

Sociodemographic and obstetric characteristics of stillbirths in China: a census of nearly 4 million health facility births between 2012 and 2014



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Summary

Background Very little is known about the burden and determinants of stillbirths in China. We used data from a national surveillance system for health facility births to compute a stillbirth rate representative of all facility births in China and to explore sociodemographic and obstetric factors associated with variation in the stillbirth rate.

Methods We used data from China's National Maternal Near Miss Surveillance System between Jan 1, 2012, and Dec 31, 2014, which covers 441 hospitals in 326 urban districts and rural counties. The surveillance aimed to enumerate all maternal deaths and near misses in health facilities, and collected data prospectively for all pregnant or post-partum women admitted to the obstetric department. We restricted the analysis to births of 28 or more completed weeks of gestation or 1000 g or heavier birthweight. We examined the strength of association between sociodemographic characteristics, gestational age, and obstetric complications and stillbirths using logistic regression, taking account of the sampling strategy and clustering of births within hospitals and in cases of more than one birth per woman.

Findings There were 3956836 births and 37855 stillbirths, giving a stillbirth rate of 8·8 per 1000 births (95% CI 8·8–8·9). The stillbirth rate was particularly high for women younger than 15 years of age (59·9 stillbirths per 1000 births), those who had not sought antenatal care (38·3 per 1000), the unmarried (32·5 per 1000), those with no education (26·9 per 1000), or those who had had four or more births (23·2 per 1000). A high proportion (29 319 [78·2%] of 37 514) of stillbirths occurred at gestational ages of younger than 37 weeks, and about two thirds (24 787 [66·1%] of 37 514) were in women without any maternal complication at the time of birth. Of babies born at normal gestations (37–41 weeks), maternal complications substantially increased the risk of stillbirth (odds ratio comparing antepartum or intrapartum complications with no complication 3·96 [95% CI 3·66–4·29]), but only a small proportion (1638 [4·4%] of 37 514) of stillbirths fell into this group.

Interpretation Our analysis of nearly 4 million births in 441 health facilities in China suggests a stillbirth rate of 8·8 per 1000 births between 2012 and 2014. Stillbirths do not feature in the Chinese Government's 5 year plans and most information systems do not include stillbirths. The Government need to start paying attention to stillbirths and invest strategically in antenatal care, particularly for the most disadvantaged women, including the very young, unmarried, and illiterate, and those at high parity.

Funding National Health and Family Planning Commission of the People's Republic of China, National Natural Science Foundation of China, China Medical Board, WHO, and UNICEF.

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Introduction

The Millennium Development Goals have been instrumental in drawing attention to the high burden of maternal and child deaths in low-income and middle-income countries. During the past 25 years, substantial progress has been made in both child survival and safe motherhood, although regional inequalities persist.^{1,2} Stillbirths, by contrast, have been largely ignored in public health debates and programmes, despite the obviously devastating effect that they have on parents. Stillbirths are often not counted in national and international statistics, and the worldwide focus remains on the survival of babies born alive.

Attention has been drawn to the importance of stillbirths, and systematic efforts have been made to ascertain levels and causes. Stanton and colleagues³ reported 3·2 million stillbirths worldwide for 1989, but very few low-income and middle-income countries had usable data. In 2011, Lawn and colleagues⁴ revised the estimates to 2·65 million stillbirths for 2008, with 98% thought to occur in low-income and middle-income countries. Many countries did not have valid data, however, and China, representing more than a fifth of the world's population, was identified as contributing to an important data gap. Nationally representative data for China were not available, and only a dearth of small

Lancet Glob Health 2016;
4: e109–18

Published Online
January 18, 2016
[http://dx.doi.org/10.1016/S2214-109X\(15\)00271-5](http://dx.doi.org/10.1016/S2214-109X(15)00271-5)
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Research in context

Evidence before this study

We searched both English (PubMed) and Chinese (China Biology Medicine, China National Knowledge Infrastructure, Wanfang, and VIP) databases for reports published in English or Chinese with the search terms “stillbirth”, “China”, “死胎”, “死产”, “发生率”, “流行病学”, and “围产儿死亡”, with no date restrictions. The English literature search identified six population-based and four facility-based studies. Only one of the population-based studies reporting stillbirth rates relied on empirical data from a cohort of pregnant women in 20 townships in one rural county in eastern China; all other estimates were model-based. The Chinese literature search resulted in 223 reports mentioning stillbirths, only four of which captured population-based data in restricted geographical areas. Of the 220 studies reporting facility-based stillbirth estimates, 175 were from a single hospital, 18 collected data from two to 30 hospitals, and six reported estimates from more than 30 hospitals. None weighed the data by hospital. Very few population-based or facility-based data exist that can provide representative estimates of stillbirths in China. As a result, reported stillbirth rates are based on statistical models and vary substantially. For example, Stanton and colleagues reported a rate of 24 stillbirths per 1000 births for 1989, WHO estimated the stillbirth rate in 2000 to be 19 per 1000, and Lawn and colleagues reported a rate of nine per 1000 for 2008. The national birth defect surveillance system, which covers about 500 hospitals across the country, suggested unweighted estimates of 13.3 per 1000 between 1988 and 1992, and a

decrease from 15.6 to 9.8 per 1000 between 1990 and 2001. Even less is known about the socioeconomic or obstetric determinants of stillbirths in China. Findings from two hospital-based studies published in Chinese suggest that the causes of stillbirth in China are similar to those found elsewhere, although many stillbirths remain unexplained. One large unpublished study from Zhejiang, a wealthy province in eastern China, suggested that socioeconomic disadvantage, migrant status, and absence of antenatal care were important contributing factors. The study was descriptive, however, and no crude or adjusted relative risks were provided.

Added value of this study

Our analysis presents, for the first time, an empirical estimate of the stillbirth rate in a large sample of county and provincial hospitals across China. By focusing our analysis on sociodemographic determinants and the role of gestational age and obstetric complications, we provide insights into the ways in which health interventions could contribute to further reduction of the number of stillbirths in China.

Implications of all the available evidence

Stillbirth rates are much lower than those in much of Asia, but remain higher than those in high-income countries, despite excessively high caesarean section rates in China. Strategic investments in strengthening of antenatal care for the most disadvantaged women, particularly the very young, unmarried, and illiterate, and those at high parity, are essential to further reduce stillbirth rates in China.

studies reporting population-based stillbirth rates were found.³⁻⁵ As a result, the number of stillbirths for China was inferred from statistical models, with rates varying substantially depending on the data used to inform the models. For example, Stanton and colleagues³ reported a rate of 24 stillbirths per 1000 births for 1989, WHO estimated the stillbirth rate in 2000 to be 19 per 1000,⁶ and Lawn and colleagues⁴ reported a rate of nine per 1000 for 2008.

Even less is known about the causes or determinants of stillbirths than about rates of stillbirths. Direct causes include congenital factors, maternal infection, fetal growth restriction, and placental insufficiency, but most stillbirths have no identified cause.^{4,7} Obstetric complications, such as diabetes, hypertension, dystocia, or antepartum haemorrhage, increase the risk of stillbirth, but most occur in the absence of maternal disorders.⁴ Authors of a systematic review⁷ of risk factors for stillbirths in low-income countries showed that socioeconomic disadvantage and absence of antenatal care were important factors associated with stillbirth, but the number of studies was small and no Chinese studies were identified. Findings from hospital-based studies published in Chinese suggest that the causes of stillbirth in China are similar to those found elsewhere, although many remain unexplained.^{8,9}

Investigators of one large unpublished study⁹ from Zhejiang province suggested that socioeconomic disadvantage, migrant status, and absence of antenatal care were important contributing factors.

In this study, we use data from nearly 4 million health facility births to calculate a stillbirth rate representative of all facility births in China and to explore socio-demographic and obstetric factors associated with variation in the stillbirth rate. Most Chinese women now give birth in health facilities, so a facility-based sample therefore captures most births in China.^{10,11} By focusing our analysis on the role of gestational age and obstetric complications, we provide insights into the ways in which health interventions could contribute to a further reduction of the number of stillbirths in China.

Methods

Data sources

We used data from China's National Maternal Near Miss Surveillance System (NMNMSS) between Jan 1, 2012, and Dec 31, 2014. The NMNMSS was established in October, 2010,¹² in health facilities in the districts and counties included in the National Maternal and Child Mortality Surveillance System.¹³ The National Maternal and Child Mortality Surveillance System was established

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