Etiology of Diarrhea in a Neonatal Nursery
Role of Maternal Stool as a Source of Infection for Their Infants

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OBJECTIVES :

1. To correlate maternal with infant rectal flora within three days after delivery.

2. To determine the prevalence and etiology of diarrheal disease in the Phra Mongkutklao Hospital nursery.

BACKGROUND : Previous studies of the Phra Mongkutklao Hospital have described a high incidence of enteric pathogens in mothers at the time of delivery (1, 2). There has been a suggestion that mothers may be a source of enteric pathogens for their infants. The majority of these enteropathogens were enteropathogenic *E. coli*. Serotyping of these *E. coli* was not done adequately nor were isolates tested for toxin production. Therefore, a pilot study (2 months) to include serotyping and tests for toxin production was undertaken.

METHODS : From April 26 until July 6, 1979, stool specimens were collected from 94 mothers and 84 infants (75 infant mother pairs). Stool specimens (1-3/infants) were also collected from 18 infants with diarrhea, in half of whom we were able to collect matching maternal specimens. Sixty stools were collected from 34 nursing personnel (26 twice) to determine if they were a source of enteropathogens.

Specimens were screened for *Salmonella*, *Shigella*, and enteropathogenic *E. coli* (EPEC) (by heating and retesting agglutinating isolates in the EPEC pools). Ten lac (+) colonies were picked from each culture and were tested for heat-labile toxin (LT) and heat-stable toxin (ST) in the Y-1 adrenal and suckling mouse assays (3, 4).

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RESULTS :

1. The incidence of diarrhea was 4.6 per cent (18/390) among the infants in the nursery during the study period.

2. Only one of 74 infant mother pairs shared the same enteropathogen (EPEC 0127a:K63).

3. Rotavirus was found in 1/18 infants with diarrhea but not in the mothers' stools.

4. Tox *E. coli* was isolated from 22 per cent (4/18) of infants with diarrhea, but was not present in the mothers' stools.

5. *Shigella* were isolated from three nurses - 9 per cent (3/34)

6. *Campylobacter* (1/18) and *EPEC* (4/18) were isolated from infants with diarrheal stools. EPEC were isolated from 3/67 infants and 32/94 mothers without diarrhea. There was no statistical difference between the isolation rate of EPEC from infants with diarrhea and well controls. *Campylobacter* were not found in asymptomatic individuals. *Yersinia enterocolitica* were not found in this study population.

REFERENCES

1. Chiraphun, D. et al. Prepartum rectal bacterial flora: Phra Mongkutklao Hospital, Bangkok, Thailand. Annual Report, AFRIMS, Bangkok, 1977.

2. Crum, J. et al. Maternal rectal and vaginal flora associated with infant colonization and its relationship to diarrhea. Annual Report, AFRIMS, Bangkok, 1978.

3. Sack, D.A., and Sack, R.B. 1975. Test for enterotoxigenic *Escherichia coli* using Y-1 adrenal cells in miniculture. Infect. Immun. 11: 334-336.

4. Dean, A.G., Ching, Y.C., Williams, R.G. et al. 1972. Test for *Escherichia coli* enterotoxin using infant mice: application in a study of diarrhea in children in Honolulu. J. Infect. Dis. 125: 407-411.

Enteric Infection in a Neonatal Nursery, Army Hospital

Etiology of neonatal diarrhea

Total infants studied 84 cases.
Infants with diarrhea = 18 cases (21.5%)
no diarrhea = 66 cases (78.5%)

Causes of diarrhea

Campylobacter jejuni 1
Enterotoxigenic E. coli (ST+) 1 (10 B-D 1)
(LT+) 3 (24 B-D 2, 3, 81 B-D 1, 99 B-D 2)

Among 18 diarrheal infants, 9 (50%) mothers' stools were examined while another 9 cases (50%) were not cultured (because the infants' developed symptoms after mothers were discharged)

9 pairs of mothers and diarrheal infants.

1.	7M	EPEC 0125:K70; 0127:K63 *V. parahaemolyticus* *Pl. shigelloides*	7B, 7B-D1, 7B-D2, 7B-D3
2.	10M	EPEC 0127a:K63	10B EPEC 0128:K67 10B-D1 *Enterotoxigenic E. coli* (ST+)
3.	23M		23B-D1
4.	34M	EPEC 020a 020b:K84 *A. hydrophila*	34B-D1, B-D2, B-D3
5.	44M	EPEC 020a 020c:K61 *A. hydrophila*	44B, B-D1, B-D2, B-D3 } - *Campylobacter*
6.	45M		45B, B-D1, B-D2, B-D3
7.	60M	*Pl. shigelloides*	60B-D1, B-D2
8.	95M		95B-D1, B-D2, B-D3
9.	99M		99B-D1 B-D2 *Enterotoxigenic E. coli* (LT+) B-D3

9 diarrheal infants, no mothers' specimens

1. 24 B-D1 -
   B-D2 *Enterotoxigenic E. coli* (LT+)
   B-D3 " *E. coli* (LT+)

2. 37 B-D1 -
   B-D2 -
   B-D3 -

3. 50 B-D1 -
   B-D2 -
   B-D3 -

4. 65 B-D1 -
   B-D2 -
   B-D3 -

5. 66 B-D1 -
   B-D2 -
   B-D3 -

6. 71 B-D1 020a 020c:K61
   B-D2 020a 020c:K61
   B-D3 -

7. 73 B-D1 020a 020c:K61
   B-D2 020a 020c:K61
   B-D3 -

8. 77 B-D1 020a 020c:K61
   B-D2 020a 020c:K61
   B-D3 020a 020c:K61

9. 81 B-D1 *Enterotoxigenic E. coli* (LT+)
   B-D2 -
   B-D3 -

Mothers who were positive with enteropathogens

1. 7M *V. parahaemolyticus* 7B-D neg. for *V. parahaemolyticus*
2. 30M *Sh. flexneri* 30B no diarrhea
3. 48M *S. biafra* (group E2) 48B no diarrhea

REMARKS : Only 1 pair (9M-9B) EPEC 0128:K67 was isolated from both mother and infant (no diarrhea).