

Bowel habits of exclusively breastfed 0-4 month-old babies

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ABSTRACT

Background Exclusively breastfed newborns have frequent bowel movements and sometimes watery stool, which parents or doctors might think as diarrhea.

Objective The aim of this study was to observe the bowel habits of exclusively breastfed infants.

Methods A longitudinal study was done on 100 babies born between November and December 2002 in Cinta Kasih Maternity Hospital. The inclusion criteria were fullterm baby, exclusively breastfed for 4 months, and informed consent from parents. Babies with problems in organ or nerve that influenced the gastrointestinal tract were excluded. Stool frequency, consistency, and color were observed.

Results The mean stool frequency per day were 3 times in the 1st week (95%CI 2.6;3.4), 2 times in the 2nd week (95%CI 1.7;2.3), 1.8 times in the 3rd week (95%CI 1.5;2.1), and 1.5 times in the 4th week (95%CI 1.3;1.7). In the second and third month, it was 1.4 times a day and the fourth month, 1.2 times a day. The consistency of meconium was soft in the first four days. After that, 18% of babies had watery stool, which increased to 30% on day 15-113. In the last week of the fourth month, all babies had soft stool. Meconium was black and lasted for 1-3 days. On the fourth day, the stool became yellow. On day 5-14, 6% of babies had green stool, which increased to 12% on day 15-120.

Conclusion The first week of the first month was the week when the stool frequency was highest compared to the weeks or months after. The consistency of meconium was soft. After it disappeared, most babies had soft stool. Eighteen up to 30% percent of babies had watery stool. Regarding the color, meconium was black and stayed for 1-3 days. After that, most babies had yellow stool and 6-12% had green stool [Paediatr Indones 2003;43:138-142].

Keywords: bowel habit, stool, frequency, consistency, color

In the first week of life, breast milk, especially colostrum, act as a natural laxative and cause frequent bowel movements. Parents with lack of knowledge about this condition often take

their newborn baby to doctors or health workers and a lot of doctors and health workers will diagnose and treat this condition as diarrhea. Besides frequency, one should also consider the consistency and color of the stool to judge whether a baby has a problem in defecation or not.

The first study on bowel habit was from the United States in 1952.¹ After that, most studies took place in European countries, while in the Asia-Pacific region, only Australia and Thailand published their studies. The aim of this study was to observe the bowel habits of 0-4 months old exclusively breastfed babies, especially stool frequency, consistency, and color.

Methods

This was a longitudinal study on 100 babies born between November-December 2002 in Cinta Kasih Maternity Hospital, Ciputat, Banten. The inclusion criteria were fullterm baby, exclusively breastfed for 4 months, and informed consent from parents. The exclusion criterion was baby with problems in organ or nerve that influenced the gastrointestinal tract.

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Stool was defined as a mass with consistency, whether hard (shaped), soft, or watery. If it was watery, it should cover almost half of the surface of the baby's diaper. If it was only a stain, it did not count. Stool frequency was defined as how many times a baby defecates in a day. The color of stool was categorized as black, yellow, and green.

In the pre-study period, all of the health workers in Cinta Kasih Maternity Hospital were trained to fill up a form and evaluate them. During the study period, mothers were motivated to participate and signed the informed consent. After that, the health workers trained the mothers to fill up the form by putting a tick in the appropriate column stating the stool frequency, consistency and color.

To make sure that mothers did it correctly, we asked them to go back to Cinta Kasih Maternity Hospital on day 7 and 14 for baby routine check up and free vaccination performed by the researcher. Besides that, mothers were asked whether they had problems in filling the form, the production of breast milk, and the willingness of the baby to breastfed. In the next month, this procedure was performed by the health workers and they will visit parents who failed to come continuously. This study ended when the baby reached 120 days old. The collected data were processed manually and presented in graphs.

Results

From 100 babies, 79% were the first child in the family and 73% were female.

Frequency

The mean stool frequency in 100 babies can be seen in **Figure 1**.

In the first week of the first month, the mean stool frequency was 3 times a day (95%CI 2.6;3.4) and the peak was on day 3 (4 times a day). In the second week, the mean daily frequency was 2 times (95%CI 1.7;2.3), in the third week, 1.8 times (95%CI 1.5; 2.1), and in the fourth week, 1.5 times a day (95%CI 1.3; 1.7) (**Figure 1**). Individually, there were 63% babies that defecated 4-7 times a day, while 57% of babies defecated once a day and even did not defecate at all.

In the second and third month, the mean daily frequency was 1.4 times (95%CI 1.3;1.5) and became 1.2 times in the fourth month (95%CI 1.1;1.3) (**Figure 1**). Some babies did not defecate for several days (usually 1-6 days) which happened after the first month.

Consistency

In the first four days, when meconium still appeared in some babies, the consistency of stool was soft. Then up to day 14, 18% of babies had watery stool while the others remained soft. On day 15-113, the number of babies that had watery stool increased to 30%. On day 114-120, all the babies had soft stool. (**Figure 2**)

Color

In the first 24 hours, all babies had black stool which was meconium. On the second day, there were 3% of babies whose stool color had already changed to yellow, which means that there were 3% of babies that had

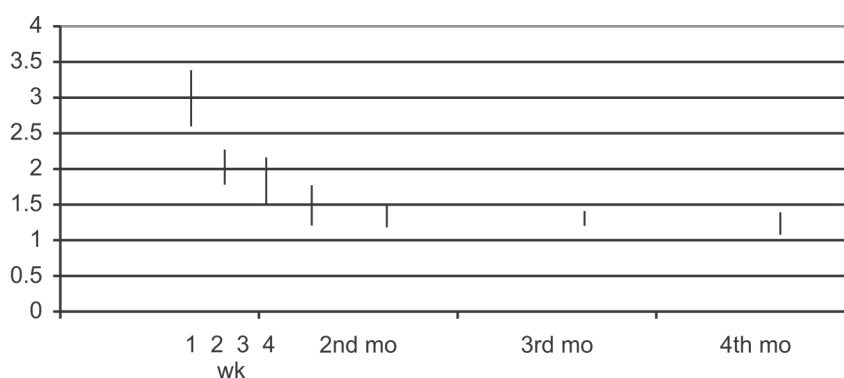


Figure 1. The mean stool frequency in the first up to the fourth month

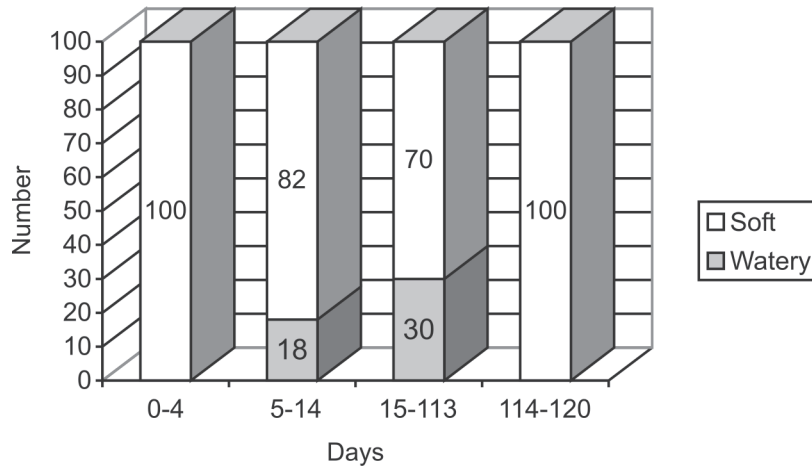


Figure 2. The changing pattern of stool consistency

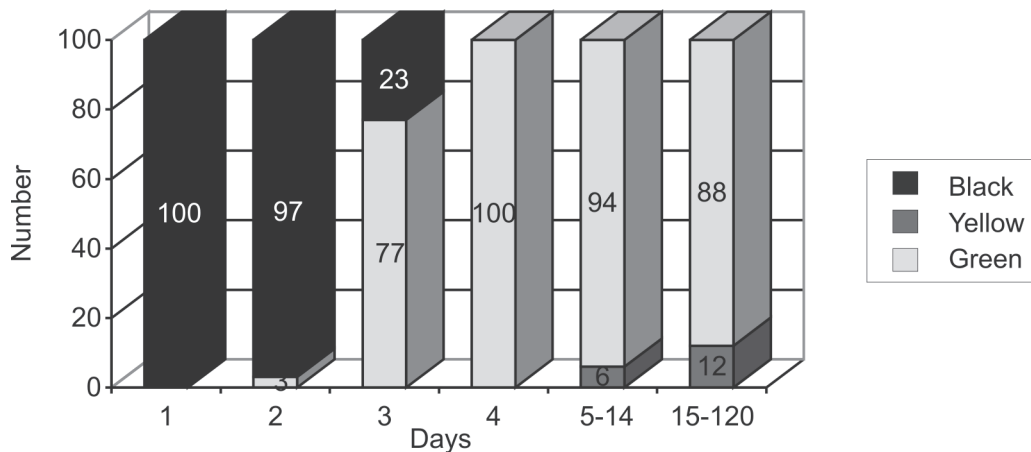


Figure 3. The changing pattern of stool color

meconium for only one day. On the third day, only 23% of babies passed black stool. On the fourth day, all babies had yellow stool. (Figure 3)

From days 5-14, the stool color changed to green in 6% of babies. Until the end of the study (day 120), the number of babies with green stool increased to 12%.

Discussion

Frequency

Nyhan reported that in the first week, the stool frequency peaked on day 5 (4.4 times a day).¹ Wolman reported almost the same result.^{2,3} A study concluded that 95% of babies aged 0-14 days old defecated 2 times a day.⁴ Some babies defecated up to 12 times a day.⁵

Some (2%) did not defecate at all in a day and there was no explanation about what actually caused it.¹

All babies passed stool more frequently in the first week of life than the weeks after. The reason might be related to breast milk, especially colostrum, that can act as a natural laxative.^{6,7} In addition, the function of digestive enzymes is still not optimal^{8,9-11} and some believed that the more frequently we feed a baby, the more frequently the baby will defecate.¹²

A study reported that on day 8-28, the mean stool frequency became 2.2 times a day.² Compared to this study, the number was higher, even if it was counted by weeks. In Figure 1, we can see that the mean frequency decreased parallel with the increase of age, along with changes in breast milk composition. Also, it had something to do with the increase of transit time in the bowel.

Lesne and Triboulet found that the transit time in a baby aged 1-3 months was 8.5 hours and at the age of 4-24 months was 16 hours.^{13,14}

During the second to the fourth month, the mean frequency decreased.³ A study concluded that 94% of babies aged 1-6 months defecated only once a day.⁴ According to the American Academy of Pediatrics and other literature, there are babies that defecate every 4-12 days, even more, in the second up to the fourth month. Parents should not be worried about this condition as long as the abdomen is still soft and the baby is calm.^{5,15} One of the reasons has something to do with breast milk that is 100% absorbed. Besides that, a lot of vegetables consumed by mothers can also play a role in creating the condition, but this still needs to be proven.

Color and consistency

Based on the results of this study, the consistency and color of stool could be divided into three periods of time, that is 0-4, 5-14, and 15-120 days. This actually follows the period of changes in the composition of breast milk, from colostrums to transition breast milk and ended as mature breast milk.

When meconium still appeared, the consistency was soft.^{16,17} After it turned into transition or mature breast milk, the consistency remained soft and in a small number of babies, became watery.^{6,15,16}

Watery stool can be caused by enzymes that are not optimally active.⁸ In this study, in the second up to the third week of the fourth month, the consistency of stool varied between soft and watery. But in the last week of the fourth month, all babies had soft stool which might be a sign that some of the enzymes had already begun to function.

Black colored stool that appears within 36-48 hours after birth and stays for 3-4 days is called meconium.^{12,16-18} After that, the color of stool will change into yellow or green.^{12,15}

In a breastfed baby, the color can become green. Usually it is caused by a rapid transit in the large bowel resulting in not enough time to be processed for changing color.²⁰ Besides that, in the community, it is believed that vegetables consumed by mothers also play a role in making the stool green. Whether this is true or not needs to be proven.

We concluded that the mean stool frequency in 0-4 month-old exclusively breastfed babies decreases along with

the increase of age. The highest frequency is in the first week compared to the weeks after. The consistency of meconium is soft. After it disappears, the consistency remains soft and in 18-30% of babies, becomes watery on day 5-113. The color of meconium is black which comes out in the first 24 hours of life and stays for 1-3 days. After that, the color changes to yellow, and in 6-12% babies, becomes green on day 5-120. We suggested that a study of bowel habits on larger and older infants should be performed to complete the picture of bowel habits of Indonesian children. Besides that, the relationship between food consumed by mother and stool frequency, consistency, or color should also be studied.

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