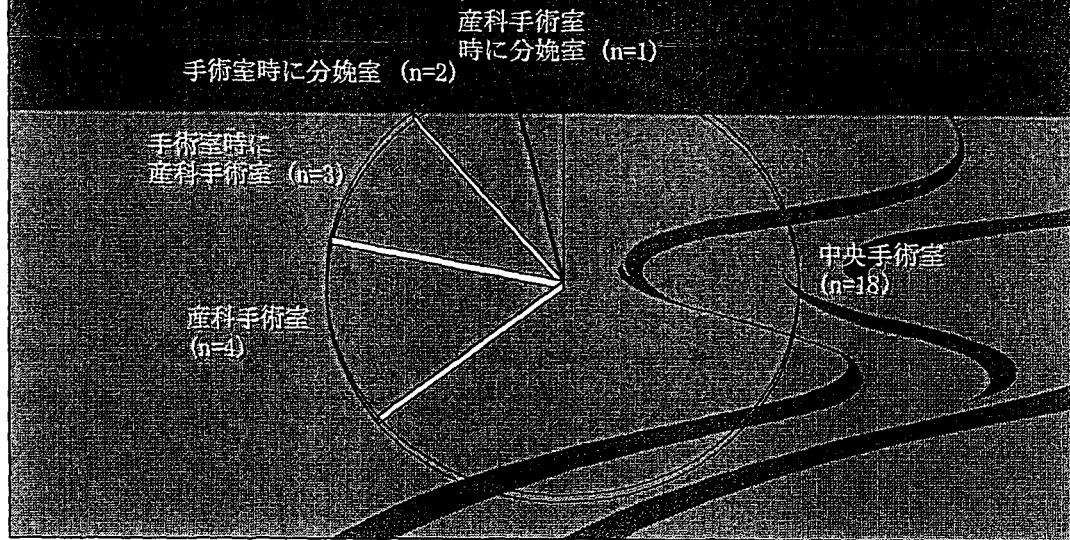


緊急帝王切開の場所



緊急帝王切開の準備に30分以上かかる施設

	日勤帯	夜間帯	日祭日
大学病院	0	0	0
公立病院	0	2	2
その他	2	4	4
計	2	6	6

※ 総合周産期特定集中治療室 (MFICU) 管理の施設基準

帝王切開が必要な場合、30分以内に児の娩出が可能となるよう、医師その他の各職員が配置されていること

小 括

周産期センターでの緊急帝王切開の現状を、28施設の回答から分析

- ・産科医による麻酔 4施設 (14.3%)
- ・分娩室での帝王切開 3施設 (10.7%)
- ・夜間帯や日祭日で、緊急帝王切開の準備に30分以上かかる施設 6施設 (21.4%)

問題と考えられた症例 (公立病院)

症例 : 妊娠34週, 双子第1児遷延性徐脈
帝王切開の場合, 筋弛緩剤等の全身麻酔用薬品が麻酔科管理であったため
麻酔科の到着を待たざるを得ずその間に胎内死亡となった
緊急で行おうとした腰椎麻酔も不成功であった

分娩様式 : 帝王切開
麻酔方法 : 全身麻酔
出生時の状況 : 体重1518g, Apgar score (0-0)
第2児は2,006g, Apgar score (8-9) pH 7.338
予後 : 新生児死亡
コメント : 人的要因 : 麻酔科側
施設要因 : 全麻用の薬剤が麻酔科管理 (金庫) となっていたため,
麻酔科医不在で全身麻酔ができなかった
時間要因 : 麻酔科の到着に時間を要した点
その他 : 最近, 麻酔薬の管理体制が替わっていたことを
確認していなかった

Causes of Maternal Mortality in Japan

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SYSTEMATIC IDENTIFICATION OF factors contributing to adverse events in health care and mechanisms for reducing their occurrence have been used in hospitals, long-term care facilities, and the outpatient setting.¹⁻¹⁰ The need to comprehensively examine factors contributing to maternal mortality in Japan prompted our study of the Japanese obstetrics system.

The obstetrics system in Japan differs greatly from those of European and American countries. First, a distinguishing characteristic of the Japanese system is the low ratio of obstetricians per medical facility.^{11,12} There are approximately 11 000 medical facilities in Japan, including hospitals and clinics, that provide ambulatory or inpatient obstetric services, but only 14 000 obstetricians (including residents), for an average of 1.4 physicians per obstetric

For editorial comment see p 2712.

Context Japan's maternal mortality rate is higher than that of other developed countries.

Objectives To identify causes of maternal mortality in Japan, examine attributes of treating facilities associated with maternal mortality, and assess the preventability of such deaths.

Design and Setting Cross-sectional study of maternal deaths occurring in Japan between January 1, 1991, and December 31, 1992.

Subjects Of 230 women who died while pregnant or within 42 days of being pregnant, 197 died in a hospital and had medical records available, 22 died outside of a medical facility, and 11 did not have records available.

Main Outcome Measures Maternal mortality rates per 100 000 live births by cause (identified by death certificate review and information from treating physicians or coroners); resources and staffing patterns of facilities where deaths occurred; and preventability of death, as determined by a 42-member panel of medical specialists.

Results Overall maternal mortality was 9.5 per 100 000 births. Hemorrhage was the most common cause of death, occurring in 86 (39%) of 219 women. Seventy-two (37%) of 197 deaths occurring in facilities were deemed preventable and another 32 (16%) possibly preventable. Among deaths that occurred in a medical facility with an obstetrician on duty, the highest rate of preventable deaths (4.09/100 000 live births) occurred in facilities with 1 obstetrician. Among the 72 preventable deaths, 49 were attributed to 1 physician functioning as the obstetrician and anesthetist. While the unpreventable maternal death rate was highest in referral facilities, the preventable maternal death rate was 14 times lower in referral facilities than in transferring facilities.

Conclusions Inadequate obstetric services are associated with maternal mortality in Japan. Reducing single-obstetrician only delivery patterns and establishing regional 24-hour inpatient obstetrics facilities for high-risk cases may reduce maternal mortality in Japan.

JAMA. 2000;283:2661-2667

www.jama.com

facility. Second, a majority of facilities do not have anesthesiologists, and 1 physician commonly serves as obstetrician and anesthetist. Third, obstetricians are the only specialists routinely delivering babies. There is virtually no tradi-

tion of family physicians providing obstetric care. Moreover, only about 1% of Japan's nurse-midwives practice independently; they usually function as an assistant to the obstetrician and, with the exception of cutting the umbilical cord,

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are not permitted to perform obstetrical procedures. Finally, while perinatal and infant mortality rates in Japan are the lowest worldwide,¹¹ maternal mortality is relatively high. For example, the reported maternal mortality rates in 1990 for Japan, the United States, United Kingdom, and Canada were 8.6, 8.2, 7.6, and 2.4 per 100 000 live births, respectively,¹³ and absence of cross-checking for deaths from sources other than death certificates in Japan suggests the true rate is even higher.

The Confidential Inquiry into Maternal Deaths Research Group (CIMDRG) was created in 1995 to study ways of reducing maternal mortality. The group investigated the history of each maternal death during a 2-year period, identified factors associated with maternal mortality, and made recommendations for reducing maternal mortality. This inquiry was initiated by the Japanese Ministry of Health and Welfare because of concern about the high rate of maternal mortality in Japan. One of the authors (K.N., director of the group) recruited the 14 additional members based on their expertise and interest in reduction of maternal mortality. The CIMDRG participants only received financial support for research-associated expenses.

METHODS

The group systematically investigated circumstances of known maternal deaths by examining death certificates, scrutinizing the circumstances of each death, and assessing its preventability.

Comprehensive Investigation of Maternal Deaths

Although laws governing vital statistics restrict their use to calculating death statistics, after 9 months of negotiations, the CIMDRG successfully petitioned the Japanese government for permission to examine all maternal death certificates from the study period. Since government approval had been granted to conduct the investigation, approval of institutional review boards of the target hospitals or surrogates was not

sought. All efforts were made to protect participant confidentiality. Cases meeting the *International Classification of Diseases, Ninth Revision (ICD-9)* maternal death definition, "the death of a woman while pregnant or within 42 days of termination of pregnancy, irrespective of the duration of pregnancy or its management, but not from accidental or incidental causes" qualified for this investigation.¹⁴ Death certificates do not require indication of current or recent pregnancy, and no other sources of maternal deaths were identified.

Using the contact information contained in the death certificates, we telephoned the medical facilities that provided medical care to the study participants at any time during the pregnancy; for deaths that occurred outside a medical facility, we contacted the office of the coroner. After explaining the study and obtaining consent for participation by phone, we mailed a questionnaire to the physician, facility representative, or coroner contacted. The 59-page questionnaire contained approximately 600 questions and elicited detailed information about the clinical history of each death, facility characteristics, what personnel participated in the patient's care, and the available daytime and nighttime staffing and laboratory services. Two weeks after mailing the questionnaire, a CIMDRG researcher visited the medical facilities or coroner's office to investigate the case by reviewing the questionnaire and interviewing individuals knowledgeable about the case.

We calculated demographics and maternal mortality rates. Medical facilities were divided into 3 groups: *non-transferring* facilities were sites where patients received all their care in the same facility and died with no history of transfer; *transferring* medical facilities provided initial care, then transferred the patient to a *receiving* facility, where patients ultimately died. Nontransferring hospitals were generally larger than transferring facilities, while receiving facilities were the largest. We examined the distribution of

maternal deaths by facility and pattern of transfer; medical facility characteristics; staffing and facility operating patterns; and availability of laboratory and diagnostic services. We determined the obstetrical characteristics and causes of the maternal deaths.

Preventable Maternal Deaths

The CIMDRG invited national authorities renowned for clinical expertise to participate in a Preventability Assessment Committee. This committee for determining preventability of maternal deaths included 42 medical specialists in obstetrics and gynecology, anesthesiology, neurosurgery, emergency medicine, and pathology. At the outset, the committee determined that a mistake or error must have occurred for an event to qualify as preventable. During four 3-day sessions, the records of all 197 women who received care in a medical facility and died and for whom records were available were reviewed 1 at a time by the committee.

To maximize consistency in evaluation, cases were clustered according to cause of death. The CIMDRG member who investigated the death presented to the committee the case history, physical findings, diagnostic results, autopsy findings, and associated interview data. After in-depth group discussion of each case, each member anonymously voted on the preventability of death for each case. Committee members assigned 1 of 4 preventability categories: (1) impossible to prevent; (2) difficult, but possible to prevent; (3) not difficult to prevent; and (4) indeterminable. For study purposes, the conservative criteria for a preventable death were defined as no committee member selected *impossible to prevent* and at least 70% of committee members chose *not difficult to prevent*. Each committee member assessed for deficiencies in ambulatory and hospital care and whether the care met a basic community practice standard. Seventy percent or more of the committee members had to agree to conclude failure to meet the basic community practice standard.