ORIGINAL ARTICLE

Bowel Habits in Children

Sri Sulastri, M. Iqbal, Johnwan Usman Atan Baas Sinuhaji, A.H. Sutanto

(Department of Child Health, Medical School, University of North Sumatera / H.A. Malik Hospital, Medan)

ABSTRACT A cross sectional study of the bowel habits of 119 children (aged 2 years or less) was performed at PTP VIII, North Sumatera. The study was carried out on Desember 18 and 19, 1992, using questionnaire. Mean frequency of defecation was 1.2 times/day (± 0.49) and median volume of defecation was 25 ml/day. Out of 119 children, 9 children were on fluid diet, the mean frequency of defecation was 1.5 times/day (± 0.71) and the median volume of defecation was 5 ml/day. Eighty-eight children who were on fluid diet plus solid diet had a mean frequency of defecation 1.1 times/day (± 0.48) and median volume of defecation was 25 ml/day. Twenty two children who received solid diets had a mean frequency of defecation of 1.2 times/day (± 0.35) and median volume of defecation was 57.5 ml/day. The volume of defecation in children who received solid diets was higher than children who had not received solid diets ($p < 0.05$). There was a positive corelation between age and stool volume ($r=0.4$; $p < 0.05$). **[Paediatr Indones 1995;35:41-46]**

Introduction

Normal defecation in infants and adults is influenced by age, diet, medication, and the presence of disease.[1] Young babies who receive only breast feeding will have a higher frequency of defecation than those who receive milk formula, but the stool consistency is normal.[2] Moreover, the patterns of defecation will vary from one to other areas or communities. Pattern of defecation implies the frequen- cy, volume, consistency, color, and smell of stool excreted daily.[3-5]

The pattern of defecation in children in developed countries has widely been studied since the last 50 years, so that definitions of normal defecation based on age groups have been made.[1] In a study by Nyhan in 800 American babies of the United States, 400 of them were breast fed and the remaining received milk formula for one week of their life. The frequency of defecation in 97% of those

Accepted for publication: March 22, 1994. Author's address: Sri Sulastri, MD. Dept. of Child Health, Medical School, University of Sumatera , Jalan Bunga Lau, Medan, Indonesia.

babies was 1-9 times per day.[1] Another study demonstrated that diets with high fibres in babies of developing countries resulted in high frequency of defecation.[6] This study aimed to find out bowel habits in children aged 2 years or less.

Methods

This study was conducted cross-sectionally by using designed questionnaires in PTP VIII (a plantation), Balimbingan, North Sumatera. PTP VIII is located ± 15 km from Pematang Siantar or 142 km from Medan. The PTP VIII Balimbingan covered areas of 12633 acres with a population of 7356. PTP VIII was divided into 16 units comprising of office, technical, factory, A, B, C, D, E1, E2, F, G, H, J, K, L and hospital units.

The study subjects were obtained from all children of 2 years old or less who came from each unit. The study was done on December 18 and December 19, 1992 adjusted to the schedule of Pos- yandu (integrated service unit) activity. Interview was performed to parents of children aged 2 years or less who were apparently healthy or who only had minor disease. Children with diarrhea or reported diarrhea were excluded from this study, while the children with mild or non- serious disease such as cough, cold, eye shores, and skin diseases were included. Based on the children's diet, the subjects were grouped into one of 3 categories, i.e., (1) children who were only on liquid diet (breast feeding, milk formula, or breast feeding plus milk formula; (2) children who were on liquid plus solid diet, (3) children who were only on solid diet.

The characteristics of defecation and stool were obtained, namely frequency, consistency, color, and volume of children's stools. The parents were asked to give information about their children's defecation for the last three days and the average was recorded as daily habit of defecation. The estimated measures for defecation used in this study were a grape (5 ml); a small sausage (25 ml); or large sausage (40 ml).

Statistical analysis was done by using chi-square test and regression analysis by a Microstat computer software with the significance level of $p = 0.05$. Mantel Haenszel chi-square test is applied in order to find out the relation among the qualitative variables while other factors as the control.

Results

Out of 203 children studied, as many as 122 came to Posyandu whose parents having been interviewed. But, only 119 children were included in this study because 3 children had diarrhea. Median volume of tool in 119 children of 2 years old or less was 25 ml/day (Table 1).

In 119 children of 2 years of age or less, the mean frequency of defecation was 1.2 times/day (±0.49) and the highest frequency was found in children of 15-16 months (Table 2). No correlation between the age and frequency of defecation was found in these children.

Significant difference was found between diets and stool volume ($p<0.05$) (Table 3). However, no significant correlation between diet and frequency of defecation was seen in these children ($p>0.05$) (Table 6). Children who received solid diet were seen to have a higher stool

Table 1. Age and stool volume

Age (mo)	No of subjects	Volume (ml/day)	
		Median	Range
0-	8	20.5	10.0-40.0
2-	15	10.0	5.0-50.0
4-	13	25.0	3.3-56.6
6-	9	20.0	8.3-133.3
8-	10	5.0	5.0-58.3
10-	7	25.0	10.0-41.6
12-	9	25.0	4.0-80.0
14-	8	25.0	5.0-41.6
16-	14	40.8	10.0-83.3
18-	12	32.5	23.3-53.3
20-	6	40.0	25.0-80.0
22-	8	26.5	21.6-106.6
Total	119	25.0	3.3-133.3

Table 2. Age and frequency of defecation

Age (mo)	No of subjects	Frequency (X/Day)	
		Mean	SD
0-	8	1.40	0.91
2-	15	1.26	0.63
4-	13	1.32	0.65
6-	9	1.17	0.53
8-	10	1.05	0.25
10-	7	0.92	0.41
12-	9	0.97	0.31
14-	8	1.92	0.39
16-	14	1.36	0.48
18-	12	1.40	0.44
20-	6	1.00	0.00
22-	8	1.15	0.50
Total	119	1.20	0.49

volume. The median volume of stool in these children was 25 ml/day (Table 5). The mean frequency of defecation was 1.2 times/day (±0.49) (Table 7).

From data obtained it was found that there was a correlation between age and volume of stool and between diet, and volume of stool. After controlling the age factor by using Mantel Haenszel chi-square test, there was still significant relationship between diet and stool volume (Table 4). Out of 119 children, 82 (68.9%) children had soft stool (Table 7). All children who received breast feeding or breast feeding plus milk formula had soft consistency of stool.

The color of the stools in 100 of 119 children (88.2%) was yellow and all of the children who received breast feeding plus milk formula produced yellow of stools (Table 9). Positive regression was found between the age of children and their stool volume ($r=0.4$; $p<0.05$) (Figure 1).

Discussion

Out of 119 children in this study, 9 children who received breast feeding or breast feeding plus milk formula, the mean frequency of defecation was 1.5 times/day (± 0.71). Eighty-eight children who received breast feeding or breast feeding and milk formula plus solid diets, the frequency of defecation was 1.1 times/day (±0.48). In 22 children who received solid diets, the frequency of defe-

Table 3. Diets and stool volume

Diet	Stool volume (ml/day)			No of subjects
	< 5	6-25	> 25	
B/B+F	3	4	2	9
B/B+M+S	8	53	27	88
S	-	7	15	22
TOTAL	11	64	44	119

$X^2 = 16.52$, df = 4, $p < 0.05$; B = Breast feed; = Milk formula; S = Solid Diet

Table 4. Stool volume based on the age and diet

	< 25 ml/day			> 25 ml/day		
Age (mo)	Diet I	Diet II	Diet III	Diet I	Diet II	Diet III
0-6	6	21	0	2	7	0
-12	1	19	0	0	3	3
-24	0	21	7	0	17	12
Total	7	61	7	2	27	15

$p < 0.05$; Diet I = B/B+F; Diet II = B/B+F+S, Diet III = SD

Table 5. Diets and median stool volume

	Stool volume (ml/day)	
Diet	Median	Range
B/B+F	5	3.3-5
B/B+F+S	25	5-45
S	57.5	50-133.3
Mean	25	3.3-133.3

Table 6. Diets and stool frequency

Diet	Frequency of Stool/Day			No of Subjects
	< 1	-2	> 2	
B/F+F	5	3	1	9
B/F+F+S	66	20	2	88
S	13	9	-	22
Total	84	32	3	119

Table 7. Diets and mean stool frequency and Standard Deviation

Diet	Mean Frequency (X/Day)	StD
B/B+F	1.47	0.71
B/B+F+S	1.14	0.48
S	1.18	0.36
Mean	1.2	0.49

Table 8. Diets and consistency of stools

Diet	Consistency of stools			No of Subjects
	Solid	Soft	Liquid	
B/B+F	-	9	-	9
B/B+F+S	23	62	3	88
S	11	11	-	22
TOTAL	34	82	3	119

Table 9. Diet and colour of stools

Diet	Colour of Stools			Number
	Yellow	Brown	Green	
BF/BF+MF	9	-	-	9
BF/BF+MF+SD	75	11	2	88
SD	21	1	-	22
Total	105	12	2	119

cation was 1.2 times/day (± 0.36), while in 119 children who were studied, the mean frequency of defecation was 1.2 times/day (±0.49).

The study showed no significant correlation between diets and frequency of defecation. A study by Weaver in 240 children of 2-20 weeks demonstrated that

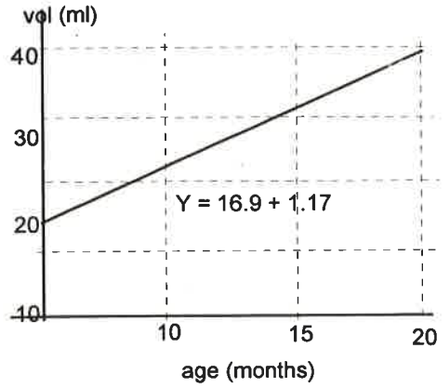

Figure 1. *Regression between the age and the volume of stool*

the increase in age of babies will result in lower frequency of defecation.[7] Median volume of stools in 9 children who received breast feeding or breast feeding plus milk formula was 5 ml/day, while 88 children with breast feeding or breast feeding plus milk formula showed the median volume of 25 ml/day. And in 22 children with solid diet, the median volume of stools was 57.5 ml/day, while the median volume in 119 children in this study was 25 ml/day. This was similar to the result found by Weaver and Steiner in their study so that more children in the age group of 1-4 years old had the stool volume of 5 ml/day and less than 10% with 5 ml/day.[6]

This study showed a strong correlation between age and volume of stools. The same result was reported by Weaver who showed that the increase in age will result in higher volume of stools.[7]

This study also showed strong correlation between the stool volume and diets. And after controlling the age factor, it is apparent that there is still significant relationship between diet and the volume of stool (Table 4). The children with solid diets will have higher stool volume compared with that of those who did not receive such diets.

Consistency of stools in 82 children (68.9%) was soft. This is similar to the result reported by Weaver and other investigator.[6] The study also demonstrates that solid diet significantly change the consistency of stools from soft to solid consistency.

The stool color in 105 children (88.3%) was yellow. This is similar to the report by Weaver from his study in 240 children 2-20 weeks old with breast feeding or milk formula. Ninety-three of these children had yellow stools up to the age of 8 weeks when the start of solid diets begin to change the color of stools from yellow into brown color.[7]

The increase in age will result in higher volume of stools. Solid diet will result in higher volume of stools. No cor- relation exist between the age and fre- quency of defecation. Most of the chil- dren had soft stool consistency and all of the children who received fluid diets had soft stool consistency. The majority of children had yellow stool color and all of the children who received fluid diets had yellow stool color.

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