ORIGINAL ARTICLE

Neonatal Mortality in Yogyakarta Rural Areas

by

ACHMAD SURJONO

(From the Department of Child Health, School of Medicine, Gajah Mada University, Yogyakarta)

Abstract

The outcome of neonatal care was studied in three subdistricts rural areas in Yogyakarta Province with a total population of 112075 people. For data collection all pregnancies and deliveries between May 1983 - April 1984 were registered and visited twice during pregnancy, on delivery, 5 days and one month afterwards by trained health cadres.

There were 1819 singleton livebirth infants with a neonatal mortality rate of 25.3 ‰, in which 82.6% of the deaths occurred in the early neonatal period. An amount of 91.5% of the women delivered in their own house and 83.9% were assisted by a traditional birth attendant either trained or untrained. There was still 27.1% of pregnancies which never got any antenatal care. The coverage of tetanus immunization was 75.2% with 1.1‰ incidence of tetanus. The incidence of low birthweight infants was 8.1%, of which 19.7% died before one month of age, representing 63% of neonatal mortality.

The causes of neonatal deaths were as follows: birth asphyxia and hypoxia 56.5%, prematurity/low birthweight 13%, infection/sepsis 13%, diarrhea 8.7%, tetanus neonatorum 4.4% and others/unknown 4.4%.

In rural areas, traditional birth attendants play a key role on assisting labour and taking care of the mothers as well as their newborns up to one month of age. Improvement of health service delivery at all levels of the health care system which includes the traditional birth attendants is needed especially concerning resuscitation of the newborns and the problems of low birthweights.

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Introduction

Mortality is used as indicator of the quality of neonatal care in a given area because it is a definite event and can be recorded with certainty. Also the probable cause of death can be diagnosed more accurately than its cause of morbidity.

Strong evidence exists that the high level of infant mortality (death under 1 year of age) in many developing countries are closely related to perinatal events. A reduction in infant deaths is therefore highly dependent on the effective management of pregnancy, delivery and neonatal care (Puffer and Serrano, 1973).

The Indonesian National Health System has given a great priority to reducing infant mortality. The size of neonatal mortality (deaths under 30 days of age) contributes to the figure of infant mortality. Based on the result of the national household survey (1980) the neonatal mortality rate was estimated 40.3‰ (Budiarso, 1980). Prospective study on the incidence of neonatal deaths is few. Handayani et al. (1983) reported a neonatal mortality rate of 30‰ in a rural village of Yogyakarta. Another study in a subdistrict of West Java showed a figure of 51.6‰ (Alisjahbana et al., 1983).

The purpose of this report is to present the result of a prospective study on neonatal care in Yogyakarta rural areas and to find out some associated factors and the probable leading cause of death. The result will give some indications for further study on preventive programmes for reducing the neonatal mortality as well as stimulating improvement in neonatal care.

Materials and Methods

The study was conducted in three rural subdistricts (15 villages) with a total population of 112,075 people. Their location were in South (Pandak), West (Pengasih) and North (Turi) direction respectively from Yogyakarta city, at about 20-25 kilometers distance. In each subdistrict there was a health centre, led by a medical doctor. Other health personnels were 1-2 midwives, 1-2 nurses and 8-12 auxillaries.

All pregnancies and deliveries occurring between May 1983 up to April 1984 were included in this study. The cases were visited by trained voluntary health workers (two local persons for each village) at least 5 times for data collections: twice during pregnancy, in labour, 5 days and 1 month after delivery.

The collected data consisted of pregnancy history, biological data, delivery and neonatal conditions. Checking of the validity and consistency of the data was done by direct supervision (regular 2-weekly meeting), double cross-examination, indirectly from village administration record and from the data form submitted. Special attentions for neonatal-data were given to the accuracy of pregnancy history (number of antenatal visit, tetanus immunization, last menstrual period, age of the pregnant women) and of the birthweight. Salter baby weighing machines were used for obtaining the birthweight.

Neonatal data collections were conducted by female voluntary health workers, 34 persons for 15 villages. They belonged to and stayed in the village studied. They were recruited from nutrition health cadres, field family planning workers and traditional birth attendants. They registered and monitored the fate of pregnancies up to the neonatal period. Training had been performed starting before the beginning of the study and continued during the study period. Any completed neonatal data were reviewed on regular meetings. These activities were done to minimize any error of the study.

If there was any death, the midwife or the doctor will visit the family to get information of the signs and symptoms that had recurred to find out the probable underlying cause of death.

Results

During one year of study there were 1819 singleton live births and on 30-day follow-up 46 infants died. The neonatal mortality rate (NMR) was 25.3 per 1000 live births. Of the neonatal deaths 52.1% and 82.6% occurred in less than 24 hours after birth and during the early neonatal period (less than 1 week of life) respectively.

Table 1 : *Neonatal mortality of low birthweight infants*

Birthweight	Number	Death	%
< 2500 gram	147	29	19.7
⩾ 2500 gram	1672	17	1.02

The incidence of low birthweight infants was 8.1%. Case fatality rate was 19.7% and represented 63% of the neonatal mortality. The relative risk of death of low birthweights was 19 times compared to those with birthweights more than 2500 gram group (table 1). It was noted that only 64% of weight could be obtained before 4 hours after delivery and the remaining infants were estimated from 5 days body weight.

Table 2 : *Distribution of liveborn and neonatal death by parity*

Parity	Number	%	Death	‰
1	649	35.7	16	24.65
2	429	23.6	11	25.64
3	279	15.3	2	7.17
4	173	9.5	5	28.90
5	142	7.8	5	35.21
6	58	3.2	3	51.72
7	44	2.4	2	45.45
8+	45	2.5	2	44.43
Total	1819	100	46	25.3

Table 3 : *Neonatal mortality by group of parity*

Parity	Number	%	Death	‰
1	649	35.7	16	24.65
2 - 5	1023	56.2	23	22.48
6+	147	8.1	7	47.62

Table 2 and 3 showed the percentage distribution of pregnant women by parity and the neonatal mortality. It shows that 25.4% of births belonged to mothers with parity 4 and up. This might be due to the extensive family planning activities in these three subdistricts. There was an increasing NMR with increase in parity beyond the fourth. The group of grand multiparity carried a definitely higher risk of neonatal deaths. The higher risk of primiparity could not be seen.

Neonatal mortality by the age group of the mother is shown in table 4. A great risk of neonatal death can be found in the 20 years or less and the more than 35 years age groups.

Table 4 : *Neonatal mortality by group of age of mother*

Age/years	Number	Death	%
⩽ 20	99	11	11.1
21 - 35	1594	28	1.8
> 35	126	7	5.6

An amount of 91.5% and 83.9% of births were conducted in the mother own house and attended by traditional birth attendants (TBA), respectively (table 5 & 6). Higher risk of death occurred in hospital deliveries because of transfered pathologic cases. A small quantity of cases attended by doctor with greater risk of neonatal death were also due to pathologic and complicated cases after being managed by TBA or midwife.

Table 5 : *Place of delivery and neonatal death*

Place	Number	%	Death	‰
Home	1664	91.5	33	19.83
Hospital	155	8.5	13	83.87

Table 6 : *Neonatal mortality by birth attendant*

	Number	%	Death	‰
T B A	1526	83.9	26	17.04
Midwife	264	14.5	12	45.45
Doctor	29	1.6	8	275.86

There were still 27.1 % of pregnancies which had never got any antenatal care (ANC). There was not much difference for neonatal mortality between the number of antenatal care groups (table 7). The antenatal care was conducted either by midwife or doctor.

Table 7 : *Neonatal mortality by number of ANC*

ANC/times	Number	%	Death	‰
0	493	27.1	14	28.39
1 - 3	771	42.4	19	24.64
4+	555	30.5	13	23.42

Most mothers (75.2%) had ever experienced tetanus immunization during pregnancy, 22.5% once and 52.7% twice. The incidence of tetanus neonatorum in this study was 1.1‰.

Table 8 : *Probable main cause of death and birth weight*

	< 2.5 kg	⩾ 2.5 kg	Total	%
Birth asphyxia-hypoxia	18	8	26	56.5
Prematurity - LBW	6	-	6	13
Infection - sepsis	3	3	6	13
Diarrhea	2	2	4	8.7
Tetanus neonatorum	-	2	2	4.4
Others - unknown	-	2	2	4.4
	26	17	46	100

The probable main cause of neonatal death is given in table 8. Birth asphyxia took account for 56.5%, prematurity or low birthweight 13% and infection 13%. Diarrhea and tetanus neonatorum were found 8.7% and 4.4%.

Discussion

In three rural subdistricts of Yogyakarta the NMR was 25.3 per 1000 live births, comparable to the figure reported by Handayani et al. (1983). These investigators followed the births of 510 neonates in rural areas of a subdistrict, located 15 km North of Yogyakarta city. A double figure of NMR was reported by Alisjahbana et al. (1983) which came from a subdistrict area, located East of Bandung, West Java. In fact this difference might be due to the different rural situation and health care delivery condition.

Birthweight appeared to be an important factor in determining neonatal mortality. Alisjahbana et al. (1983) reported an incidence of 14.7% of low birthweight infants (LBW). This study showed an incidence of 8.1% and represented 63% of the total death. Preventive services in the antenatal period for LBW births and the role of perinatal intensive care in the hospital might affect the contribution of LBW to neonatal mortality rate. These influences could be seen partly on the high mortality of hospital deliveries and births attended by doctors.

The impact of family planning on neonatal deaths was high-lighted. Infants from very young and elderly mothers showed to have a higher mortality. Higher rates were also observed among neonates of the fourth or higher birth orders. The maternal age of child birth, parity together with birth interval play a role on neonatal mortality.

Most deaths occurred during the first seven days after birth (82.6%) and more than 50% of the leading cause of death was birth asphyxia-hypoxia. Evidently the factors responsible for these deaths were linked with pregnancy and the birth process. And again the improvement of antenatal care and birth attendant might lead to a significant reduction of neonatal mortality. As almost 84% of deliveries were conducted by traditional birth attendants (TBA), continued training on delivery management should be emphasized. The TBA's should be able to detect high risk pregnancies and pathological delivery for referral to health centre and hospital. There was still a gap between trained TBA and the health delivery system in these areas. An administration system should be developed for monitoring and continuing education of TBA's. The TBA's still playing a key role in the delivery process and the taking care of mothers and infants up to 1 month in rural areas, should be managed properly by health centres.

The incidence of tetanus neonatorum was 1.1% in these areas with 75.2% coverage of single or twice injection of tetanus toxoid immunization. Alisjahbana et al. (1983) reported an incidence of 17% in the area with 7.3% coverage of immunization. Tetanus and other causes of death (diarrhea, sepsis) are actually preventable.

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