Feeding practices in the Netherlands during the first four months of life. A study of the motives for discontinuing breastfeeding and for the subsequent feeding method selected
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CHAPTER 2.

The feeding of infants during the first four months
During the first six months of life human milk is the only food needed for the optimal growth and development of infants. In case breastfeeding is not the first and only choice the same comment applies to formula or a combination of human milk and formula. 'Non-humanised' formulae such as home-made cow's milk/ water mixtures are inferior. They are rarely used nowadays.

2.1. Breastfeeding

Under normal circumstances human milk is the best kind of milk for infants (1,2). The superiority of human milk over formula is supported by a vast number of studies (3). Infants have fewer infections, and if they do have an infectious disease, its course is more gentle (4,5,6,7). Factors involved are the presence in breast milk contrary to formula of immunoglobulines, lactoferrins, lysozymes and living cellular components (5,6).

Breastfeeding has a favourable effect on the occurrence of atopic diseases and lowers the risk of cot death (8,9,10,11,12,13,14,15). There is increasing evidence that breast milk in infancy decreases the incidence of obesity both in infancy and in adulthood (16,17,18,19,20,21,22). Cancer in childhood appears to occur less in infants who have been breastfed (23). Furthermore, a number of studies show that both motor- and mental-development are faster in breastfed infants (24,25,26). Breastfeeding promotes bonding between mother and child and helps to establish an emotional relationship (27,28).

However, fewer data are available on the subject of how long the beneficial effects last, particularly on the development of children or on atopic diseases in adulthood, and about the minimum period of breastfeeding needed to give a measurable beneficial effect. Studies on these subjects show different outcomes (29,30,31,32).

The composition of breast milk changes in relation to the age of the baby and adapts to the needs of the infant (33,34). There are differences in the composition of human milk; these are partly genetically determined and probably in favour of the infant and partly dependent of the feeding pattern of the mother (35,36,37). However, breastfeeding may lead to vitamin D and K deficiencies. Supplementary vitamin K is needed only in the first ten weeks of life. Supplementary vitamin D is needed as long as only breast milk is given.

Particularly in developing countries breastfeeding is important for hygienic and economic reasons. Formula feeding costs money and breastfeeding is free (38).

Reliable information about the advantages of breastfeeding infants should be made available to everyone (39,40). Therefore WHO drafted specified rules with enables as many infants as possible to be breastfed.
In well-nourished women the quality of breast milk is invariably good enough to feed a baby. Even in undernourished women the composition is mostly sufficient to breastfeed children (33).

In special cases there are some disadvantages associated with breastfeeding. It is better not to give breast milk in case of a number of rare metabolic diseases, such as galactosaemia, and only in a small quantity in phenylketonuria. Particularly in Western countries breastfeeding can better not be given if mothers are infected with HIV (41).

Certain medications are sometimes a contraindication for breastfeeding. Heavy smoking or excessive use of alcohol or drugs also falls in this category. Contamination remaining from pesticides and BCPs has been found in breast milk (42,43,44,45). So far, however, such contamination has not been a reason for rejecting breastfeeding (46).

Notwithstanding the superiority of breast milk the infant mortality rates for breastfed and bottle-fed infants in Western countries are nearly equal. The absence of detrimental effects of formula feed is largely due to the fact that formulae are manufactured to the highest standards and that the composition is very strictly controlled (47). During the last 30 years the majority of Dutch mothers have bottle-fed their infants (48). Figure 2.1 depicts the percentages of breastfed infants in this period.

**Figure 2.1** The course of exclusive breastfeeding during the last 30 years in Dutch studies: a study performed in Terneuzen, a small town in the south of The Netherlands and the nationwide studies referred to as SMOCK (socio-medical study of well-baby clinic children), and the present study (LOVZ).
2.2. Formula feeding

Regular (normal) formulae try to mimic human milk as far as possible, both in composition and in effects, and are called humanised formulae. At the same time the food industry has produced special types of formulae that have been manufactured so that they give health benefits to certain groups of infants, such as children prone to allergic diseases, or children suffering from genetic abnormalities, like phenylketonuria or galactosaemia. Furthermore, certain formulae are adapted to the special needs of prematurely or small for gestational age born infants. Thus, in addition to the regular formulae there are four special types of formulae. Details of these formulae are given below.

Hypoallergenic (hypo antigenic) formulae

Some infants are hypersensitive of food. In young infants it concerns mostly cow's milk proteins (49). For this reason various hypoallergenic formulae are available. They contain hydrolysed proteins of cow's milk or mixtures of amino acids (50). The variety in hydrolyzation grade and the peptide pattern between brands makes differences in successful use in allergic infants.

Formulae for premature and small for gestational age infants

For many years breastfeeding was contraindicated for infants with a very low birth weight or a short gestational age. Now, with the availability of breastfeeding fortifiers, breast milk can also be given to these babies (51,52,53). If breast milk with added fortifiers cannot be given, special formulae adapted for prematures are available (54,55). A new phenomenon in this category are the post discharge formulae. It is not yet known up to what age these formulae are needed to ensure optimal growth. Some studies advocate their use up to the calculated full-term age, some others advocate using them until the infant weighs 3500 grams and others up to the age of 6 months (56). More studies are needed to solve this problem.

Soy-based formulae

These formulae were manufactured for infants suspected of having a food allergy (57). Because infants with hypersensitivity to cow's milk proteins are also prone to develop a soy protein allergy these formulae are hardly prescribed any more. Soy-based formulae are now restricted to infants whose parents do not want to give animal-based milk.

Formulae with special adaptations

adaptations to counter vomiting

For infants suffering from problematic vomiting two types of special formulae are available: one type is based on the addition of carob bean gum and the other
one contains additional amyl pectin. The formulae with carob bean gum have a mild laxative effect.

Some anti-emetic formulae, such as the amyl pectin added one, have a casein/whey rate that differs from that of the regular formulae and that makes the milk curdle more coarsely in the stomach. It is therefore less easy to regurgitate.

adaptations to counter the feeling of hunger

These formulae are developed especially for infants who are not satisfied by regular formulae in spite of good weight gain. Various mechanisms ensure a longer period of feeling satisfied after a bottle-feeding. In one the tryptophan value is augmented and some rice-flour is added, in another the ratio of the various proteins (casein/whey) has been changed (58). These formulae have the same caloric value as regular formulae.

low lactose formulae

These formulae are indicated for the few number of infants with an inborn lactase deficiency or for temporary use with infants who had suffered from a severe intestinal infection (59).

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