy has exceeded 38 weeks of gestation.

##### **Preterm birth**

Providing adequate obstetric care, including the optimal timing for delivery in high-risk pregnancies, especially to the socially disadvantaged, could improve pregnancy outcomes. Decreasing provider-initiated preterm delivery in women once maternal complications such as anaemia or hypertensive disorders are present is important for countries at various stages of development, but may be more challenging to achieve.

##### **Neonatal near miss**

Survivors of selected markers of severe neonatal morbidities could be appropriately labelled as neonatal near-miss cases. The definition developed in the present analysis is a basis for future applications in neonatal health.

## Disclosure of interests

The authors declare no conflicts of interest.

## Funding

This study was financially supported by the UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP); Department of Reproductive Health and Research, World Health Organization (WHO); United States Agency for International Development (USAID); Ministry of Health, Labour and Welfare of Japan; and Gynuity Health Projects.

## Acknowledgements

The Multicountry Survey on Maternal and Newborn Health is a research project implemented by the WHO in a global network of health facilities between 2010 and 2011. This project is part of WHO's response to the United Nations Secretary-General's call for action towards improving women's and children's health around the world. In this regard, the WHO is grateful to the extensive network of institutions and individuals who contributed to the project design and implementation, including researchers, study coordinators, data collectors, data clerks, and other partners, including staff from the Ministries of Health and WHO offices. Members of the WHOMCS Research Group are listed in Appendix S1. ■

## Supporting Information

Additional Supporting Information may be found in the online version of this article:

**Appendix S1.** The WHOMCS Research Network.

### JP Souza on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network\*

UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), Department of Reproductive Health and Research,

World Health Organization, Geneva, Switzerland

## References

- Shah A, Faundes A, Machoki M, Bataglia V, Amokrane F, Donner A, et al. Methodological considerations in implementing the WHO Global Survey for Monitoring Maternal and Perinatal Health. *Bull World Health Organ* 2008;86:126–31.
- World Health Organization. The global survey on maternal and perinatal health [www.who.int/reproductivehealth/topics/best\_practices/globalsurvey/en/index.html] Accessed 18 October 2013.
- Souza JP, Gülmezoglu AM, Carroli G, Lumbiganon P, Qureshi Z, WHOMCS Research Group. The World Health Organization Multicountry Survey on Maternal and Newborn Health: study protocol. *BMC Health Serv Res* 2011;11:286.
- World Health Organization. The multicountry survey on maternal and newborn health [www.who.int/reproductivehealth/topics/maternal\_perinatal/nearmiss/en/index.html] Accessed 18 October 2013.
- Souza JP, Gülmezoglu AM, Vogel J, Carroli G, Lumbiganon P, Qureshi Z, et al. Moving beyond essential interventions for reduction of maternal mortality (the WHO Multicountry Survey on Maternal and Newborn Health): a cross-sectional study. *Lancet* 2013;381:1747–55.
- Souza JP, Tunçalp Ö, Vogel JP, Bohren M, Widmer M, Oladapo OT, et al. Obstetric transition: the pathway towards ending preventable maternal deaths. *BJOG* 2014;121(Suppl. 1):1–4.
- Sheldon WR, Blum J, Vogel JP, Souza JP, Gülmezoglu AM, Winikoff B, on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Pospartum haemorrhage management, risks, and maternal outcomes: findings from the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG* 2014;121(Suppl. 1):5–13.
- Abalos E, Cuesta C, Carroli G, Qureshi Z, Widmer M, Vogel JP, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Pre-eclampsia, eclampsia and adverse maternal and perinatal outcomes: a secondary analysis of the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG* 2014; 121(Suppl. 1):14–24.
- Dragoman M, Sheldon WR, Qureshi Z, Blum J, Winikoff B, Ganatra B, on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Overview of abortion cases with severe maternal outcomes in the WHO Multicountry Survey on Maternal and Newborn Health: a descriptive analysis. *BJOG* 2014;121(Suppl. 1):25–31.
- Lumbiganon P, Laopaiboon M, Intarut N, Vogel JP, Souza JP, Gülmezoglu AM, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Indirect causes of severe adverse maternal outcomes: a secondary analysis of the WHO Multicountry Survey on Maternal and Newborn Health. *BJOG* 2014;121 (Suppl. 1):32–9.
- Ganchimeg T, Ota E, Morisaki N, Laopaiboon M, Lumbiganon P, Zhang J, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Pregnancy and childbirth outcomes among adolescent mothers: a World Health Organization multicountry study. *BJOG* 2014; 121(Suppl. 1):40–48.
- Laopaiboon M, Lumbiganon P, Intarut N, Mori R, Ganchimeg T, Vogel JP, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Advanced maternal age and pregnancy outcomes: a multicountry assessment. *BJOG* 2014;121(Suppl. 1): 49–56.
- Tunçalp Ö, Souza JP, Hindin MJ, dos Santos CA, Oliveira TH, Vogel JP, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Education and severe maternal outcomes in developing countries: a multicountry cross-sectional survey. *BJOG* 2014;121(Suppl. 1):57–65.
- Morisaki N, Ganchimeg T, Ota E, Vogel JP, Souza JP, Mori R, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Maternal and institutional characteristics associated with the administration of prophylactic antibiotics for caesarean section: a secondary analysis of the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG* 2014;121(Suppl. 1):66–75.
- Vogel JP, Souza JP, Mori R, Morisaki N, Lumbiganon P, Laopaiboon M, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Maternal complications and perinatal mortality: findings of the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG* 2014;121(Suppl. 1):76–88.

\*See Appendix S1 for a full list of contributors.

- 16** Ganchimeg T, Morisaki N, Vogel JP, Cecatti JG, Barrett J, Jayaratne K, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Mode and timing of twin delivery and perinatal outcomes in low- and middle-income countries: a secondary analysis of the WHO Multicountry Survey on Maternal and Newborn Health. *BJOG* 2014;121(Suppl. 1):89–100.
- 17** Morisaki N, Togoobaatar G, Vogel JP, Souza JP, Rowland Hogue CJ, Jayaratne K, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Risk factors for spontaneous and provider-initiated preterm delivery in high and low Human Development Index countries: a secondary analysis of the World Health Organization Multicountry Survey on Maternal and Newborn Health. *BJOG* 2014;121(Suppl. 1):101–9.
- 18** Pileggi-Castro C, Camelo Jr JS, Perdoná GC, Mussi-Pinhata MM, Cecatti JG, Mori R, et al., on behalf of the WHO Multicountry Survey on Maternal and Newborn Health Research Network. Development of criteria for identifying neonatal near-miss cases: analysis of two WHO multicountry cross-sectional studies. *BJOG* 2014;121 (Suppl. 1):110–8.