

## ORIGINAL ARTICLE

**Diarrhea in Neonates at the Subdivision of Perinatology Dr. Pirngadi Hospital, Medan**

by

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**Abstract**

*A retrospective study on diarrheal manifestation in newborn babies was conducted at the ward of Neonatology, Dr. Pirngadi Hospital Medan from January to December 1988.*

*There were all 3367 babies hospitalized during the study period. One hundred and thirty five (4.0%) had diarrhea, including 106 (78.5%) babies with birth weights of  $\geq 2500$  gram. Of 2478 babies with spontaneous delivery, 34 (1.4%) babies had diarrhea, while of 889 babies with obstetrical intervention delivery 101 (11.4%) babies had diarrhea. The difference was statistically significant ( $p < 0.001$ ). Of 135 babies with diarrhea, there were 82 (60.7%) with moderate and 31 (23.0%) with severe dehydration. The mortality rate was 47.5% in patients with accompanying diseases and 0.0% in them without. The mortality rate in babies with birth weights  $< 2500$  gr was 37.9% and 16.9% in babies with birthweights  $\geq 2500$  gram ( $p < 0.001$ ). The mortality rate increased with the increase of severity of dehydration ( $p < 0.03$ ).*

### Introduction

Although it is known that only a small number of neonates get diarrhea caused by pathogenic infection, life-threatening diarrhea which is transmitted in the baby room might be explosive (Glasgow et al., 1983; Poernomo et al., 1978). Gastroenteritis in neonates have a special aspect with respect to epidemiology, pathogenesis or clinical view. Many factors are associated with the causes of gastroenteritis in neonates such as infections, carbohydrate and fat malabsorption, allergy to cow milk, and it also may be associated with hyperosmolality of milk formula (Aswitha et al., 1977; Muzief

et al., 1979; Oppusunggu et al., 1984; Effendy et al., 1980). In Indonesia, the incidence and mortality of diarrhea in neonates is high (Mustadjab et al., 1979; Oppusunggu et al., 1984; Poernomo et al., 1978); this is due to the high prevalence of infections and high-risk babies, especially low birth weights (Mustadjab et al., 1982).

This study was designated to assess the variables associated with diarrhea in neonates who were hospitalized at the ward of Neonatology, Dr. Pirngadi Hospital/ Medical School University of North Sumatera Medan in 1988.

### Materials and methods

This study was done retrospectively over-viewing the medical records of babies with diarrhea hospitalized at the ward of Neonatology, Dr. Pirngadi Hospital Medan from 1 January to 31 December 1988. The data collected consisted of gestational period, method term of delivery, sex and birth weight, the onset and duration of diarrhea, degree of dehydration, com-

plications (accompanying diseases) and mortality. The degree of dehydration was assessed by mean of the WHO criteria (Robson, 1983).

In Dr. Pirngadi Hospital there are three wards for neonatal care consisting of two wards for healthy and one for sick neonates.

### Results

In the period from 1 January to 31 December 1988, there were 3367 neonates consisting of 3324 born at Dr. Pirngadi Hospital and 43 born outside who were afterwards hospitalized at the ward of Neonatology of the same hospital. Of those patients, 135 (4%) had diarrhea. Seventy one (52,6%) of the 135 patients with diarrhea

were males and 64 (47,4%) females: 106 (78,5%) had birth weight of  $\geq 2500$  gram, and 29 (21,5%)  $< 2500$  gr. Of the 135 babies with diarrhea, 101 (74,8%) were born by obstetrical intervention of which most was caesarian section composing 87 babies (16,2%) (Table 1).

Table 1 : *Distribution of cases by type of delivery*

Delivery	Number of babies	Diarrhea	%
Spontaneous	2478	34	1.4
Obstetrical intervention :			
- Manual aid	39	1	2.6
- Vacuum extraction	313	13	4.2
- Caesarean section	537	87	16.2
	889	101	11.4
<b>T o t a l</b>	<b>3367</b>	<b>135</b>	<b>4.0</b>

$X^2 = 147.637$

df = 1

p < 0.001

Table 2 : *Mortality of babies with diarrhea by degree of dehydration and birth weight*

Birth weight	Degree of dehydration											
	Mild			Moderate			Severe			Number		
	N	Died	%	N	Died	%	N	Died	%	N	Died	%
$\geq 2500$ gr	17	1	5.9	60	10	16.7	29	7	24.2	106	18	17.0
$< 2500$ gr	5	3	60.0	22	8	36.4	2	-	-	29	11	37.9
<b>T o t a l</b>	<b>22</b>	<b>4</b>	<b>18.2</b>	<b>82</b>	<b>18</b>	<b>22</b>	<b>31</b>	<b>7</b>	<b>22.6</b>	<b>135</b>	<b>29</b>	<b>21.5</b>

$X^2 = 6.937$

df = 2

p < 0.001

Most of those babies (63,0%) had the onset of diarrhea of 4-6 days after birth, none had in the first day. Twenty nine (21,5%) died, where the highest mortality was found in patients with severe dehydration namely in 22,6% (Table 2).

The babies with diarrhea consisted of 19 (14.1%) with gestational age of < 38 weeks, 111 (82.2%) 38-42 weeks, and 5 (3.7%) > 42 weeks. The highest mortality was found in babies with birth weights of less than 2500 gr namely in 11 (37.9%) ( $p < 0.001$ ) while gestational age < 38 weeks was found in 8 (42.1%) babies (Table 3).

Table 3 : Mortality of babies with diarrhea by gestational age and birthweight

Birth weight	Gestational age												N	Died	%
	< 38 wk				38 - 42 wk				> 42 wk						
	N	%	Died	%	N	%	Died	%	N	%	Died	%			
≥ 2500 gr	3	2.8	-	-	98	92.5	18	18.4	5	4.7	-	-	106	18	17.0
< 2500 gr	16	55.2	8	50.0	13	44.8	3	23.1	-	-	-	-	29	11	37.9
Total	19	14.2	8	42.1	111	82.2	21	18.8	5	3.7	-	-	135	29	21.5

Table 4 : Mortality of babies with complicated diarrhea

Accompanying diseases	Number	Died	%
Sepsis	49	28	57.1
Bronchopneumonia	4	1	25.0
Intrapartial infections	3	-	-
Umbilical infections	5	-	-
Total	61	29	57.5

Of the 135 babies with diarrhea, 61 (45.2%) contracted complications. The predominant accompanying diseases were sepsis in 49 (80.3%) and those who were accompanied by sepsis had the highest mortality (57.1%) (Table 4).

Mortality in babies with diarrhea accompanied by other diseases who received milk formula before having diarrhea occurred in 2 (66.7%), while 18 (43.9%) out of 41

babies with pathological delivery who were breast fed plus formula died, and 6 of 7 babies with low-birth-weight and had breast milk plus formula before also died (85.7%) (Table 5).

Table 5 : Mortality of babies with diarrhea accompanied by additional diseases according to the patterns of feeding before contracting diarrhea and predisposing factors

Factors	Breast feeding			Milk formula			Breast feeding + with formula		
	Diarr.	Died	%	Diarr.	Died	%	Diarr.	Died	%
LBW	-	-	-	-	-	-	7	6	85.7
Pathological-delivery	3	-	-	3	2	66.7	41	18	43.9
Normal	-	-	-	-	-	-	7	3	42.9
Total	3	-	-	3	2	66.7	55	27	49.1

## Discussions

The incidence of diarrhea in neonates in Indonesia remains high (Aswitha et al., 1977; Poernomo et al., 1978) and nosocomial origin (Parma et al., 1984; Raid et al., 1984).

Due to lack of adequate data, the exact incidence is unclear though some studies in several centers has suggested some variations. Factors influencing the incidence of diarrhea in neonates includes obstetrical intervention delivery, low-birth-weight (Aswitha et al., 1977; Kamilah et al., 1984; Oppusunggu et al., 1984; Sunoto, 1988) problems of alimentation, allergy, infections (Muzief et al., 1979) and malabsorption (Aswitha et al., 1977). In this study, incidence of diarrhea was 4%; this was different from that found by Kamilah et al., (1983) from Dr. Kariadi Hospital, Semarang and by Asykaruddin et al., who

reported 6.2%, 9.5% respectively. Diarrhea occurred more frequently in babies with birth weights of more than 2500 g, born with obstetrical intervention (15.2%) than in those with birth weights of less than 2500 g, born spontaneously (1.4%). The usage of milk formula in the first days of life plays important roles in the development of diarrhea in neonates (Asykaruddin et al., 1984; Muzief et al., 1979) so that in babies born with intervention delivery early breastfeeding might reduce the incidence of diarrhea (Raid et al., 1982). Diarrhea in neonates usually occurs 3-5 days after birth; in this study 63.0% of patients developed diarrhea at the age of 4-6 days, while Muzief et al., (1979) reported in 58% of babies the diarrhea occurred 5 days after birth and Raid et al., from Medan (1982) reported a figure of 77%. In general, diar-

rheal last only in 2-5 days, though 3-20% may last 5-14 days or longer and may tend to become chronic diarrhea, (Sunoto, 1988). This study suggested that diarrhea occurred predominantly for 3 days (59.3%) and only 0.8% for 12-15 days; these figures are almost similar to the results of a study by Oppusunggu et al., who reported figures of 72.9% and 2.9% respectively. The excessive losses of fluid and electrolytes are common in diarrhea, especially in preterm babies; diarrhea may also cause severe hypovolemia with a high mortality (Glasgo et al., 1983). The mortality of diarrhea in neonates in Indonesia is very high (Poernomo et al., 1978; Raid et al., 1982) and is associated with many factors including the degree of dehydration, low birth weight (Djoti et al., 1984; Sidqi Anwar et al., 1984), and additional diseases that may deteriorate the patient's condition (Oppusunggu et al., 1984; Raid et al., 1982; Soegianto et al., 1979; Sunoto,

1979). The mortality of the low-birth-weights with diarrhea is higher (37.9%) than those of normal birth weights (17.0%), and this is similar with the report of Oppusunggu et al. (1982) who noted 51.4%. Babies born by obstetrical intervention with diarrhea and using milk formula in first day of life produced higher mortalities (66.7%); not one of the babies who had breastfeeding died.

In this study, the mortality was 21.5%; this was lower than those reported by Oppusunggu et al., (1982) who found 29.2%. Babies with diarrhea who died, were those who had additional diseases such as sepsis (57.1%) and bronchopneumonia (0.7%). This was similar to the study of Oppusunggu et al., from Medan (1982) who stated that the mortality was higher (50.5%) in patients with additional diseases than in those without (Raid et al., 1982).

### Conclusion

1. The highest prevalence of neonatal diarrhea is found in babies born with obstetrical interventions.
2. In most of the cases the onset of diarrhea, occurred in day 4-6 and recovered within 3 days.
3. The mortality of diarrhea in neonates was high, especially in babies with severe dehydration, birth weight less than 2500 gr, gestational age less than 38 weeks, and accompanying diseases.

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