



ORIGINAL ARTICLE

Nationwide Birth Weight and Gestational Age-specific Neonatal Mortality Rate in Taiwan



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Key Words

low birth weight;
neonatal mortality;
preterm birth

Background: There are limited nationwide data relating to neonatal mortality rate in Taiwan. This study aims to provide updated national birth weight/gestational age-specific neonatal mortality reference rates.

Methods: We abstracted the birth registration database from the Ministry of Interior in Taiwan from 1998 to 2002 and linked the data to the death registration database from the Ministry of Health and Welfare in Taiwan between 1998 and 2003. We included 1,331,785 infants born between 20 weeks and 44 weeks of gestation and weighing within the median \pm 2 interquartile ranges in their age group in this study. We calculated the birth weight/gestational age-specific

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neonatal mortality rates of different genders by birth weight increments of 250 g and at gestational age intervals of 1 week. A Poisson regression model was used in modeling the mortality data.

Results: A total of 4,169 deaths occurred within 28 days of life out of a total of 1,331,785 live births between 20 weeks and 44 weeks of gestation, giving a neonatal mortality rate (0–27 days) of 3.39 per 1000 live births for males and 2.80 per 1000 for females. The infant mortality rate remained higher in the male (5.91 per 1000) than the female (5.10 per 1000) population within the 1st year of life. Birth weight/gestational age-specific neonatal mortality rates were plotted with curves representing the 10th and 90th birth weight percentiles. The risk of an early neonatal death (0–6 days) does not exceed 50% except for female neonates < 500 g and \leq 23 weeks, which implies that the limit of viability is now at 23 weeks for females.

Conclusion: We have provided an easy-to-use birth weight/gestational age-specific neonatal mortality rate chart as a reference document that physicians and parents can use to make decisions based on ethical considerations relating to whether to give palliative care or further invasive management. The normative data are crucial for public health policies on neonatal care in Taiwan.

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1. Introduction

Neonatal and infant mortality rates are indicators of the quality of health and welfare of a society over time.^{1,2} The worldwide estimated infant mortality rates were 35 deaths per 1000 live births in 2012, with the highest rate in Africa (63 per 1000 live births) and the lowest in Japan and Scandinavian countries (2.1–2.4 per 1000).^{3,4} The disparities between populations reflect economic and social conditions affecting the health of mothers and neonates as well as the effectiveness of the medical service system.^{1,2} Taiwan is an emerging developed country and initiated the National Health Insurance Program in 1995 to offer affordable medical care for all residents. The National Health Insurance Program covers over 99% of the population.⁵ Thus, an up-to-date survey of neonatal and infant mortality in Taiwan is a useful way to explore the quality of health care and to make an international comparison.

Factors that affect survival rate in neonates, especially premature infants, include gestational age, birth weight, gender, plurality, and the use of antenatal corticosteroid therapy. Among these, gestational age is the major factor in determining viability. Therefore, the birth weight/gestational age-specific neonatal mortality rate of different genders has been widely employed by health care professionals to identify high-risk pregnancy and neonates requiring observation and special care.^{6–11} In addition to this, it is still difficult to decide upon a viability threshold. A reliable national reference of survival rates for infants < 25 completed weeks of gestation is essential for clinical management.

This study aimed to explore the neonatal and infant mortality rate and establish a birth weight and gestational age-specific neonatal mortality rate chart based on two nationwide datasets, namely the birth certificate registry and death registry datasets.

2. Participants and methods

2.1. Data sources

The Ministry of the Interior in Taiwan supervises the Taiwan birth certificate registry, and all live births in Taiwan must be legally registered. Data include the birthdates of infants and their parents, gestational age at birth, birth weight, gender, parity, place of birth, and parental educational levels. The database has previously been used for epidemiologic research, and the information regarding infants and their parents is of reliable quality.^{12,13}

The death registration data were retrieved from the Ministry of Health and Welfare (formerly the Department of Health) in Taipei city, Taiwan, which monitors the completeness and accuracy of the database. The data contained underlying causes of death, age, sex, and place of death.

We abstracted the birth certificate registry between January 1, 1998 and December 31, 2002 and linked it with the death registry dataset between January 1, 1998 and December 31, 2003. We calculated the number of deaths within 1 year of life for each gender and constructed several graphs regarding birth weight/gestational age-specific early neonatal, neonatal and infant mortality rates by birth weight increments of 250 g and gestational age intervals of 1 week. We defined early neonatal, neonatal, and infant mortality rates as the number of deaths per 1000 live births during Days 0–6, Days 0–27 and within 1 year of age, respectively.

2.2. Study population

We analyzed data from infants born between 20 weeks and 44 weeks of gestation during the period between January 1, 1998 and December 31, 2002. In order to exclude the

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