

Analysis of the causes of maternal death in China*

ZHANG LINGMEI¹ & DING HUI²

Data were analysed on maternal mortality for 1984 in 287 cities, districts, and counties in 21 provinces, municipalities, and autonomous regions of China. The total population covered was 177.55 million, and during the study period there were 2 483 269 live births and 1211 maternal deaths, corresponding to a maternal mortality rate of 48.8 per 100 000. The main cause of maternal death was obstetric haemorrhage, followed, in order, by cardiac diseases, toxæmia of pregnancy, hepatic disease, puerperal infection, and amniotic fluid embolism. The health care measures received by the mothers who died are analysed, and methods of reducing the maternal mortality rate are proposed.

Maternal mortality rate is an important index for determining the socioeconomic and cultural status, general health care, as well as the mother and child health care level of a country or an area. In order to ascertain the maternal mortality rates in various areas of China and to analyse the factors that cause such deaths, the Maternal Death Investigation Cooperative Group of China was set up in May 1984. The group covers 21 provinces, municipalities, and autonomous regions in the six principal administrative districts of the country. The maternal mortality rate was investigated by the group using a unified protocol, and proposals were made on improving the health care of mothers and infants in China.

MATERIALS AND METHODS

Method of investigation

The investigation was carried out in areas that were typical of each province, municipality, and autonomous region, and included urban and rural locations in both flat and mountainous parts of the country. The mother and child health workers in the various areas organized the details of the investigation and ensured that a uniform method was used to collect the data. All the data were sent to the Beijing Municipal Maternal Health Institute for analysis and the results reported to the Maternal Death Investigation Cooperative Group.

* Results of a study of 21 provinces, municipalities, and autonomous regions, carried out by the Maternal Death Investigation Cooperative Group of China.

¹ Director, Beijing Municipal Maternal Health Institute, Beijing, China. Requests for reprints should be sent to this author.

² Visiting Doctor, Beijing Municipal Maternal Health Institute, Beijing, China.

Study subjects

Maternal deaths among residents registered in the study areas were investigated using the following definition of maternal death stipulated by WHO and the International Federation of Gynaecology and Obstetrics (FIGO):

—Death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration and the site of the pregnancy, from any cause related to or aggravated by the pregnancy or its management, but not from accidental or incidental causes.

Study areas

The investigation was carried out in the following 21 provinces, municipalities or autonomous regions of China:

—Beijing, Shanghai, Tianjin, Heilongjiang, Liaoning, Hebei, Shanxi, Neimenggu, Sha'anxi, Gansu, Ningxia, Jiangsu, Zhejiang, Jiangxi, Fujian, Hubei, Hunan, Guangdong, Sichuan, Yunnan, and Henan. Altogether 287 cities, districts, and counties were selected as typical areas, covering a population of 177.55 million.

A preliminary analysis of the data on maternal deaths is presented here. A total of 2 483 269 live births and 1211 maternal deaths occurred in 1984 in the study areas.

RESULTS

General

Distribution of residence areas. A total of 46.7% of the maternal deaths occurred among women who

lived on the plains, while 43.4% were from mountainous or semi-mountainous areas and the remainder from other areas.

Economic status. The average family income per person per month of 49.7% of the women who died was less than 20 yuan, that of 39.2% ranged from 20 to 50 yuan, while that of only 8.3% was greater than 50 yuan (1US\$=3.71 yuan).

Educational level. A total of 29.2% of the women who died were illiterate, 35.4% had attended only primary school, and 34.4% junior middle school or above.

Maternal mortality rate

The maternal mortality rate per 100 000 live births was calculated using the relationship:

$$\frac{\text{Number of maternal deaths per annum}}{\text{Total number of live births per annum}} \times 10^5$$

The rate in the areas investigated was 48.8 per 100 000 in 1984—the rate being 24.8 per 100 000 in urban areas and 58.7 per 100 000 in rural areas (Table 1).

The mortality rates differed widely depending on geographical area. For example in Ningxia, Gansu, Henan, and Shanxi the rates were greater than 100 per 100 000; those in Sha'anxi, Yunnan, Hunan, Neimenggu, and Sichuan, 50 per 100 000 to 100 per 100 000; those in Beijing, Tianjin, Hebei, Liaoning, Heilongjiang, Zhejiang, Hubei, Guangdong, Jiangxi, Jiangsu, and Fujian, 20 per 100 000 to 50 per 100 000; and those in Shanghai, less than 20 per 100 000.

In contrast, from 1975 to 1985 the levels of maternal mortality (per 100 000 live births) in some other countries in east and south Asia were as follows:^a

Greater than 100: Burma, India, Indonesia, Pakistan, and Viet Nam.

50–100: Philippines, Sri Lanka, and Thailand.

20–50: Democratic People's Republic of Korea, Republic of Korea, and Malaysia.

Less than 20: Australia, Hong Kong, Japan, New Zealand, and Singapore.

Both the results of the present study and the above-mentioned maternal mortality rates in Asia indicate that such rates are closely related to economic and cultural factors as well as to health care facilities.

^a *Maternal mortality rates, a tabulation of available information*, 2nd edition. Unpublished document, WHO/FHE/86.3.

Table 1. Maternal mortality rates in the areas studied in 21 provinces, municipalities, and autonomous regions of China, 1984

Area	Maternal mortality rate (per 100 000)
Beijing	30.7
Shanghai	17.7
Tianjin	38.9
Heilongjiang	31.9
Liaoning	34.8
Hebei	48.5
Shanxi	101.7
Neimenggu	76.1
Sha'anxi	69.5
Sichuan	77.1
Gansu	101.1
Ningxia	108.2
Jiangsu	30.5
Zhejiang	43.8
Henan	106.6
Hunan	89.4
Hubei	45.0
Jiangxi	46.2
Fujian	42.7
Guangdong	40.1
Yunnan	86.3
Total	48.8

Analysis of causes of maternal deaths

A total of 60.2% of the causes of deaths were reported by hospitals and 39.8% by medical personnel at the primary health care level. Among the hospital diagnoses, only 4.3% were based on autopsy.

Obstetric haemorrhage was the principal cause of death and was responsible for 45.4% of the 1211 maternal deaths in the study. This was followed by cardiac disease (11.1%), pregnancy-induced hypertension (10.6%), puerperal infection (6.5%), hepatic diseases (4.4%), and amniotic fluid embolism (4.2%). Together, these causes constituted 82.2% of maternal deaths (Table 2).

Sequence of causes of maternal mortalities in urban and rural areas. In urban areas the first six causes of maternal deaths, in decreasing order of importance, were: pregnancy-induced hypertension, obstetric haemorrhage, cardiac disease, hepatic diseases, amniotic fluid embolism, and puerperal infection. In contrast, in rural areas the principal causes of such

Table 2. Cause and distribution of maternal deaths in the areas studied in 21 provinces, municipalities, and autonomous regions of China, 1984

Cause of death	No. of deaths
Obstetric haemorrhage	550 (45.4)*
Retained placenta	212 (17.5)
Uterine inertia	125 (10.3)
Ruptured uterus	68 (5.6)
Placenta praevia	41 (3.4)
Injury of birth canal	33 (2.7)
Inversion of uterus	23 (1.9)
Abruptio placentae	21 (1.7)
Blood coagulation dysfunction	13 (1.1)
Other haemorrhages	14 (1.2)
Cardiac disease	134 (11.1)
Pregnancy induced hypertension	128 (10.6)
Puerperal infection	79 (6.5)
Hepatic diseases	54 (4.5)
Amniotic fluid embolism	51 (4.2)
Ectopic pregnancy	23 (1.9)
Other obstetric causes	22 (1.8)
Infectious diseases	34 (2.8)
Blood diseases	21 (1.7)
Gastro-intestinal tract diseases	22 (1.8)
Respiratory diseases	18 (1.5)
Circulatory diseases	12 (1.0)
Urological diseases	8 (0.7)
Endocrine and metabolic diseases	7 (0.6)
Cancer	12 (1.0)
Miscellaneous	11 (0.9)
Unknown	25 (2.1)
Total	1211 (100.0)

* Figures in parentheses are percentages.

deaths followed the order: obstetric haemorrhage, heart disease, pregnancy-induced hypertension, puerperal infection, amniotic fluid embolism, and hepatic diseases. Obstetric haemorrhage accounted for two-thirds of the deaths from the six main causes in rural areas, but in urban areas pregnancy-induced hypertension and obstetric haemorrhage together were responsible for half the deaths (Fig. 1).

Comparison of deaths due to direct and indirect obstetric causes. Direct obstetric causes accounted for 853 and indirect obstetric causes for 358 of the 1211 maternal deaths (ratio of direct to indirect deaths, 2.4 to 1).

Health care received by the women who died

Antenatal examination. Of the 1211 women who died, 764 (63%) had undergone at least one antenatal examination, and of these 37% had had one to two, 33% had had three to four, and 28.4% had had more than five examinations. The mean number of examinations was 3.5 ± 1.9 .

Place of delivery. Of the 1211 deaths recorded, the place of delivery was known in 978 instances. More than half (50.5%) of these deliveries were at home, while 46.9% were in regional hospitals.

Place of death. In the urban areas, a total of 82.0% of maternal deaths occurred in hospital. In contrast, in rural areas, a large proportion of the deaths were at home (31.8%) or on the way to hospital (14.8%).

Attendance at delivery. Of women who died from one of the six principal causes of death, 27 were attended during birth by traditional birth attendants or gave birth without assistance from any health worker.

DISCUSSION

Maternal mortality rate is an important indicator for evaluating both socioeconomic and cultural conditions, the level of mother and child health care, as well as providing information for use in making policy decisions on establishing health services. The results of the present study indicate that in China the focus for improvements in mother and child health care should be on rural areas, remote peripheral districts, and parts of the country where there is a large proportion of national minorities.

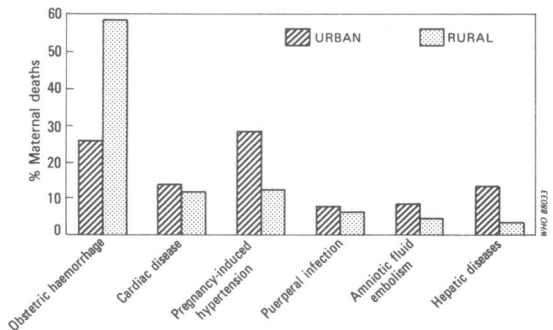


Fig. 1. Distribution of the six principal causes of maternal deaths in 21 provinces, municipalities, and autonomous regions of China, 1984

The results of the analysis of the causes of maternal deaths and their circumstances can be used to establish priorities for the provision of mother and child health care and clinical services. Obstetric haemorrhage was the main cause of maternal death in both urban and rural areas, the proportion of such deaths being considerably higher in rural areas. Also, in these areas it is significant that 31.8% of maternal deaths occurred at home and that 14.8% happened while on the way to hospital. In rural areas of China emphasis should therefore be placed on improving the coverage and service provided by trained health workers at deliveries, on increasing the proportion of

deliveries in hospitals, and on providing women who experience obstetric emergencies at home with the life-saving care they require. In contrast, emphasis in the cities should be placed on improving the quality of obstetric services.

In many instances, the survey indicated that the health care provided to mothers was far from adequate, particularly in the rural and more remote areas. Efforts must therefore be made to enlarge and improve the mother and child health care network, increase the number of personnel engaged in maternal and child health and obstetric care, and improve the quality of the service provided.

RÉSUMÉ

ANALYSE DES CAUSES DE MORTALITÉ MATERNELLE EN CHINE

Le taux de mortalité maternelle est un indicateur important de la situation socio-économique et culturelle, ainsi que du niveau général des soins de santé dans un pays ou une région, et plus particulièrement de la qualité des soins de santé maternelle et infantile. Le groupe coopératif d'enquête sur la mortalité maternelle en Chine, créé en mai 1984 pour analyser la situation dans ce domaine, couvre 21 provinces, municipalités et régions autonomes des six principaux districts administratifs du pays. L'étude des causes de mortalité maternelle qui fait l'objet du présent article a été menée par le groupe à la fois dans des régions urbaines et dans des régions rurales du pays et a porté sur une population globale de 177,5 millions d'habitants. La définition de la mort maternelle utilisée aux fins de l'étude est celle qui a été stipulée par l'OMS et la Fédération internationale de Gynécologie et d'Obstétrique. En 1984 il y a eu au total dans ces régions 2 483 269 naissances vivantes et

1211 morts maternelles, ce qui correspond à un taux de mortalité de 48,8 pour 100 000.

L'hémorragie obstétricale a été la principale cause de mort maternelle, tant en milieu urbain qu'en milieu rural, mais son importance relative a été beaucoup plus grande en milieu rural. D'autre part, dans les régions rurales, 32% des décès se sont produits à domicile et 15% pendant le transport à l'hôpital. Dans ces régions, les efforts devraient viser à améliorer la couverture et la qualité des services fournis lors de l'accouchement par des agents de santé formés à cette tâche, à accroître la proportion des accouchements en milieu hospitalier et à fournir aux femmes qui sont victimes de complications obstétricales à domicile les soins vitaux dont elles ont besoin. Dans les villes, l'accent devrait être mis sur l'amélioration de la qualité des services obstétricaux.