

Nutrition Discussion Forum

Duration of exclusive breast-feeding: introduction of complementary feeding may be necessary before 6 months of age – Comments by M. Kersting et al.

The authors (Reilly & Wells, 2005) discuss the adequacy of exclusive breast-feeding up to the age of 6 months in the developed world. Based on a systematic literature review (Reilly *et al.* 2005) and various assumptions and calculations, the authors conclude that there is a gap of approximately 0.35 MJ/d between metabolisable energy intake in exclusively breast-fed infants at 6 months (2.2–2.4 MJ/d) and mean energy requirements at this age (2.6–2.7 MJ/d), and that mean milk energy transfer in the exclusively breast-fed infant is likely to be inadequate at 6 months of age.

The review (Reilly *et al.* 2005) identified only limited data on exclusive breast milk intake at 6 months: five studies (seventy-two mother–infant pairs), all from the 1980s. We would therefore like to extend the database to more recent breast-milk intake measurements at the crucial age of 6 months, and to suggest an alternative approach to evaluating the adequacy of breast-feeding.

First, in the Dortmund Nutritional and Anthropometric Longitudinally Designed Study (DONALD), an (open) cohort and purely observational study, 3-d weighed dietary records are collected in healthy infants, children and adolescents at regular intervals, including the age points of 3 and 6 months. Breast milk intake is assessed by test weighing (Kersting *et al.* 1998; Kroke *et al.* 2004). Owing to the detailed dietary recording, we are able to clearly distinguish breast-feeding categories according to WHO criteria (Division of Child Health and Development, 1991) into ‘exclusive’ breast-feeding (breast milk only, with no other fluids, such as water or carbohydrate solutions; medicines are allowed) and ‘predominant’ breast-feeding (breast milk and other fluids).

In the study period 1989–2005 of the DONALD Study, a total of 39 or 157 records of ‘exclusively’ breast-fed infants aged 6 or 3 months, respectively, was collected (Table 1). The mean breast-milk intake (boys and girls at the age of 6 months) of 886 g/d is the same as the weighted mean value of 894 g/d calculated by Reilly *et al.* (2005) from the five studies found in their review. Reilly & Wells (2005) propose adding 5% to the test weighing results to adjust for insensible water losses during breast-milk meals. Assuming that this was done by the authors, we corrected our figures in the same way (Table 1).

The new and still limited data do not suggest a significant increase in the milk output of exclusively breast-feeding mothers at 6 months over the past 20 years. Nevertheless, breast-feeding rates have increased in many European countries (Yngve *et al.* 2001), including in the DONALD study, in which the percentage of ‘full’ breast-feeding (exclusive plus predominant) at 6 months has increased from 2% in 1989 to 20% in 2003. Psychosocial and environmental influences, for example better breast-feeding support to overcome

early breast-feeding problems and greater self-confidence of mothers in their breast-feeding skills, have probably favoured long-term breast-feeding success.

From the review, Reilly *et al.* (2005) identified nine studies that provided repeated measurements of exclusive breast-milk intake in the same infants. All reported no marked increase in milk transfer between the ages of 2 and 4 or 5 months. Our data, however, do not support this finding. In our subgroup of twenty-five exclusively breast-fed infants (ten boys, fifteen girls) with repeated measurements at the age of 3 and 6 months in the DONALD study, we found a significant increase in milk intake in girls (from 722 to 900 g/d) and a slight increase in boys (from 833 to 895 g/d). Our data thus suggest that the pattern of change in milk intake over time may not result in the often assumed ‘plateau’ after 3 months in some subgroups of exclusively breast-fed infants. Reilly *et al.* report a weighted mean breast-milk intake of 796 g/d at age 3–4 months, and of 827 and 894 g/d at age 5 and 6 months, in their review.

Given these scarce and contradictory data, a study that examines the effects of increasing the exclusive breast-feeding duration on actual breast-milk amounts, as proposed by Reilly & Wells (2005), would be welcome.

Taking now our second aim, until we have the results of WHO the data collection on the growth of breast-fed infants that is currently in progress, it is difficult to evaluate the adequacy of exclusive breast-feeding in the critical period after the age of 3–4 months (de Onis & Onyango, 2003). Reilly & Wells (2005) used WHO figures for the sex-specific energy requirements (per kilogram body weight) of breast-fed infants (World Health Organization/Food and Agriculture Organization, 2002) and compared them with their estimated metabolisable energy intake per kilogram body weight and by gender. Reilly & Wells, however, used the fiftieth percentile body weights from UK 1990 references (6 months old: girls 7.7 kg, boys 8.0 kg). Presumably, most reference infants were bottle-fed at that time and should thus have been heavier than exclusively breast-fed infants, as suggested by our sample and other studies (Table 1). This approach is liable to be at least partly responsible for the deficit in energy intake in exclusively breast-fed infants at the age of 6 months identified by Reilly & Wells (2005).

Instead of this indirect approach, we suggest a direct and simple approach. We used the sex-specific measured milk consumption and measured body weights in our 6-month exclusively breast-fed infants and applied the suggested metabolisable energy content of breast-milk of 2.6 kJ/g. A comparison with the WHO (World Health Organization, 2002) sex-specific energy requirements of 6-month-old breast-fed infants (girls 325 kJ/kg per d, boys 330 kJ/kg per d) shows that the mean energy intake is adequate in girls and remains around 28 kJ/kg per d below the requirements in boys. If insensible water loss is taken into account (Fig. 1), this deficit decreases.

Table 1. Measured body weight and breast-milk intake and calculated energy intake in 6-month-old, exclusively breast-fed boys and girls from the DONALD study (1989–2005)

	Boys (n 21)*			Girls (n 18)*		
	Mean	SD	Median	Mean	SD	Median
Body weight (kg)	7.7	0.9	7.7	7.0	0.8	7.0
Breast milk (g/d)†	881	128	910	892	243	812
Breast milk + 5% (g/d)‡	925	135	956	936	256	853
Energy intake (kJ/d)§	2286	332	2361	2313	631	2106
Energy intake + 5%‡ (kJ/d)	2400	349	2479	2429	663	2211
Energy intake (kJ/kg _{bw})	297	36	300	334	107	293
Energy intake + 5%‡ (kJ/kg _{bw})	312	38	315	351	113	308

* Number of 3-d dietary records.

† Measured breast milk intake based on individual means from 3 d.

‡ Calculated breast milk intake = breast milk (measured) + 5% (to adjust for insensible water loss; Reilly & Wells, 2005; Reilly *et al.* 2005)

§ Calculated energy intake based on the metabolisable energy content of breast milk (2.6 kJ/g; Reilly & Wells, 2005; Reilly *et al.* 2005)

|| Calculated metabolisable energy intake and measured body weight (bw).

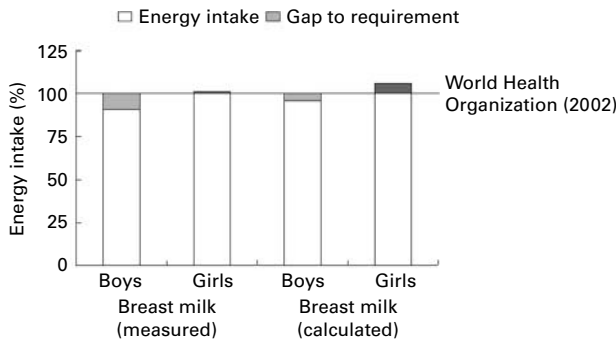


Fig. 1. Energy intake in 6-month-old, exclusively breast-fed boys and girls from the DONALD study (1989–2005), based on measured breast milk intake or calculated (+5% for insensible water loss) from the percentage of WHO sex-specific energy requirements for breast-fed infants (World Health Organization/Food and Agriculture Organization, 2002).

In conclusion, the postulated gap between mean energy intake in exclusively breast-fed infants at 6 months and mean energy requirements demonstrated by an indirect evaluation (Reilly & Wells, 2005) almost disappears when simultaneous measurements of breast-milk consumption and body weight in the same subjects are used and in particular when the sexes are evaluated separately.

Nevertheless, we support the message by Reilly & Wells (2005) that the decision on the adequate age at which to introduce weaning food should be taken on an individual basis, taking into account not only individual growth, but also the development of eating skills. Considering both these criteria, and in agreement with the current England and Wales Department of Health (Reilly & Wells, 2005), the German National Breastfeeding Committee recommends exclusive breastfeeding for 6 months as a population goal and advises that weaning food (*Beikost*) should be introduced not before the beginning of the fifth month and no later than the beginning of the seventh month (NSK (German National Breastfeeding Committee), 2004).

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