Obstetric transition: the pathway towards ending preventable maternal deaths

JP Souza,a,b,c Ö Tuncalp,a JP Vogel,a M Bohren,a,d M Widmer,a OT Oladapo,a L Say,a AM Gülmezoglu,a M Temmerman,a

a 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 b Department of Social Medicine, Ribeirao Preto Medical School, University of Sao Paulo, Ribeirao Preto, Sao Paulo, Brazil c Glide Technical Cooperation and Research, Ribeirao Preto, Sao Paulo, Brazil d Johns Hopkins Bloomberg School of Public Health, Baltimore, ML, USA

Correspondence: JP Souza, Department of Social Medicine, Ribeirao Preto Medical School, University of Sao Paulo, Avenida Bandeirantes, 3900, Ribeirao Preto, Sao Paulo, Brazil 14049-900
Email jpsouza@fmrp.usp.br

Accepted 30 January 2014.

Please cite this paper as: Souza JP, Tuncalp Ö, Vogel JP, Bohren M, Oladapo OT, Say L, Gülmezoglu AM, Temmerman M. Obstetric transition: the pathway towards ending preventable maternal deaths. BJOG 2014; 121 (Suppl. 1): 1–4.

Since the mid-1990s, the world has seen a substantial reduction of maternal mortality.1 Considering that social determinants and health system arrangements play a major role in maternal mortality2, this reduction is important not only because of the number of lives that have been spared in this period (more than 2.5 million maternal deaths averted between 1990 and 2010), but because it indicates that the world is making significant progress towards development and gender equality. However, this progress is still insufficient, unequal and slow: recent estimates suggest that 287 000 women died of causes related to pregnancy and childbirth in 2010.1 Maternal mortality remains a global tragedy, but the observed progress inspires the international community to strive for the elimination of preventable maternal deaths in the decades to come.3

The vast majority of maternal deaths are avoidable and take place in developing countries. In developed countries, the maternal mortality ratio (MMR) may be as low as 10 maternal deaths per 100 000 live births, compared to least developed countries where it may be as high as 1000 maternal deaths or more per 100 000 live births.1 Wide disparities are also observed within countries and when the population is disaggregated by income or education quintiles.2,4 Thus, countries, regions within countries, and population groups within countries are often at different points on the path towards eliminating maternal mortality. Specific, targeted approaches that take this into account could accelerate mortality reductions or possibly make it more cost-effective.

Certain population patterns can be observed during the development of societies over time. In 1929, Thompson described the demographic transition which was characterized by a gradual global shift from a pattern of high mortality and high fertility to a pattern of low mortality and low fertility.5 In 1971, Omram described the epidemiologic transition, with a global shift from a pattern of high prevalence of communicable diseases to a pattern of high prevalence of non communicable diseases.6 Finally, Popkin (1993) proposed the nutritional transition model, which depicts transformations in human diets and the global epidemic of obesity.7 These transitions and other socioeconomic and cultural changes (such as globalization and urbanization) led us to develop the concept of the ‘obstetric transition’. We believe that the concept of obstetric transition is useful to understand the dynamic process of maternal mortality reduction and can function as a conceptual framework to explain the co-existence of different strategies for reducing maternal mortality and to inform policies and programmes at the country and global levels.

Obstetric transition

In connection with the efforts to monitor progress towards the Millennium Development Goals, WHO and partners strengthened the methodology to estimate trends of maternal mortality and its causes, as well as maternal morbidity, and conducted a large Multi-country Survey on Maternal and Newborn Health, with a focus on the prevalence and management of severe maternal morbidities.1,8–10 As a result, improved data related to maternal mortality and severe maternal morbidity became available for the period between 1990 and 2010. Altogether, these data reflect a secu-
lar trend where countries are gradually shifting from a pattern of high maternal mortality to low maternal mortality, from predominance of direct obstetric causes of maternal mortality to an increasing proportion of indirect causes, noncommunicable causes, ageing of the maternal population, and moving from the natural history of pregnancy and childbirth towards institutionalization of maternity care, increasing rates of obstetric intervention and eventual over-medicalization. This is the ‘obstetric transition’ phenomenon, which has implications for the strategies aimed at reducing maternal mortality.

Considering that countries and world regions are transitioning in the same pathway towards elimination of maternal deaths, we describe five stages of obstetric transition (Stages I-V). It should be noted that countries are experiencing this transition at different speeds, and have started this process in different historical time periods: most developed countries began their transitions more than a century ago, while some developing countries have begun their transition more recently (Figure 1). Moreover, countries move through these stages at their own pace.

In Stage I (MMR >1000 maternal deaths per 100 000 live births) most women experience a situation close to the natural history of pregnancy and childbirth, with very little – if anything at all – being done to reduce the risk of maternal mortality at the population level. Stage I is characterized by very high maternal mortality, high fertility and the predominance of direct causes of maternal deaths, together with a substantial proportion of deaths attributable to communicable diseases, such as malaria. As time passes (and progress occurs), no country will remain in this stage. A total of 16 countries have exited Stage I since 1990.1 As of 2010,1 Chad and Somalia are countries where cultural, social and economic factors overwhelm limited efforts to influence the natural history of pregnancy and childbirth and could illustrate this stage.

In Stage II (MMR 999–300 maternal deaths per 100 000 live births) mortality and fertility remain very high, with a similar pattern of causes as in Stage I. However, a greater proportion of women start seeking care at health facilities. Several countries in sub-Saharan Africa, such as Burundi and Cameroon, could illustrate Stage II. For Stages I and II, the critical issue is access to care. In general, these are countries substantially lacking basic infrastructure (such as roads, transportation and health facilities), very low levels of education (particularly female literacy), weak health systems, severe shortages of skilled birth attendants and low capacity to deliver essential life-saving interventions. In this context, poor quality of care functions as a deterrent for generating demand for health services. In countries in these stages, focus should be directed to developing the basic infrastructure (including human resources) and implementing maternal-mortality primary prevention measures (e.g. access to family planning, safe abortion, iron supplementation, insecticide treated nets, and overall collaboration to

![Figure 1. The obstetric transition in selected countries; the size of each bubble denotes the number of children per woman (multiple data sources, free material from www.gapminder.org).](image-url)
remove barriers to accessing the health system). As the minimal infrastructure is developed, health services should strive to deliver quality care in order to become a sensible alternative to pregnant women (demand generation). At Stages I and II, demand and access issues (i.e. first and second delays) are very important and it should also be noted that many countries at these stages have a history of current or recent conflict.

In the obstetric transition, the tipping point occurs at Stage III. In this stage the mortality is still high (MMR 299–50 maternal deaths per 100 000 live births), fertility is variable and direct causes of mortality still predominate. This is a complex stage because access remains an issue for a much of the population, but as a greater proportion of pregnant women start reaching health facilities, quality of care becomes a major determinant of health outcomes, especially with regard to overloaded health facilities. In addition to primary prevention, secondary and tertiary prevention are critical for improving maternal health outcomes in this stage. In other words, quality of care, with skilled birth attendance and appropriate management of complications and disabilities, is essential to reduce maternal mortality. India, Guatemala and Botswana are countries that could illustrate this stage. At this stage, the role of intrahospital issues (i.e. third delay) in maternal mortality becomes gradually more important.

In Stage IV (MMR <50 maternal deaths per 100 000 live births), maternal mortality is moderate or low, there is low fertility and indirect causes of maternal mortality, particularly noncommunicable diseases, acquire greater importance. In order to further reduce maternal mortality, addressing quality of care issues and eliminating delays within health systems are critical measures. Another aspect emerging in this stage is the increasing role of over-medicalization as a threat to quality and improved health outcomes. This stage is illustrated by some Asian countries (e.g. China), some Latin American countries (e.g. Chile), and developed countries in general.

In Stage V, all avoidable maternal deaths are indeed avoided. The MMR is very low, the fertility rate is low or very low, and noncommunicable diseases/indirect obstetric causes are the main causes of maternal mortality. As this is an aspirational, largely theoretical stage at the moment, the maternal mortality levels remain uncertain, but could be lower than five maternal deaths per 100 000 live births. The main issues in this stage would be consolidating advances against structural violence (e.g. gender inequality), effectively managing vulnerable populations (e.g. immigrants and displaced persons) and ensuring the sustainability of quality of care.

It is worth noting that the main purpose of this framework is to illustrate different phases of a dynamic process and offer a rationale for different focuses and solutions for reducing mortality according to the stage in the obstetric transition. The ranges of MMR used to define the proposed stages of obstetric transition are frequently used in country stratification. The threshold of 50 maternal deaths by 100 000 live births (Stage IV) is seen as a possible target for the next cycle of mobilization of the international development community (between 2015 and 2035, following the original Millennium Development Goals project). The boundaries between the proposed stages of obstetric transition are imprecise and one stage tends to fade into another. As observed in other population transitions (e.g. epidemiological transition), progression is not always linear and, largely due to equity issues, different stages often co-exist in the same country.

Conclusion

While maternal mortality remains a global tragedy, recent examples of progress support the notion that ending preventable maternal deaths is possible in the years to come. Countries, regions within countries and subpopulation groups may experience different stages of the obstetric transition, requiring customized strategies to make progress. Promoting social development and equity, together with health system strengthening and improvements in quality of care, are mandatory steps in the quest for a world free of preventable maternal deaths.

Disclosure of interests
The authors have declared that no competing interests exist.

Contribution to authorship
The concept of an obstetric transition was proposed by JPS with contributions from all authors. This manuscript was drafted by JPS and all authors have read, provided comments and approved the final version of this manuscript.

Funding
This manuscript was prepared without any specific funding.

Acknowledgements
The World Health Organization Multicountry Survey on Maternal and Newborn Health Research Network includes countries in various stages of the obstetric transition and various papers included in this BJOG supplement on maternal and perinatal morbidity and mortality illustrate features of the proposed obstetric transition. The authors are grateful to this network for the inspiration and support.
References


