

Discussion

Data on stool size and consistency are difficult to obtain except in physiological studies of small groups investigated for nutritional or medicinal purposes.² The present study documents the total stool weight of 300 children between the ages of 1 to 4 years from a developing country in Asia. The stools were weighed and their frequencies recorded at home. Previous studies depended on the use of proxy measurements to obtain the consistency and weight of the stools. Weaver and Steiner used questionnaires and a set of plasticine stools of different volumes to help mothers judge the size of their children's stools.¹⁰ The size of the stools were of a grape (5 ml), a small sausage (25 ml), and a large sausage (40 ml). Walker and Walker in their study of bowel behaviour in 275 children used similar pictures.¹¹ Thus the present study had an advantage to recording actual measurements. A seven day study period was also chosen to minimise the variation in bowel habit reported by other workers.

The consistency scale used in the present study is of three categories (soft, hard, and semisolid) and similar to that of other studies.^{10 11} Studies on bowel function in adults have used a wider scale for stool consistency.^{13 14} We did not believe that using a wide scale had any advantage.

Our study has its limitations. Individual stools were not weighed. Stools were weighed either in the morning or in the evening. In a field situation with a portable weighing scale, weighing each stool whenever a child defecates was not practical. We felt that using a seven day study period with twice daily measurement of stools was adequate.

Most (90.3%) of the children defecated once or twice a day. This is consistent with the findings in British children.¹⁰ However, studies from South Africa reported much higher daily frequencies. In a household survey, 44% of children had three or more stools a day.¹² Walker and Walker studied South African children aged 1 to 4 years from rural and urban areas and reported that 9 to 14% of the children defecated three or more times a day and that black children passed stools more frequently than white children.¹¹ Although a decline in daily mean frequency with age has been reported,¹⁰ we did not find this.

The upper values of defecation frequency in a population is important in defining diarrhoeal and non-diarrhoeal states. From hospital records dating back to 1910,¹⁵ acute childhood diarrhoea has been shown to be a major health problem in Myanmar. Diarrhoea is usually defined as watery stools or passing three or more soft stools which take the shape of the container into which they are passed. The findings of our study show only 1% of children with three motions a day, and none with more than three a day, supporting the suitability of the definition of diarrhoea for our population.

Most children in our study passed soft stools. This is consistent with the findings in studies from England¹⁰ and South Africa.¹² In

the present study, the mean weekly total stool weight was 596 g and equates to 85 g a day. It is three times less than that of rural African children (275 g),¹⁶ but comparable with that of African children (age 10–12 years) having a partly Westernised diet whose daily stool weight was 75 g¹² and Canadian children aged 3 to 13 years with 78 g/day.¹³

Recently, women's bowel function has been shown to be different from that of men.¹⁴ Weaver found no significant difference in bowel function in relation to frequency, consistency, and stool weight between boys and girls and our findings agree with this study.¹⁰ The difference in gender may become apparent at an older age where other factors such as hormones, diet, and exercise may change. An effect of diet was not observed in our study.

By describing the normal range of stool frequency, weight, and consistency of a childhood population with a rice based staple diet our findings contribute towards better understanding of constipation and diarrhoea in childhood. They also help in developing definitions to be used in clinical, laboratory, and field studies.

- Schuster MM. Chronic constipation in children: the need for hard data about normal stools. *J Pediatr Gastroenterol Nutr* 1984; 3: 336–73.
- Weaver LT. Bowel habit from birth to old age. *J Pediatr Gastroenterol Nutr* 1988; 7: 637–40.
- Colon AR, Jacob LJ. Defecation patterns in American infants and children. *Clin Pediatr (Phila)* 1977; 16: 999–1000.
- Taylor I. A survey of normal bowel habit. *Br J Clin Pract* 1975; 29: 289–91.
- Connell AM, Hilton C, Irvine G, Lennard-Jones JE, Misiewicz JJ. Variation of bowel habit in two population samples. *BMJ* 1965; ii: 1095–9.
- Nyhan WL. Stool frequency of normal infants in the first week of life. *Pediatrics* 1952; 10: 414–25.
- Lemoh JN, Brooke OG. Frequency and weight of normal stools in infancy. *Arch Dis Child* 1979; 54: 719–20.
- Weaver LT, Ewing G, Taylor LC. The bowel habit of milk-fed infants. *J Pediatr Gastroenterol Nutr* 1988; 7: 568–71.
- Weaver LT, Lucas A. Development of bowel habit in preterm infants. *Arch Dis Child* 1993; 68: 317–20.
- Weaver LT, Steiner H. The bowel habit of young children. *Arch Dis Child* 1984; 59: 649–52.
- Walker ARP, Walker BF. Bowel behaviour in young black and white children. *Arch Dis Child* 1985; 60: 967–70.
- Burkitt D, Morley D, Walker A. Dietary fibre in under- and over-nutrition in childhood. *Arch Dis Child* 1980; 55: 803–7.
- Davies GJ, Crowder M, Reid B, Dickerson JWT. Bowel function measurements of individuals with different eating patterns. *Gut* 1986; 27: 164–9.
- Heaton KW, Radvan J, Cripps H, Mountford RA, Braddon FEM, Hughes AO. Defecation frequency and timing, and stool form in the general population: a prospective study. *Gut* 1992; 33: 818–24.
- Thaung U. Epidemiology of acute diarrhoea in childhood. *Proceedings of the research seminar on acute diarrhoea in childhood*. Rangoon, 27 February 1982. Rangoon (Yangon): Department of Medical Research, 1–20.
- Burkitt DP, Walker ARP, Painter NS. Effect of dietary fibre on stools and transit times, and its role in the causation of disease. *Lancet* 1972; ii: 1408–11.

Commentary

Myo-Khin *et al* have shown that the defecation frequency of Burmese children differs little from that of English children, even though they eat a very different diet. This suggests that in early life, although diet may affect stool size, it has little effect on frequency of bowel actions. Their paper also provides data from which a clearer definition of diarrhoea can be formulated.

The authors are to be congratulated on responding, after almost 20 years, to Burkitt's

appeal for paediatricians to weigh the stools of normal children.¹ In a survey I conducted some years ago among a sample of paediatricians of all grades in the north of England, there was widespread belief that the normal bowel habit of young children could be as frequent as five times a day and as infrequent as three times a week.² However, we got no further than using plasticine models and charts to assess stool volume.

What comes out of the bottom is a crude reflection of what is happening higher up the gut. Nevertheless we continue to talk of 'diarrhoeal disease' even though it is as vague a term as 'tachypnoeic disease' would be to a

respiratory physician. We are badly in need of better measures of gastrointestinal function, and Myo-Khin *et al* have collected useful data on stool frequency, size, and consistency that show the normal bowel habit of healthy children differs little around the world, and that a universal definition of diarrhoea could now be more confidently formulated.

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1 Burkitt DP. Stool weights in western children. *Lancet* 1976; ii: 633.

2 Weaver LT, Steiner H. The bowel habit of young children. *Arch Dis Child* 1984; 59: 649-52.