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## Five Years Annual Report on Neonatal Diarrheal Outbreaks in Yogyakarta

by

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### Abstract

*To prevent the morbidity and mortality of diarrhea in neonatal nursery units, especially in developing countries, we suggest 3 points to be considered :*

- a) planning of bed capacities according to the need of the surrounding area;*
- b) prompt investigation of the best ratio between babies and nurses to guarantee the best nursing care (Walsh, 1971);*
- c) nurse retraining every 3-6 months.*

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## Introduction

The University of Gadjah Mada Hospital and the Bethesda Hospital, with 700 and 400 beds respectively, are the largest public hospitals in Yogyakarta. Both have served not less than 1700 deliveries each year, which is about 20 percent of the local live birth. Besides, newborns from their own delivery rooms, their 70 cots in the neonatal nursery units have had to tend the handicapped, risk or sick newborns from outside. During many years of experience in the neonatal unit, we observed that diarrhea appeared not infrequently; there might even be an outbreak where death could occur. It is rather difficult to find the etiology, even in developed countries (Ayliffe et al., 1971), but in general we believe that infection from outside is the main cause.

Laboratory examination could not be done very often, except when research projects were carried out, because most of the patients or their relatives could not afford it. Some studies have been made and revealed that lactose intolerance (Surjono et al., 1973), candida albicans (Sadjimin and Surjono, 1974), pathogenic *E. coli* (unpublished data), and pulmonary infection (Streptococcal infection, unpublished data) may be responsible for the infection. The purpose of this report is to show that efforts to handle neonatal diarrheal with better nursing care might be worked out, even with minimal facilities.

## Material and method

Data were taken from the neonatal nursery units (fullterm and low birth weight newborns) of the University of Gadjah Mada Hospital and Bethesda Hospital during 5 years (1971 - 1975). Diarrhea is assumed to be present if the stool passed was more than 6 times a day or if there was one watery stool. These newborns were then observed closely until they recovered. Death by diarrhea was considered if the body weight dropped by more than 10% and the signs of severe dehydration appeared before they died.

### *Treatment*

At the first sign of diarrhea, oral electrolytes composed of sodium chloride, potassium chloride, and glucose were given within the first 6 hours. Before 1972, tea diet was used because electrolyte powders were not available. If the diarrhea decreased diluted milk could be given. However, when the treatment seemed to be unsuccessful and the body weight dropped to nearly 10%, then intravenous drips (dextrose 5% and sodium chloride 0.18%) were given in the range of 150 - 200 ml./kg. body weight in 24 hours and could be prolonged if necessary. Diluted milk was given in the second 24 hours and intravenous fluid was either stopped or decreased. Not very often antibiotics were given (penicillin, penbritin, cloxacillin, polymixin B, etc.); it depended on whether or not the babies had "potentiated infection".

TABLE 2: *Number of diarrheal cases in each hospital per month*

|           | Univ. of Gadjah Mada Hospital |      |      |      |      | Bethesda Hospital |      |      |      |      |
|-----------|-------------------------------|------|------|------|------|-------------------|------|------|------|------|
|           | 1971                          | 1972 | 1973 | 1974 | 1975 | 1971              | 1972 | 1973 | 1974 | 1975 |
| January   | 10                            | 23   | 14   | 19   | 10   | 1                 | 2    | —    | 5    | 15   |
| February  | 8                             | 11   | 10   | 16   | 9    | —                 | —    | 1    | 1    | 15   |
| March     | 7                             | 5    | 12   | 10   | 6    | —                 | 2    | 1    | 1    | 16   |
| April     | 6                             | 9    | 9    | 12   | 2    | —                 | —    | 1    | —    | 3    |
| May       | 5                             | 4    | 8    | 10   | 2    | —                 | —    | 1    | —    | 2    |
| June      | 4                             | 4    | 5    | 6    | —    | —                 | —    | —    | —    | 1    |
| July      | 2                             | 2    | 6    | 7    | 2    | —                 | —    | —    | —    | 1    |
| August    | 3                             | 6    | 5    | 7    | 2    | —                 | —    | —    | —    | 1    |
| September | 6                             | 16   | 10   | 16   | 9    | —                 | —    | —    | —    | 3    |
| October   | 10                            | 16   | 13   | 22   | 8    | 1                 | 1    | —    | 1    | 3    |
| November  | 16                            | 15   | 15   | 23   | 9    | 1                 | —    | 1    | 2    | 7    |
| December  | 13                            | 47   | 17   | 25   | 12   | 1                 | 6    | 1    | 3    | 5    |
| Total     | 90                            | 158  | 124  | 175  | 71   | 4                 | 11   | 6    | 12   | 56   |

TABLE 3: *Report of diarrheal cases in LBW in each hospital*

|             | 1971 |    | 1972 |    | 1973 |    | 1974 |    | 1975 |     |
|-------------|------|----|------|----|------|----|------|----|------|-----|
|             | GMH  | BH | GMH  | BH | GMH  | BH | GMH  | BH | GMH  | BH  |
| No. of LBW. | 195  | 31 | 177  | 43 | 149  | 42 | 216  | 62 | 143  | 115 |
| Morbidity   | 45   | 1  | 68   | 5  | 58   | 1  | 75   | 7  | 25   | 30  |
| Mortality   | 20   | —  | 31   | —  | 37   | —  | 32   | 2  | 5    | 8   |
| % mortality | 44   | —  | 45   | —  | 63   | —  | 42   | 28 | 20   | 26  |

Note: GMH = University of Gadjah Mada Hospital  
 BH = Bethesda Hospital

*The performance of nurse retraining*

In 1974 there was an outbreak in the Gadjah Mada Hospital. This was the reason why nurse retraining was considered necessary. This kind of training included the role of aseptic methods, comprising mainly demonstration how to prepare milk, how to feed, how to clean the room, instruments, baby boxes, how to wash the hands, etc. Most important was that the demonstration be performed by the estimated least unskilled nurse in that unit, and then the others discussed her faults and made some critique. The second topic was to repeat the signs of dehydration and how to handle it.

**Results**

There were 6095 fullterm (FT) and 1173 low birth weight (LBW) babies analyzed in both hospitals, comprising 4516 FT and 880 LBW from the Gadjah Mada Hospital and 1579 FT and 293 LBW from the Bethesda Hospital. Between 1971 and 1974 the morbidity of

diarrhea increased from 94 cases in 1971 to 184 in 1974, then decreased to 125 in 1975 (Table 1). The mortality was only one of 318 FT in 1975 in the Bethesda Hospital. In LBW it was 20 (44%) in 1971, increased to 37 (63%) in 1973, but decreased to 13 (23%) in 1975. The number of diarrheal cases in the Gadjah Mada Hospital as shown in Table 2 increased from 90 in 1971 to 175 in 1974. We considered it an outbreak; then after nurse retraining the incidence decreased to 71 cases in 1975. As shown in Table 3 the peak incidence of diarrheal cases was in 1974 when the cases increased from 45 in 1971 to 75 in 1974. The results of nurse retraining in 1974 are revealed in Table 3 as a drop of diarrheal cases from 75 in 1974 to 25 cases in 1975. The outbreak in the Gadjah Mada Hospital in 1974 was caused by an increased number of admitted LBW (216) as a consequence of overcrowding in the Bethesda Hospital. The mortality in the Gadjah Mada Hospital was 44% (20 cases) in 1971, increased to 63% (37 cases) in 1973, and later dropped to 20% (5 cases) in 1975.

TABLE 1: *Number of newborns, morbidity, and mortality in both hospitals*

|                 | 1971  |     | 1972  |     | 1973  |     | 1974 |     | 1975  |     |
|-----------------|-------|-----|-------|-----|-------|-----|------|-----|-------|-----|
|                 | FT    | LBW | FT    | LBW | FT    | LBW | FT   | LBW | FT    | LBW |
| No. of newborns | 1,365 | 226 | 1,267 | 220 | 1,132 | 191 | 914  | 278 | 1,416 | 258 |
| Morbidity       | 48    | 46  | 96    | 73  | 71    | 59  | 102  | 82  | 70    | 55  |
| Mortality       | —     | 20  | —     | 31  | —     | 37  | —    | 34  | 1     | 13  |
| % mortality     | —     | 43  | —     | 42  | —     | 63  | —    | 41  | 1     | 23  |

### Discussion

From 1971 to 1975 the number of LBW's admitted to the Bethesda Hospital increased from 31 to 115. During that time facilities (paramedical personnel and other equipments) were not much added. The nursery units became overcrowded and this might be considered as impairment of the nursing care. Aseptic measures could not be taken properly, so that diarrheal cases increased from 1 to 30 in 1975 (Table 3). The diarrheal cases in the LBW in the Gadjah Mada Hospital were still high from 1971 to 1975. This was considered a bad planning management in the nursery. Usually this condition could be made better if not more than 12 LBW were admitted to these units.

The aim of the aseptic measures in the neonatal nursery unit is to eradicate the pathogenic organisms, but it is not

always possible as said by Ayliffe et al. (1975). He compared to clean incubator with detergent, water, 1% "savlon", 0.5% aq. hibitane, and 70% alcohol: he only succeeded with 70% alcohol. Nowadays the use of hexachlorophene is restricted to FT only since an increased number of staphylococcus colonies (Hyans et al., 1975) and outbreaks of staphylococcus infection (De Souza et al., 1975) were reported with the use of this agent. The number of diarrheal cases could increase in nursery units in which crowding of susceptible newborn occur. (McCracken et al. 1971).

However, human milk could still prevent the growth of bacteria, especially in digestive tracts (Gunther, 1975). With minimal facilities (without blood examination and other laboratory data) the mortality of future babies could be prevented to nearly 100% by Swietz (1975) when working in Burma.

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