
*From the Department of Child Health, Medical School
University of Indonesia, Jakarta.*

Low Lactose Milk (LLM) on Refeeding
of Infantile Diarrhoea

by

SUHARJONO, SUNOTO, ASWITHA BOEDIARSO, SUTOTO
and DADI E.M.

Abstract

Seventeen infants suffering from diarrhoea hospitalized in the Department of Child Health, Medical School University of Indonesia/Dr. Tjipto Mangunkusumo General Hospital from 10 to 31 August 1973 were refeed with LLM, Almiron or SGM. LLM gives good to excellent results in refeeding of infants suffering from diarrhoea.

Nine out of 17 cases were refeed with LLM, where as the other 8 with Almiron or SGM as a control. Result of LLM in stopping diarrhoea was excellent in 5, good in 2, poor in 2 cases. Increase of body weight was excellent in 4 cases, good in none, poor in 5 cases. Results of Almiron or SGM in stopping diarrhoea was excellent in 1 case, good in one, poor in 6 cases. Increase of body weight was excellent in 1 case, good in none, poor in 7 cases.

From these results it is recommended to give low lactose milk as refeeding on patients with infantile gastroenteritis.

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Introduction

Small bowel biopsy from children who fail to thrive after gastro-enteritis often demonstrates histologically the presence of severe partial villous atrophy. This may persist for several months, but the mucosa usually returns to normal without specific therapy (Walker Smith, 1973).

The enzyme lactase is produced and acts in the brushborder of the microvilli. Lactase deficiency in gastroenteritis due to change in villous pattern might cause lactose intolerance. During the last 2 years sugar intolerance has been investigated on 838 Indonesian children with chronic diarrhoea, 22 children with PCM, 50 "healthy" pre-school age children and 32 neonates with post bowel surgery. The results were 52.8%, 86.4%, 72.0% and 21.8% respectively (Sunoto et al., 1973).

In treating Protein Calorie Malnutrition and/or gastroenteritis, a lactose free or lactose - low diet might be more reasonable (Suharjo et al., 1971; Sutedjo et al., 1972).

This paper is dealing with the results of our study on the effect of "low lactose milk" Sari Husada on refeeding of diarrhoeal infants.

Material and methods

Seventeen diarrhoeal infants hospitalized in the Department of Child Health, Medical School, University of Indonesia Dr. Tjipto Mangun-

kusumo General Hospital Jakarta, belonged to this study. We used "low-lactose milk-Sari Husada" (LLM) which contain 0.8% lactose. The main composition of this formula (LLM-Sari Husada, 1973) 1 liter solution is as follows:

— protein	2.4%
— carbohydrate	
lactose	0.8%
dextrin maltose	3.2%
— fat	2.5%
— calories	605

Nine diarrhoeal infants were refeed with LLM and as control of this study we put the other 8 diarrhoeal infants on "Almiron" with a lactose content of 1.0% or on normal formula milk SGM.

The main composition of Almiron (Nutricia, 1966) in 1 liter solution is as follows:

— protein	1.7%
— carbohydrate	
lactose	1.0%
— dextrin maltose	3.6%
saccharose	3.6%
— fat	2.8%
— calories	675

Whereas the main composition of SGM (Sutedjo, 1968) is as follows:

— protein	2.4%
— carbohydrate	7.4%
lactose	3.4%
saccharose	4 %
— fat	1.3%
— calories	514

The follow up of clinical status of diarrhoea and the nutritional status, growth or increase of body weight were evaluated daily until approximately 3 weeks of hospitalization. During the entire trial mostly only milk as the sole food was given.

Results

The criteria of the results used, are as follows:

Excellent

if the increase of body weight within 1 month (4 weeks) divided by the natural optimal increase reflected by body weight and age is more than one.

Example:

A 1 - year - old girl, with a body weight of 5 kg on admission, was hospitalized during 8 weeks. On discharge, the body weight was 7 kg. So the increase of body weight within 1 month (4 weeks) was 1000 gm.

The natural optimal monthly increase of a child with a body weight of 5 kg - regarded as healthy child of the first trimester of age - is 750 gm.

$$\frac{\text{Increase of b.w. (1 month)}}{\text{Optimal increase (1 month)}} = \frac{1000}{750} = > 1$$

The results in this child is considered excellent

Good : if the ratio obtained according to the above mentioned calculations is approximately 1.

Example :

A 2 - year - old boy, with a body weight of 6.5 kg on admission was hospitalized during 8 weeks. On discharge, the body weight was 7.4 kg, so the increase of body weight within 1 month (4 weeks) was 450 gm.

The natural optimal monthly increase of a child with a body weight of 6.5 kg - regarded as healthy child of the second trimester of age is 450 gm.

$$\frac{\text{Increase of b.w. (1 month)}}{\text{Optimal increase (1 month)}} = \frac{450}{450} = 1$$

The results is considered good.

Poor : if the ratio is less than one.

Example :

A 3 - year-old boy, with a body weight of 8.5 kg on admission was hospitalized during 8 weeks. On discharge, the body weight was 9.0 kg, so the increase of body weight within 1 month (4 weeks) was 250 gm. The natural optimal monthly increase of a child with a body weight of 8.5 kg regarded as a healthy child of the third trimester of age is 350 gm.

$$\frac{\text{Increase of b.w. (1 month)}}{\text{Optimal increase (1 month)}} = \frac{250}{350} = < 1$$

The results is considered poor.

Table 1 shows the effect of LLM in diarrhoeal infants.

On diarrhoea : Excellent on 4 out of 9 patients, good on 2 out of 9 patients and poor on 2 out of 9 patients.

On growth (increase of body weight) : Excellent on 5 out of 9 patients, good on none and poor on 5 out of 9 patients.

Table 2 shows the effect of Almiron and SGM in diarrhoeal infants.

On diarrhoea : Excellent on 1 out of 8 patients, good on 1 out of 8 patients and poor on 6 out of 8 patients.

On growth (increase of body weight) : Excellent on 1 out of 8 patients, good on none and poor on 7 out of 8 patients.

Table 3 shows the summary of effect of LLM, Almiron and SGM.

Discussion

Disaccharidases are found within the brushborder lining of the luminal surface of the intestinal epithelium (Miller and Crane, 1961) and therefore are liable to be affected in any disorder in which the intestinal mucosa is damaged.

Normally, lactase is present in lower concentration as compared with

other brushborder disaccharidase (Dahlqvist, 1964).

It is also the last to recover completely following mucosal damage (Plotkin and Isselbacher, 1962).

Consequently, lactase deficiency is the most important type of secondary disaccharidase deficiency. Lactase deficiency might cause lactase intolerance. Our study during those last 2 years on 838 children suffering from diarrhoea showed 52.8% with positive lactose intolerance (Sunoto et al., 1973).

In refeeding gastroenteritis, a lactose - low or free diet is recommended. From our present study we got good to excellent results in refeeding gastroenteritis with low lactose milk.

From these patients.

- 1 patient showed an average increase of 900 gm of body weight within 1 month.
- 4 patients showed an average increase of 500 to 650 gm of body weight within 1 month.
- 1 patient showed an average increase of 350 gm of body weight within 1 month.
- 1 patient showed no increase and
- 2 patients showed an average decrease resp. of 950 gm within 21 days of hospitalization and of 450 gm within 6 days of hospitalization.

On the other hand the results of Almiron and SGM to other 8 diarrhoeal infants, were for the majority poor (on diarrhoea 6 out of 8 patients and on growth or increase of body weight: 7 out of 8 patients).

Only 2 patients gave an excellent result on stopping of diarrhoea and also only 1 patient gave an excellent result on growth or increase of body weight, whereas the other 1 remaining patient but none growth or increase of body weight. Average

increase in body weight within one month of these 5 patients refeed with Almiron, or SGM 3 patients increase or varied only from 150 to 500 gm. Only 1 patient gave a good increase, whereas the other 5 patients decreased sharply.

In general, the conclusion drawn from this trial is that LLM in diarrhoeal infants gives significantly better results rather than Almiron or SGM and this might be seriously considered in the management of gastroenteritis.

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TABLE 1 : *Effect of low lactose milk (LLM — Sari Husada) in diarrhoeal infants hospitalized in the Dr. Tjipto Mangunkusumo General Hospital Jakarta*

No.	Name	No. Code	Age (mos)	Body weight on admission (gm)	Duration of trial (days)	Increase of body weight during hospitalization (gm)	Disappearance of diarrhoea (days)	Working Diagnosis	Results		
									E	G	P
1.	T	3a/1	7½	9.200	20	0	2 nd	SI + IG	D	—	Gw
2.	S	3a/2	11	6.900	18	350	2 nd	SI	D.Gw.	—	—
3.	A	3a/3	15	8.200	10	300	4 th	SI + IG	Gw.	D.	—
4.	W	3a/4	3½	5.500	6	-450	1 st	SI	D	—	Gw.
5.	N	4a/1	9	6.200	20	-950	21 st	IG	D.	—	D.Gw.
6.	S	4a/2	6	3.280	19	300	1 st	IG	D.	—	Gw.
7.	S	4a/3	16	6.800	18	200	2 nd	IG	D	—	—
8.	A	4a/4	9	7.200	14	300	11 th	IG	Gw.	—	D.
9.	R	4a/5	13	6.300	12	250	3 rd	IG	Gw	D.	—

S.I. = Sugar Intolerance
I.G. = Infection of the Gut

D = Diarrhoea
Gw = Growth (increase of body weight)

E = Excellent
G = Good
P = Poor

TABLE 2 : Effect of Almiron and SGM on diarrhoeal infants hospitalized in the Dr. Tjipto Mangunkusumo General Hospital — Jakarta.

No.	Name	No. Code	Age (mos)	Body weight on admission (gm)	Duration of trial (days)	Increase of body weight during hospitalization (gm)	Disappearance of diarrhoea (days)	Working Diagnosis	Results		
									E	G	P
1.	F	3b/1	1½	3.450	18	100	16 th	SI + IG	—	—	D.Gw.
2.	E	3b/2	8	7.200	12	300	3 rd	SI + IG	Gw	D	—
3.	M	3b/3	9½	8.200	6	-850	6 th	SI	—	—	D.Gw.
4.	I	4b/1	7	6.300	20	-500	16 th	IG	—	—	D.Gw.
5.	S	4b/2	8	6.300	19	- 50	11 th	IG	—	—	D.Gw.
6.	A	4b/3	3½	4.400	19	310	18 th	IG	—	—	D.Gw.
7.	S	4b/4	15	6.200	13	150	8 th	IG	—	—	D.Gw.
8.	E	4b/5	11	7.900	11	-100	2 nd	IG	D	—	D.Gw.

S.I. = Sugar Intolerance
I.G. = Infection of the Gut

D = Diarrhoea
Gw = Growth (increase of body weight)

E = Excellent
G = Good
P = Poor

TABLE 3 : Summary of Trial of 17 diarrhoeal infants refeed with L.L.M., Almiron and SGM.

Refeeding of milk	D/Gr	Excellent	Good	Poor
L.L.M. (9 patients)	D	5	2	2
	Gr	4	—	5
Almiron (3 patients)	D	—	1	2
	Gr	1	—	2
S.G.M. (5 patients)	D	—	—	5
	Gr	—	—	5

D = Diarrhoea (stopping). Gr = Growth