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**Defaecation pattern in healthy Asian infants**

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## **INTRODUCTION**

The defecation pattern in infants varies widely with age. It describes the frequency, consistency, volume and colour of stool an infant passes daily. A knowledge of normal defaecation pattern in healthy infants in a community is important not only to diagnose or exclude constipation or diarrhoea, but also allowing primary healthcare workers to offer appropriate health advice to parents to avoid inappropriate discontinuation of breastfeeding or adoption of unhealthy feeding practice. Defaecation pattern in infants has been described in both Western and Asian infants. We aimed to describe the defaecation pattern of healthy infants in Malaysia.

## **METHODS**

A cross sectional, observational study was conducted in a well-baby clinic in an urban hospital in Kuala Lumpur, Malaysia over a 4-month period in 2017. We recruited healthy, term or late preterm infants aged  $\leq 12$  months at the time of interview attending the clinic for vaccination and health screening. We excluded infants with conditions which may influence the bowel habits, such as congenital disorders of the gastrointestinal tract, neurological disorders, or hypothyroidism. Consenting parents were provided with a copy of Amsterdam Infant Stool Scale (AISS) and were asked to provide a prospective 3-day bowel diary of the baby.<sup>(1)</sup> A three-day average of defaecation pattern, consisting of frequency, consistency and amount were computed according to the validated AISS.<sup>(1)</sup> Data on basic demographics and feeding types were collected. Ethics approval was obtained from the hospital ethics committee (MREC ID NO: 2016101-4308).

As the defaecation frequency, consistency and amount were not normally distributed, data were expressed in median and interquartile range. Further analyses were performed with non-parametric tests.

## RESULTS

During the study period, a total of 198 infant stool diaries were returned. The response rate was 37% (198 / 534 parents approached). The mean [ $\pm$  SD] age at interview was 6.5 [ $\pm$  3.3] months. More than half (54%) were males. Among infants aged < 4 months, more than half (56%; 28/50) were exclusively breastfed while 16% (8/50) were formula-fed and 28% (14/50) had mixed feeding.

The median [IQR] defaecation frequency among the 198 infants was 1.3 [1.0] times / day (Table I). The median [IQR] daily defaecation frequency reduced with age, from 2.7 [3.0] at 1 month, to 1.7 [1.7] at 2 months, 1.3 [1.3] at 3–5 months, 1.3 [1.0] at 6–8 months and 9–12 months ( $p = 0.081$ ; Fig. 1). Infants who were started on complementary feeding had significantly lower median [IQR] stool frequency compared to those who were not (1.3 [1.0] vs. 1.7 [2.0] times / day;  $p$ -value = 0.007).

Most infants (73.7%) passed soft / formed stool, covering 25–50% (56.6%) of the diaper area according to AISS (Table I).

A sub-analysis of 50 infants aged < 4 months were performed. The median [IQR] daily defaecation frequency of infants who were exclusively breastfed was 2.3 [3.2], which was significantly higher than the frequency among infants who either had mixed or formula feeding (1.0 [0.8];  $p = 0.002$ ; Table II). None of the infant aged < 4 months received complementary feeding.

## DISCUSSION

Average daily defaecation frequency in the literature varies according to different age and the types of feeding. In the present study, we observed that the frequency of defaecation among healthy Malaysian infants who were predominantly breastfed was between 1 to 1.5 times (median 1.3 times) each day. The frequency was highest in the first month after birth (median

2.7 times / day), decreased to 1.7 times / day at second month and thereafter to 1.3 times / day from the third month onward. This pattern is similar to the stool frequency pattern reported among Thai infants, who had a mean stool frequency of 3.2 to 2.3 and 1.7 times / day at 1, 2 and 4 months, respectively.<sup>(2)</sup> Similarly, in India, the mean stool frequency reduced from 4.2 to 3.0 and 1.8 times / day at 0–4 weeks, 1–2 months and 6 months, respectively.<sup>(3)</sup> Camurdan *et al* from Turkey reported a median defaecation frequency of 4 to 3 and 2 times / day among mainly breastfed infants at 1, 2 and 3–12 months, respectively.<sup>(4)</sup> This pattern of defaecation with reducing frequency with increasing age is similarly observed in other Western countries.<sup>(5,6)</sup>

Before the advent of AISS which has been validated, report of stool consistency and volume measurement was rather arbitrary. In the current study, most infants were reported to pass soft stools, similar to other studies.<sup>(2,4)</sup> More significantly, healthy Malaysian infants who were exclusively breastfed had more frequent bowel movements as compared to those who either had a mixed or formula feeding. This finding was consistent with the findings of studies published previously.<sup>(7)</sup>

The strength of our study is that the bowel diary was collected prospectively over a three-day period, thus minimising the potential of recall bias. The response rate was 37% which was below average despite measures were used to contact the parent. The main limitation is that it was a single-centre study from an urban setting. Thus, we are unable to speculate whether similar pattern of bowel habits is observed in rural setting in Malaysia. In addition, the sample size was relatively small.

Nevertheless, the knowledge of defaecation pattern is useful for the purpose of health education to inform parents about defaecation pattern in breastfed infants. The finding of this study also adds to our current knowledge of defaecation pattern of infants in healthy Asian infant.

## ACKNOWLEDGEMENT

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**Table I: Defaecation pattern in 198 healthy Malaysian infants**

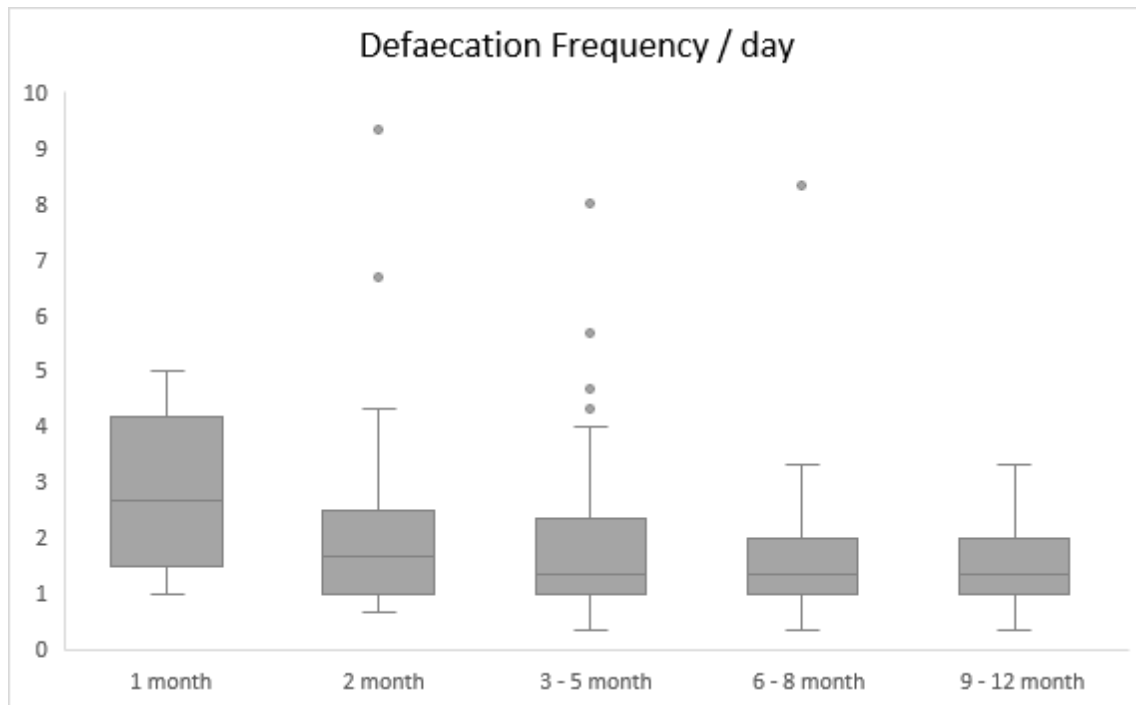
Amsterdam Infant Stool Scale (AISS)	Age (months)				
	n = 198	1 – 2 (n = 30)	3 – 5 (n = 65)	6 – 8 (n = 56)	9 – 12 (n = 47)
Stool frequency, /day					
< 1	18	4	3	5	6
1 – 2	158	18	52	48	40
≥ 3	22	8	10	3	1
Median [IQR], /day	1.3 [1.0]	1.8 [2.5]	1.3 [1.3]	1.3 [1.0]	1.3 [1.0]
Stool amount score (on diaper),					
1, smear	3	0	2	1	0
2, up to 25%	19	1	10	6	2
3, 25 – 50%	112	21	33	27	31
4, >50%	64	8	20	22	14
Median [IQR]	3.0 [0.8]	3.0 [0.6]	3.0 [0.9]	3.3 [1.1]	3.0 [0.8]
Stool consistency score					
1, watery	20	6	9	5	0
2, soft	146	22	50	40	34
3, formed	26	2	5	9	10
4, hard	6	0	1	2	3
Median [IQR]	2.0 [0.0]	2.0 [0.3]	2.0 [0.04]	2.0 [0.2]	2.0 [0.5]

*IQR: Interquartile range*

**Table II: Comparison of defaecation pattern according to type of feeding in infants aged < 4 months.**

Amsterdam Infant Stool Scale (AISS)	Exclusive breastfeeding (n = 28)	Mixed / formula feeding (n = 22)	p-value
Stool frequency, /day, median [IQR]	2.3 [3.2]	1.0 [0.8]	0.002*

\*Mann-Whitney U Test



**Fig. 1** Frequency of defaecation in healthy Malaysian infants according to age  
*\*All outliers receive exclusive breastfeeding.*