Optimal duration of exclusive breastfeeding (Review)

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ABSTRACT

Background
Although the health benefits of breastfeeding are widely acknowledged, opinions and recommendations are strongly divided on the optimal duration of exclusive breastfeeding. Much of the debate has centered on the so-called 'weanling's dilemma' in developing countries: the choice between the known protective effect of exclusive breastfeeding against infectious morbidity and the (theoretical) insufficiency of breast milk alone to satisfy the infant's energy and micronutrient requirements beyond four months of age.

Objectives
To assess the effects on child health, growth, and development, and on maternal health, of exclusive breastfeeding for six months versus exclusive breastfeeding for three to four months with mixed breastfeeding (introduction of complementary liquid or solid foods with continued breastfeeding) thereafter through six months.

Search strategy
We searched the following databases: MEDLINE (as of 1966), Index Medicus (before 1966), CINAHL, HealthSTAR, BIOSIS, CAB Abstracts, EMBASE-Medicine, EMBASE-Psychology, EconLit, Index Medicus for the WHO Eastern Mediterranean Region, African Index Medicus, LILACS (Latin American and Caribbean Health Sciences), EBM Reviews-Best Evidence, the Cochrane Database of Systematic Reviews, and the Cochrane Central Register of Controlled Trials. The two searches yielded a total of 2668 unique citations. Contacts with experts in the field yielded additional published and unpublished studies. The updated review extended the literature searched until December 2006 and yielded 835 additional unique citations.

Selection criteria
We selected all internally-controlled clinical trials and observational studies comparing child or maternal health outcomes with exclusive breastfeeding for six or more months versus exclusive breastfeeding for at least three to four months with continued mixed breastfeeding until at least six months. Studies were stratified according to study design (controlled trials versus observational studies), provenance (developing versus developed countries), and timing of compared feeding groups (three to seven months versus later).

Data collection and analysis
We independently assessed study quality and extracted data.

Main results
We identified 22 independent studies meeting the selection criteria: 11 from developing countries (two of which were controlled trials in Honduras) and 11 from developed countries (all observational studies). Definitions of exclusive breastfeeding varied considerably across studies. Neither the trials nor the observational studies suggest that infants who continue to be exclusively breastfed for six months show deficits in weight or length gain, although larger sample sizes would be required to rule out modest differences in risk of undernutrition. In developing-country settings where newborn iron stores may be suboptimal, the evidence suggests that exclusive breastfeeding without iron supplementation through six months may compromise hematologic status. Based on studies from Belarus, Iran, and Nigeria, infants who continue exclusive breastfeeding for six months or more appear to have a significantly reduced risk of gastrointestinal and (in the Iranian and Nigerian studies) respiratory infection. No significant reduction in risk of atopic eczema, asthma, or other atopic outcomes has been demonstrated in studies from Finland, Australia, and Belarus. Data from the two Honduran

trials and from observational studies from Bangladesh and Senegal suggest that exclusive breastfeeding through six months is associated with delayed resumption of menses and, in the Honduran trials, more rapid postpartum weight loss in the mother.

Authors' conclusions

We found no objective evidence of a 'weanling's dilemma'. Infants who are exclusively breastfed for six months experience less morbidity from gastrointestinal infection than those who are mixed breastfed as of three or four months, and no deficits have been demonstrated in growth among infants from either developing or developed countries who are exclusively breastfed for six months or longer. Moreover, the mothers of such infants have more prolonged lactational amenorrhea. Although infants should still be managed individually so that insufficient growth or other adverse outcomes are not ignored and appropriate interventions are provided, the available evidence demonstrates no apparent risks in recommending, as a general policy, exclusive breastfeeding for the first six months of life in both developing and developed-country settings. Large randomized trials are recommended in both types of setting to rule out small effects on growth and to confirm the reported health benefits of exclusive breastfeeding for six months or beyond.

PLAIN LANGUAGE SUMMARY

Exclusive breastfeeding for six months (versus three to four months) reduces gastrointestinal infection, does not impair growth, and helps the mother lose weight

The results of two controlled trials and 18 other studies suggest that exclusive breastfeeding (no solids or liquids besides human milk, other than vitamins and medications) for six months has several advantages over exclusive breastfeeding for three to four months followed by mixed breastfeeding. These advantages include a lower risk of gastrointestinal infection, more rapid maternal weight loss after birth, and delayed return of menstrual periods. No reduced risks of other infections or of allergic diseases have been demonstrated. No adverse effects on growth have been documented with exclusive breastfeeding for six months, but a reduced level of iron has been observed in developing-country settings.

BACKGROUND

Although the health benefits of breastfeeding are widely acknowledged, opinions and recommendations are strongly divided on the optimal duration of exclusive breastfeeding. Growth faltering is a commonly observed phenomenon in developing countries after about three months of age (Shrimpton 2001; Waterlow 1979; Whitehead 1984). This growth faltering has traditionally been attributed to three factors: (1) the suggested inadequacy of energy intake from breast milk alone after three or four months; (2) the poor nutritional quality (i.e., low energy and micronutrient content) of the weaning foods commonly introduced in many developing countries; and (3) the adverse effects of infection on energy intake and expenditure. The alleged inadequacy of breast milk for energy requirements beyond three or four months was based on calculations made by the Food and Agricultural Organization (FAO) and World Health Organization (WHO) in 1973 (FAO/WHO 1973). More careful studies since the 1980s, Whitehead 1981, Garza 1990, Butte 1996, Brown 1998 and a later FAO/WHO report (WHO 1985), however, have shown that the earlier FAO/WHO figures substantially overestimate true energy requirements in infancy.

The belief that breast milk alone is nutritionally insufficient after three or four months, combined with the fact that weaning foods given in many developing countries are both nutritionally inadequate and contaminated, led to concern about the so-called 'weanling's dilemma' (Rowland 1978; Rowland 1986). Breastfeeding can be life-saving in developing countries. A recent meta-analysis (WHO 2001a) reported markedly reduced mortality (especially due to infectious disease) with breastfeeding even into the second year of life. In contrast, a recent study from India reported an increased risk of postneonatal mortality associated with exclusive breastfeeding after three months (Anandaiah 2000), but reverse causality (illness prior to death preventing the infant's acceptance of complementary foods), selection bias (exclusion of infants who died prior to each cross-sectional period), or uncontrolled confounding might explain this result.

The weanling's dilemma and the risk of mortality associated with early weaning are concerns primarily in developing countries. In most developed countries, uncontaminated, nutritionally adequate complementary foods are readily available, and growth faltering is relatively uncommon. With the resurgence of breastfeeding in developed countries, however, recent attention has turned to the importance of promoting its duration and exclusivity. The epidemiologic evidence is now overwhelming that, even in developed countries, breastfeeding protects against gastrointestinal and (to a lesser extent) respiratory infection, and that the protective effect is enhanced with greater duration and exclusivity of breastfeeding (Beaudry 1995; Chantry 2006; Cunningham 1991; Dewey 1995;

Howie 1990; Raisler 1999). ('Greater duration and exclusivity' is used in a general sense here; the references cited do not pertain specifically to the subject of this review, i.e., the optimal duration of exclusive breastfeeding.) Prolonged and exclusive breastfeeding has also been associated with a reduced risk of the sudden infant death syndrome (Ford 1993) and of atopic disease (Gdalevich 2001a; Gdalevich 2001b; Hide 1981; Mimouni 2002; Oddy 1999; Saarinen 1979), although recent evidence bearing on atopic disease has been less supportive of a protective effect (Burgess 2006; Purvis 2005; Sears 2002). Some (Anderson 1999; Horwood 1998; Lanting 1994; Lawlor 2006; Lucas 1992; Mortensen 2002; Vestergaard 1999) but not all (Der 2006) studies report acceleration of neurocognitive development, and other studies have reported protection against long-term chronic conditions and diseases like obesity (Harder 2005; Owen 2005a; Owen 2005b), type 2 diabetes (Owen 2006), type I diabetes (Gerstein 1994; Mayer 1988), Crohn's disease (Koletzko 1989), and lymphoma (Davis 1988; Davis 1998). Maternal health benefits have also received considerable attention in developed countries, including possible protection against breast cancer among premenopausal women (Brinton 1995; Chilvers 1993; Enger 1997), ovarian cancer (Rosenblatt 1993), and osteoporosis (Alderman 1986; Cummings 1993; Melton 1993).

Although growth faltering is uncommon in developed countries, a pooled analysis of U.S., Canadian, and European data sets undertaken by the WHO Working Group on Infant Growth showed that infants from developed countries who followed then current WHO feeding recommendations (to exclusively breastfeed for four to six months of age and to continue breastfeeding with adequate complementary foods up to two years of age) show a deceleration in both weight and length gain relative to the existing international WHO/CDC growth reference from around 3 to 12 months, with partial catch-up in the second year (Dewey 1995; WHO 1994a). A Danish population-based cohort study (Nielsen 1998), an analysis based on the third U.S. National Health and Nutrition Examination Survey (Hediger 2000), and the EuroGrowth study (Haschke 2000) also reported an association between prolonged and exclusive breastfeeding and slower growth during infancy. In developed-country settings, it is not at all clear that the more rapid growth reported in infants who are formula-fed, or breastfed less exclusively and for a shorter duration, is an advantage. Moreover, a large, cluster-randomized trial from Belarus has reported that breastfed infants born and followed at sites randomized to a breastfeeding promotion intervention (and who were breastfed more exclusively and for a longer duration) actually grew more rapidly in the first six to nine months than those born and followed at control (nonintervention) sites (Kramer 2000a). WHO has recently published new growth standards (De Onis 2006a; De Onis 2006b), which were developed following the World Health Assembly's recommendation of six months for the optimal duration of exclusive breastfeeding. The latter recommendation was based largely on the original version of this review.

Most of the only scientific evidence contributing to this debate has been based on observational studies, with well-recognized sources of potential bias. Some of these biases tend to favor exclusively breastfed infants, while others favor those who receive earlier complementary feeding. Infants who continue to be exclusively breastfed tend to be those who remain healthy and on an acceptable growth trajectory; significant illness or growth faltering can lead to interruption of breastfeeding or supplementation with infant formula or solid foods (Hill 1977; Sauls 1979). Confounding by indication (Miettinen 1983) (i.e., the reason (indication) for the supplementation affects the outcome, rather than the supplementation itself) is another important bias, and could operate in either direction. Poorly-growing infants (especially those in developing countries) are likely to receive complementary feedings earlier because of their slower growth. In developed countries, however, rapidly-growing infants may require more energy than can be met by the increasingly spaced feedings typical of such settings. This may result in crying and poor sleeping, supplementation with formula or solid foods, or both, reduced suckling, and a vicious cycle leading to earlier weaning (i.e., discontinuation of breastfeeding). Reverse causality is another potential source of bias, particularly with respect to infectious morbidity and neuromotor development (Bauchner 1986). Infants who develop a clinically important infection are likely to become anorectic and to reduce their breast milk intake, which can in turn lead to reduction in milk production and even weaning. This is particularly a problem in cross-sectional studies, because the temporal sequence of the early signs of infection and weaning may not be adequately appreciated; infection may be blamed on the weaning, rather than the reverse. Advanced neuromotor development may also lead to earlier induction of solid foods, which could then receive 'credit' for accelerating motor development (Heinig 1993). Finally, other unmeasured or poorly measured confounding variables could also bias the association between introduction of complementary foods and infant health outcomes.

Because of these well-recognized problems in observational studies, two controlled clinical trials (Cohen 1994b; Dewey 1999a) from Honduras have attracted considerable interest. These trials allocated exclusively breastfed infants to either continue exclusive breastfeeding for four to six months or to receive solid foods along with continued breastfeeding as of four months. The results showed no significant benefit for growth nor any disadvantage for morbidity with the earlier introduction of complementary foods, but the small sample sizes and published analyses based on compliance with allocation (i.e., not on intention to treat) have prevented universal acceptance of these results (Frongillo 1997b). In addition, the weaning foods used were those commonly found in developed countries, rather than in those traditionally used in Honduras or other developing countries.

Most studies have reported effects in terms of group differences in mean z-scores or in mean weight or length gain; few have provided data on the tails (extremes) of the distribution, e.g., anthropo-

metric indices (z-scores less than -2) of underweight, stunting, or wasting, and none (even the larger observational studies) has had a sufficient sample size to detect modest effects on these indices. In fact, there has been an underlying assumption in this field that 'one size fits all', i.e., that average population effects can be applied to individual infants and that one international recommendation is therefore adequate for all infants. There has been little discussion of the fact that all infants, regardless of how they are fed, require careful monitoring of growth and illness, with appropriate interventions undertaken whenever clinically indicated.

OBJECTIVES

The primary objective of this review was to assess the effects on child health, growth, and development, and on maternal health, of exclusive breastfeeding for six months versus exclusive breastfeeding for three to four months with mixed breastfeeding (introduction of complementary liquid or solid foods with continued breastfeeding) thereafter through six months. A secondary objective was to assess the child and maternal health effects of prolonged (more than six months) exclusive breastfeeding versus exclusive breastfeeding through six months and mixed breastfeeding thereafter.

CRITERIA FOR CONSIDERING STUDIES FOR THIS REVIEW

Types of studies

We selected controlled clinical trials and observational studies, published in all languages, examining whether or not exclusive breastfeeding (EBF) until six months of age has an impact on growth, development, morbidity, and survival of healthy, term infants and their mothers. Studies of (or including) low birthweight (less than 2500 g) infants were not excluded, provided that such infants were born at term (at least 37 completed weeks). Only those studies with an internal comparison group were included in the review, i.e., we excluded studies based on external comparisons (with reference data). The comparisons must have been based on one group of infants who received EBF for at least three but less than seven months and mixed breastfeeding (MBF) until six months or later (i.e., infants were introduced to liquid or solid foods between three and six months of age), and another group of infants who were exclusively breastfed for at least six months. This restriction was imposed to provide direct relevance to the clinical and public health decision context: whether infants who are exclusively breastfed for the first three to four months should continue EBF or should receive complementary foods in addition to breast milk (MBF). Thus studies comparing EBF and MBF from birth were excluded, as were those that investigated the effects of age at introduction of nonbreast milk liquid or solid foods but did not ensure EBF at least three months prior to their introduction. We also included studies comparing infants receiving prolonged EBF (more than six months) to those exclusively breastfed for six months who continued MBF until at least nine months.

Types of participants

Lactating mothers and their healthy, term, singleton infants.

Types of intervention

Among infants EBF for at least three months, the interventions/exposures compared were continued EBF versus MBF. The 'complementary' foods used in MBF included juices, formula, other milks, other liquids, or solid foods. Although the World Health Organization (WHO) defines EBF as breastfeeding with no supplemental liquids or solid foods other than medications or vitamins, few studies strictly adhered to the WHO's definition. In some studies, so-called 'EBF' included provision of water, teas, or juices (corresponding to WHO's definition of predominant breastfeeding) (WHO 1991) or even small amounts of infant formula. The definitions of EBF and MBF used in each study are described in the 'Characteristics of included studies' table.

Types of outcome measures

No infant or maternal health outcomes were excluded from consideration. The infant outcomes specifically sought (but not necessarily found) included growth (weight, length, and head circumference and z-scores (based on the WHO/CDC reference) for weight-for-age, length-for-age, and weight-for-length), infections, morbidity, mortality, micronutrient status, neuromotor and cognitive development, asthma, atopic eczema, other allergic diseases, type 1 diabetes, blood pressure, and subsequent adult chronic diseases such as coronary heart disease, hypertension, type 2 diabetes, and inflammatory and autoimmune diseases. Maternal outcomes sought included postpartum weight loss, duration of lactational amenorrhea, and such chronic diseases as breast and ovarian cancer and osteoporosis.

SEARCH METHODS FOR IDENTIFICATION OF STUDIES

See: methods used in reviews.

In order to capture as many relevant studies as possible, two independent literature searches were conducted for the first version of this review: one by staff at the Nutrition Unit of the World Health Organization (WHO) and one by the authors. The search details are shown below.

The search by WHO was conducted between June and August 2000 in the following databases: MEDLINE (1966 to June 2000), OLDMEDLINE (Index Medicus previous to 1966), CINAHL (1982 to June 2000), HealthSTAR (1975 to August 2000), EBM Reviews-Best Evidence (1991 to July/August 2000), SocioFile (1974 to July 2000), Cochrane Database of

Systematic Reviews (*The Cochrane Library* 2000, Issue 2), CAB Abstracts (1973 to July 2000), EMBASE-Psychology (1987 to 3rd Quarter, 2000), EconLit (1969 to August 2000), Index Medicus for the WHO Eastern Mediterranean (IMEMR), African Index Medicus (AIM), and LILACS (Latin American and Caribbean Health Sciences). Where applicable, the medical subject heading (MeSH) 'breast feeding,' and otherwise the free language terms 'breast-feeding,' 'breast feeding,' or 'breastfeeding' combined with 'exclusive' or 'exclusively' were used in the search strategy. The search yielded 1423 citations (MEDLINE 686, OLDMEDLINE 15, CINAHL 25, HealthSTAR 1, EBM-Best Evidence 2, SocioFile 2, Cochrane Database of Systematic Reviews 8, CAB Abstracts 680, EMBASE-Psychology 4, other databases 0). Once duplicates were removed, 1035 citations remained; these were then assessed for eligibility.

The authors' search was conducted on August 12, 2000 in the following databases: MEDLINE (1966 to June 2000), CINAHL (1982 to April 2000), HealthSTAR (1975 to August 2000), BIOSIS (1989 to 2000), CAB Abstracts (1973 to June 2000), Cochrane Database of Systematic Reviews (*The Cochrane Library* 2000, Issue 3), Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2000, Issue 3), and EMBASE-Medicine (1980 to 2000). The terms 'breast feeding,' 'infant,' and 'growth,' as MeSH headings and text words, were combined in the search strategy. This search yielded a total of 2496 citations (MEDLINE yielded 1079 citations, CINAHL 75, HealthSTAR 2, BIOSIS 190, CAB 614, Cochrane Database of Systematic Reviews 25, Cochrane Controlled Trials Register 122, and EMBASE 389). Once duplicates among the databases were removed, 1845 citations remained, 1633 of which were different from the 1035 identified by the WHO search. Thus 2668 unique citations were identified by the two searches.

The literature search for the updated (2007) review was conducted in December 2006 on the same electronic databases and search terms and logic as the second search above, with the addition of the LILACS, SocioFile, and EBM Reviews-Best Evidence databases. This updated search yielded 835 additional unique citations.

For all searches, every effort was made to identify relevant non-English language articles and abstracts. Given their own backgrounds, the review authors themselves were able to determine the eligibility of articles in French, Spanish, and Japanese. For publications in other languages, two options were available. Many articles in languages other than English provided English abstracts. As such, all potentially relevant articles were obtained and checked for availability of English abstracts. If such abstracts were not available, or were available but did not provide enough information to determine their eligibility, then assistance was requested from WHO to determine their eligibility for inclusion. No article or abstract was excluded because of language of publication.

In addition to the studies found through these electronic searches, reference lists of identified articles were checked, and contacts with experts in the field were made to identify other potentially relevant published or unpublished studies. Attempts were made to contact the authors of all studies that qualified for inclusion in the review to obtain methodologic details, clarify inconsistencies, and obtain unpublished data.

Many studies were identified that either compared outcomes in infants receiving exclusive breastfeeding (EBF) versus mixed breastfeeding (MBF) or investigated the effects of age at introduction of nonbreast-milk liquid or solid foods. The vast majority of these studies were ineligible for inclusion, however, because they did not ensure EBF at least three months prior to introducing these complementary foods in the MBF group or a comparison group with EBF at least six months, or both.

We identified 41 unique citations (articles or abstracts) that met the selection criteria, comprising 22 separate studies. Of the 22 included studies, 11 were carried out in developing countries and the other 11 in developed countries.

Ten of the 41 total citations were found by both of the two original searches (Ahn 1980; Akeson 1998a; Castillo 1996; Cohen 1994b; Cohen 1995; Dewey 1996; Dewey 1998a; Dewey 1998b; Dewey 1999b; Khan 1984); 11 were identified only by the WHO search (Akeson 1998b; Duncan 1993; Heiskanen 1994; Kajosaari 1983; Kajosaari 1991; Kajosaari 1994; Kallio 1992; Oddy 1999; Pisacane 1995; Rao 1992; Savilahti 1987b); six were found only by the authors' search (Adair 1993b; Akeson 1996b; Dewey 1995; Frongillo 1997a; Heinig 1993; Simondon 1997b). Eleven additional citations were located through contacts with experts and reference lists of relevant articles (Brown 1991b; Brown 1998; Dewey 1997; Dewey 2001; Huffman 1987; Kramer 2000b; Kramer 2000c; Kramer 2001; WHO 1994b; WHO 1995; WHO 2002).

The updated (December 2006) literature search resulted in two additional studies that met the eligibility criteria (Khadivzadeh 2004; Onayade 2004), plus a new citation from one of the original included studies (Simondon 2003). The selected studies are listed in the 'Characteristics of included studies' table.

METHODS OF THE REVIEW

We evaluated studies under consideration for methodological quality and appropriateness for inclusion without consideration of their results. The criteria for quality assessment were developed a priori and are presented below.

We used Cochrane criteria for assessing controlled clinical trials. As shown below, this method rates trials on three elements.

1) Adequacy of randomization and concealment:
A. randomized and concealed appropriately;

B. randomized appropriately but concealment unclear from the description;
C. not (or not reported as) randomized or inadequate concealment, or both.

2) Losses to follow up and analysis:
A. used intention-to-treat (ITT) analysis, with losses to follow up symmetrical and less than 15% in each group;
B. symmetrical losses were at least 15%, but analysis was based on ITT;
C. asymmetrical losses to follow up despite use of ITT, or analysis not based on ITT.

3) Measurement of outcome (outcome-specific):
A. blinding of observers or 'objective' outcomes (e.g., measured weight);
B. nonblinding of observers for measurements that could be affected by bias (including length, head circumference, and self-reported outcomes).

The five-point Jadad (Jadad 1996) scale was also used to examine the quality of randomized controlled trials. Details of the scale are as follows.

1) Was the study described as randomized (this includes the use of words such as randomly, random, and randomization)?
a) not random or not mentioned (0);
b) random, described, and inappropriate (0);
c) random, not described (+1);
d) random, described, and appropriate (+2).

2) Was the study described as double-blind?
a) not double-blind (0);
b) double-blind, described, and not appropriate (0);
c) double-blind, not described (+1);
d) double-blind, described, and appropriate (+2).

3) Was there a description of withdrawals and dropouts?
Withdrawals (number and reasons) must be described by group to get 1 point.

Observational (cohort, case-control, and cross-sectional studies) were assessed for control for confounding, losses to follow up, and assessment of outcome as follows.

1) For growth and morbidity outcomes, control for confounding by socioeconomic status, water supply, sanitation facilities, parental height and weight, birthweight, and weight and length at three months (or age at which complementary feeding was introduced in the mixed breastfeeding group):
A. control for all (or almost all) pertinent confounders;
B. partial control for some confounders;
C. no control for confounding.

2) Losses to follow up:
A. losses to follow up were symmetrical and less than 15% in each group;
B. losses were 15% to 25% and symmetrical;
C. losses were greater than 25%, asymmetrical, or not reported (and all cross-sectional studies).

3) Assessment of outcome (outcome-specific):
A. blinding of observers or 'objective' outcomes (e.g., measured weight);
B. nonblinding of observers or measurements that could be affected by bias (including length, head circumference, and self-reported outcomes).

Quality assessments of all eligible studies were carried out independently by the two review authors. Disagreements were resolved by consensus. Data were extracted independently by both review authors, with disagreements resolved by consensus. Attempts were made to contact authors of included studies to obtain additional data, resolve inconsistencies, and obtain additional methodologic details.

The studies were stratified according to study design (controlled trials versus observational studies), provenance (developing versus developed countries), and timing of feeding comparison (three to seven months versus 'prolonged' (more than six months)). (One study (WHO 1997) based on a pooled analysis of two developed and three developing countries has been included with developed-country studies because of the selection criteria (literate, educated, urban mothers) and the observed high infant growth rates.) This resulted in five separate strata for considering the results of the studies located by the literature search: (1) controlled trials of exclusive versus mixed breastfeeding for four to six months from developing countries; (2) observational studies of exclusive versus mixed breastfeeding for three to seven months from developing countries; (3) observational studies of prolonged (more than six months) exclusive versus mixed breastfeeding from developing countries; (4) observational studies of exclusive versus mixed breastfeeding for three to seven months from developed countries; and (5) observational studies of prolonged (more than six months) exclusive versus mixed breastfeeding from developed countries. In accordance with conventional terminology used in Cochrane reviews, these strata are labelled below as 'comparisons'. Outcomes for each comparison are presented sequentially.

DESCRIPTION OF STUDIES

For details of included and excluded studies, *see* the 'Characteristics of included studies' and 'Characteristics of excluded studies' tables.

METHODOLOGICAL QUALITY

See 'Characteristics of included studies' table.

RESULTS

Comparison one: controlled trials of exclusive versus mixed breastfeeding for four to six months, developing countries

Two studies were found in this category, both from the same group of investigators and involving the same study setting (Honduras). The first of these studies, Cohen 1994a, involved term infants unselected for birthweight but included 29 infants (19.9%) weighing less than 2500 g at birth. The second, Dewey 1999a, was restricted to term infants weighing less than 2500 g at birth. The quality ratings of these two trials were not high for several reasons. First, in both trials, allocation was within clusters defined by weeks, rather than to individual women, yet the results were analyzed with individual women and infants as the units of analysis; any similarities in outcome within weeks (intracluster correlation) would tend to reduce the true effective sample size and thereby overestimate the precision (i.e., underestimate the variance) of the results. Second, the first trial allocated the weeks by alternation, rather than by strict randomization, thereby creating a potential for nonconcealment and uncontrolled confounding bias at enrollment (although there is no evidence that such bias actually occurred). Third, the published results were not based on analysis by intention to treat. Most of the babies not analyzed in these two trials were truly lost to follow up; however, rather than excluded for noncompliance, the latter were restricted to four babies (three in the exclusive breastfeeding (EBF) group, one in the mixed breastfeeding (MBF) group) in the first trial and three babies (all three in the exclusive breastfeeding group) in the second trial. Moreover, the investigators have provided (unpublished) data on weight and length gain on five of the nine dropouts in the second Honduran trial (three of the nine moved away before six months), thereby substantially reducing the potential for selection bias in the analysis of that trial.

Most importantly, despite the above-noted methodological problems, these two trials are the only studies uncovered by our search that used an experimental design to specifically address the four to six months versus 'about six months' controversy. Thus, at least with respect to bias due to known and unknown confounding variables, these trials are methodologically superior to any of the observational studies included in this review despite their methodological imperfections. Furthermore, the investigators made a considerable effort to ensure compliance with the assigned allocation and to standardize the training of the observers who performed the anthropometric measurements, thereby reducing the random error (improving the precision) of these measurements. Finally, detailed comparisons between trial participants and eligible nonparticipants demonstrated no differences that would detract from the external validity (generalizability) of the trials' findings, at least for the specific type of setting where the study was conducted (an urban, low-income population in Honduras).

For all analyses, the two mixed breastfeeding groups (one of which was intended to maintain frequency of breastfeeding) in the first trial were combined for the purposes of this analysis. Monthly weight gain from four to six months was nonsignificantly slightly higher among infants whose mothers were assigned to continued exclusive breastfeeding (weighted mean difference (WMD) +20.78; 95% confidence interval (CI) -21.99 to +63.54 g/mo) (outcome one). Thus the 95% CI is statistically compatible with a weight gain only 22 g/mo lower in the EBF group, which represents approximately 5% of the mean and 15% of the standard deviation (SD) for the monthly weight gain. Weight gain from 6 to 12 months (outcome two) was almost identical in the two groups (WMD -2.62; 95% CI -25.85 to +20.62 g/mo).

For length gain from four to six months, the WMD was 1.0 mm/mo (95% CI -0.40 to +2.40 mm/mo); the lower confidence limit represents only 2% of the mean and 8% of the SD for monthly length gain (outcome three). As with weight gain, length gain from 6 to 12 months (outcome four) was nearly identical in the two groups (WMD -0.4; 95% CI -1.0 to +0.2 mm/mo).

Weight-for-age, length-for-age, and weight-for-length z-scores at six months (outcomes five to seven) were all nonsignificantly higher in the EBF group (WMD +0.18; 95% CI -0.06 to +0.41; WMD +0.11; 95% CI -0.11 to +0.33; and WMD +0.09; 95% CI -0.13 to +0.31, respectively).

The impact of the small sample size of the two Honduran trials is evident when examining the risk of undernutrition, as represented by anthropometric z-scores less than -2 at six months (outcomes 8 to 10). For weight-for-age, the pooled RR was 2.14 (95% CI 0.74 to 6.24), which is statistically compatible with a six-fold increase in risk. The results were somewhat more reassuring for length-for-age (RR 1.18; 95% CI 0.56 to 2.50) but not for weight-for-length (RR 1.38; 95% CI 0.17 to 10.98).

All hematologic results (outcomes 11 to 19) are based on the first Honduras trial (Cohen 1994a), since in the second trial (Dewey 1999a, restricted to low birthweight infants), infants with low hemoglobin concentrations at two and four months were supplemented with iron. A nonsignificantly higher proportion of infants in the exclusively breastfed group received iron supplements from six to nine months (RR 1.20; 95% CI 0.91 to 1.58) (outcome 11). This is consistent with the significantly lower average hemoglobin concentration at six months in the exclusively breastfed group (difference = -5.00 (95% CI -8.46 to -1.54) g/L) (outcome 12). A nonsignificantly higher proportion of exclusively breastfed infants had a hemoglobin concentration below 110 g/L at six months (RR 1.20; 95% CI 0.91 to 1.58) (outcome 13). Similarly, mean plasma ferritin concentration was significantly lower at six months in the exclusively breastfed infants (difference = -18.90 (95% CI -37.31 to -0.49) mcg/L), with a RR for a low (less than 15 mcg/L) ferritin concentration of 2.93 (95% CI 1.13 to 7.56) (outcomes 17 and 19).

In the second trial, no significant effect was seen on the proportion of infants with a low zinc concentration (less than 70 mcg/dL) at six months (RR 0.75; 95% CI 0.43 to 1.33) (outcome 20).

In the pooled results from both Honduran trials, no significant difference was seen between the EBF and MBF groups for the percentage of days with fever, cough, or nasal congestion, nasal discharge, hoarseness, or diarrhea from four to six months (outcomes 21 to 26), nor for fever, nasal congestion, or diarrhea from 6 to 12 months (outcomes 27 to 29).

Again based on pooled results from both trials, mothers in the exclusively breastfed group reported that their infants crawled at an average of 0.80 (95% CI 0.34 to 1.26) months sooner (outcome 30). No difference was seen, however, in the mean age at which the infants were reported to have first sat from a lying position (WMD -0.17 (95% CI -0.56 to +0.21) months) (outcome 31). The results from the two Honduras trials (Cohen 1994a; Dewey 1999a) differed with respect to maternal reports of walking by 12 months (outcome 32), with a significantly lower proportion of exclusively breastfed infants reported as not having walked by 12 months in the first trial (RR 0.66; 95% CI 0.45 to 0.98), but a nonsignificantly higher proportion not having done so in the second trial (RR 1.12; 95% CI 0.90 to 1.38), with statistically significant (P < .01) heterogeneity between the two trials.

Mothers in the exclusively breastfed group (from the two trials combined) had a statistically significantly larger weight loss from four to six months (WMD 0.42; 95% CI 0.02 to -0.82) kg) (outcome 33). Women in the exclusively breastfed group were also nonsignificantly less likely to have resumed menses by six months postpartum (RR 0.58 (95% CI 0.33 to 1.03); the effect was statistically significant in the second Honduras trial when considered alone (RR 0.35; 95% CI 0.14 to 0.91) (outcome 34).

Comparison two: observational studies of exclusive versus mixed breastfeeding for three to seven months, developing countries

The main concern in using an observational design to compare outcomes with EBF versus MBF is confounding due to differences in socioeconomic status, water and sanitation facilities, parental size (a proxy for genetic potential), and (perhaps most importantly) weight and length at the time complementary foods were first introduced in the mixed breastfeeding group. The latter source of confounding (i.e., by indication) will arise if poorly-growing infants are more likely to receive complementary foods.

Four cohort studies in this category from Peru (Brown 1991a), the Philippines (Adair 1993a), Senegal (Simondon 1997a), and Iran (Khadivzadeh 2004) found no evidence of confounding by indication, Adair 1993a found no confounding by several other potential factors, and (in unpublished data provided by the authors) Simondon 1997a calculated adjusted means for weight and length gain from four to six months. Nonetheless, the inability of observational studies to control for subtle (and unknown) sources of confounding and selection bias suggests the need for cautious interpretation. All four studies reported on monthly weight gain from four to six months (outcome one). The WMD was -10.10 (95% CI -27.68 to +7.48) g/mo, a lower confidence limit compatible with a deficit of only 7% of the mean and less than 15% of the SD for monthly weight gain. The Simondon 1997a study also reported on monthly weight gain from six to nine months (difference = -6.00 (95% CI -54.15 to +42.15) g/mo) (outcome two). All four studies also reported on monthly length gain from four to six months (outcome three); the WMD was +0.4 (95% CI -0.2 to +1.1) mm/mo, a lower confidence limit statistically compatible with a reduced length gain in the EBF group less than 2% of the mean and 4% of the SD. The Simondon 1997a study also reported on monthly length gain from six to nine months (outcome four), and again the results excluded all but a small reduction in the exclusively breastfed group (difference = +0.4 (95% CI -0.6 to +1.4) mm/mo).

Onayade 2004 actually reported significantly higher absolute weights at both five and six months in the EBF group but did not analyze weight gains; the absence of control for confounding differences between the EBF and MBF groups, as well as the possibility of reverse causality (i.e., those infants with lower weights may have been more likely to receive complementary feeding) argue for cautious interpretation, however.

The Simondon 1997a study also provided (unpublished) data on anthropometric z-scores and mid-upper arm circumference. EBF was associated with nonsignificantly higher WMD z-scores at six to seven and 9 to 10 months: +0.13 (95% CI -0.09 to +0.35) and +0.09 (95% CI -0.15 to +0.33), respectively, for weight-for-age (outcomes five and six); +0.04 (95% CI -0.14 to +0.22) and +0.11 (95% CI -0.09 to +0.31), respectively, for length-for-age (outcomes seven and eight); and +0.11 (95% CI -0.09 to +0.31) and +0.01 (95% CI -0.21 to +0.23), respectively, for weight-for-length (outcomes 9 and 10). The relative risks for low (less than -2) z-scores at six to seven and 9 to 10 months were 0.92 (95% CI 0.54 to 1.58) and 0.93 (95% CI 0.64 to 1.36), respectively, for weight-for-age (outcomes 11 and 12); 1.20 (95% CI 0.57 to 2.53) and 1.21 (95% CI 0.62 to 2.37), respectively, for length-for-age (outcomes 13 and 14); and 0.42 (95% CI 0.12 to 1.50) and 0.82 (95% CI 0.39 to 1.71), respectively, for weight-for-length (outcomes 15 and 16). Mid-upper arm circumference was nonsignificantly higher in the EBF group at both six to seven and 9 to 10 months: WMD +2.0 (95% CI -0.4 to +4.4) mm and +1.0 (95% CI -1.6 to +3.6) mm, respectively (outcomes 17 and 18).

Huffman 1987 reported a longer median duration of lactational amenorrhea associated with EBF (for ³7 months) versus MBF (16.1 versus 15.3 months, respectively), but means and SDs were not reported. In a multivariate (Cox) regression model adjusting for maternal education, parity, religion, and weight, EBF for ³6 months was associated with a significantly longer time to resumption of menses versus EBF for less than one month, but no direct comparison was reported versus MBF. Simondon 1997a reported a lower risk of resumption of menses by six to seven months (outcome 21) in the EBF group: crude RR 0.19 (95% CI 0.05 to 0.79), adjusted odds ratio (OR) 0.19 (95% CI 0.04 to 0.86).

Khadivzadeh 2004 found a lower incidence of both gastrointestinal (11 versus 27%; RR 0.41; 95% CI 0.21 to 0.78) and respiratory (23 versus 35%; RR 0.68; 95% CI 0.43 to 1.06) infection at four to six months in the EBF group (outcomes 19 and 20). Onayade 2004 reported corresponding crude ORs of 0.02 (95% CI 0.01 to 0.09) and 0.43 (95% CI 0.17 to 1.00), respectively, but did not provide numerators and denominators and did not control for confounding differences between the EBF and MBF groups.

Cross-sectional studies share all of the methodological shortcomings of other observational designs (*see* above) plus one important additional one: selective loss to follow up. In particular, children who die, are hospitalized, or are referred to a site other than the one under study, may be more likely to experience morbidity or suboptimal growth. If such (unstudied) infants are more heavily represented in one of the feeding groups, the resulting comparison will be biased.

One large cross-sectional study from Chile (Castillo 1996) reported a similar risk of weight-for-age z-score less than -1 and height-for-age z-score less than -1 from three to five and six to eight months in the two feeding groups, but the prevalences, CIs, and standard errors for the reported prevalence ratios are not published, thus precluding any assessment of sampling variation.

Comparison three: observational studies of prolonged (more than six months) exclusive versus mixed breastfeeding, developing countries

One small cross-sectional study from Pune, India (Rao 1992) permitted analysis only of male infants, since a relatively large fraction of female infants in the MBF group received artificial feeding in the first six months of life. The results (outcome one) showed a nonsignificant reduction of low (less than 75% of the reference mean) weight-for-age at 6 to 12 months of age in the exclusively breastfed males (RR 0.61; 95% CI 0.26 to 1.43). The strong possibility of confounding by age, even within the range of 6 to 12 months (the EBF group is likely to have been younger, on average, and therefore less undernourished), further limits the reported result.

A cohort study from Bangladesh (Khan 1984) reported similar weight and length gains in infants who were exclusively breastfed, those who were breastfed with supplements beginning at 6 to 11 months, and those who were exclusively breastfed for 12 months and supplemented between 12 and 15 months. Unfortunately, the data are presented only graphically and without standard deviations, thus preventing a quantitative assessment or pooling with data from other studies.

Comparison four: observational studies of exclusive versus mixed breastfeeding for three to seven months, developed countries

A pooled sample of breastfed infants from seven studies carried out in six developed countries (WHO 1994a), a pooled analysis from five countries (two developed, three developing, but in which study women were all literate and of middle to high socioeconomic status) (WHO 1997), a large cohort study nested within a randomized trial in Belarus (Kramer 2000a), and a small study from Sweden (Akeson 1996a) reported on weight gain between three and eight months. WHO 1997 and Kramer 2000a controlled for confounding by indication (size or growth in first three to four months) and other potential confounders using multilevel (mixed) regression analyses. Statistically significant (P = .02) heterogeneity was observed among the four studies, with considerably larger mean weight gains in both groups from Belarus and a slightly but significantly higher gain in the MBF group (outcome one). Because of this heterogeneity, the WMD of -12.45 (95% CI -23.46 to -1.44) g/mo should be interpreted with caution; even the lower 95% confidence limit of this estimate, however, is compatible with a lower weight gain in the EBF group of less than 4% of the mean and less than 15% of the SD for the Belarussian study. Moreover, given the large weight gains in both groups in the Belarussian study, the higher gain in the MBF group is not necessarily a beneficial outcome. Heinig 1993 and Kramer 2000a also reported on weight gain between six and nine months (outcome two). Again, the results show significant heterogeneity (P = .04) but are dominated by the larger size of the Belarussian study. The pooled WMD was -2.26 (95% CI -16.94 to +12.42) g/mo. Akeson 1996a, Heinig 1993, and Kramer 2000a reported on weight gain from 8 to 12 months (outcome three); the WMD was -1.82 (95% CI -16.72 to +13.08) g/mo, which excludes a reduced length gain in the EBF group of 5% of the mean and 10% of the SD for the Belarussian study.

For length gain at three to eight months (outcome four), the studies again show significant (P < .01) heterogeneity. Kramer 2000a found a slightly but significantly lower length gain in the EBF group at four to eight months (difference -1.1 (95% CI -1.7 to -0.5) mm/mo), whereas the pooled analysis yielded a WMD of -0.4 (95% CI -0.7 to 0.0) mm/mo; the lower confidence limit is statistically compatible with a reduced length gain of less than 4% of the mean and 10% of the SD for the Belarussian study. Heinig 1993 and Kramer 2000a also reported on length gain at six to nine months (WMD -0.4 (95% CI -1.0 to +0.1) mm/mo) (outcome five). For the eight to 12 month period, the results show a slightly but significantly higher length gain in the EBF group (WMD +0.9 (95% CI +0.3 to +1.4)) mm/mo (outcome six).

Observational analyses from the Belarussian study (Kramer 2000a) also include data on weight-for-age, length-for-age, and weight-for-length z-scores at six, nine, and 12 months. Means in both the EBF and MBF groups were well above (+0.5 to +0.6) the reference values at all three ages. Nonetheless, the weight-for-age z-score was slightly but significantly lower in the EBF group at all three ages: WMD -0.09 (95% CI -0.16 to -0.02) at six months, -0.10 (95% CI -0.18 to -0.02) at nine months, and -0.09 (95% CI -0.17 to -0.01) at 12 months (outcomes seven to nine). Length-for-age z-scores were very close to the reference (0) at six and nine months

and slightly above the reference (0.15) at 12 months. Again, the EBF group had slightly but significantly (except at 12 months) lower values: WMD -0.12 (95% CI -0.20 to -0.04) at six months, -0.14 (95% CI -0.22 to -0.06) at nine months, and -0.02 (95% CI -0.10 to +0.06) at 12 months (outcomes 10 to 12). Mean weight-for-length z-scores were high and rose (from about 0.65 to 0.80) from 6 to 12 months, with no significant differences between the EBF and MBF groups at any age: WMD +0.02 (95% CI -0.07 to +0.11) at six months, +0.03 (95% CI -0.06 to +0.12) at nine months, and -0.08 (95% CI -0.17 to +0.01) at 12 months (outcomes 13 to 15).

The prevalence of low (less than -2) z-scores did not differ significantly in the two Belarussian feeding groups for any of the three z-scores at any of the three ages, although the small number of infants with low z-scores provided low statistical power to detect such differences. RRs (and 95% CIs) for low weight-for-age were 0.92 (0.04 to 19.04) at six months, 1.52 (0.16 to 14.62) at nine months and 1.15 (0.13 to 10.31) at 12 months (outcomes 16 to 18). For length-for-age, the corresponding figures were 1.53 (0.84 to 2.78) at six months, 1.46 (0.80 to 2.64) at nine months, and 0.66 (0.23 to 1.87) at 12 months (outcomes 19 to 21). For weight-for-length, the figures were 0.31 (0.02 to 5.34) at six months, 1.14 (0.24 to 5.37) at nine months, and 1.15 (0.13 to 10.31) at 12 months (outcomes 22 to 24).

The Belarussian study also provided data on head circumference. No significant differences were observed at six months (difference -1.0 (95% CI -2.3 to +0.3) mm) (outcome 25) or nine months (+ 0.7 (95% CI -0.6 to +2.0) mm) (outcome 26), but the EBF group had a slightly but significantly larger circumference at 12 months (outcome 27): difference = +1.9 (95% CI +0.6 to +3.2) mm.

Heinig 1993 reported nearly identical sleeping time (729 versus 728 minutes/day) in the two groups (outcome 28). Akeson 1996a reported similar total amino acid and essential amino acid concentrations at six months of age in the two feeding groups (outcomes 29 and 30). Both Kramer 2000a and a cohort study from Finland (Kajosaari 1983) reported an atopic eczema at one year (outcome 31). The two studies showed statistically significant (P = .03) heterogeneity, with Kajosaari 1983 reporting a significantly reduced risk (RR 0.40; 95% CI 0.21 to 0.78), but the larger Belarussian study finding a much lower absolute risk in both feeding groups and no risk reduction with EBF (RR 1.00; 95% CI 0.60 to 1.69). Although Kajosaari 1983 also reported a reduced risk of a history of food allergy (outcome 32), double food challenges showed no significant risk reduction (RR 0.77; 95% CI 0.25 to 2.41) (outcome 33). Neither Oddy 1999 nor Kramer 2000a found a significant reduction in risk of recurrent (two or more episodes) wheezing in the EBF group (pooled RR 0.79; 95% CI 0.49 to 1.28) (outcome 34). In the Kajosaari 1983 study, the reduction in risk of any atopy at five years (outcome 35) in the EBF group was nonsignificant (RR 0.68; 95% CI 0.40 to 1.17), and no reduction in risk was observed for atopic eczema (RR 0.97; 95% CI 0.50 to 1.89) (outcome 36). A reduction in risk of borderline significance was observed for pollen allergy at five years (RR 0.53; 95% CI 0.28 to 1.01) (outcome 37). Both Kajosaari 1983 and Oddy 1999 reported on risk of asthma at five to six years (outcome 38); the pooled RR was 0.91 (95% CI 0.61 to 1.36). Reduced risks of history of food allergy (RR 0.61; 95% CI 0.12 to 3.19) (outcome 39) and allergy to animal dander (RR 0.81; 95% CI 0.24 to 2.72) at five years (outcome 40) were far from achieving statistical significance. Oddy 1999 found no reduction in risk of a positive skin prick test at six years in the EBF group (RR 0.99; 95% CI 0.73 to 1.35) (outcome 41).

A small Italian study of hematologic outcomes at 12 months by Pisacane in 1995 reported a statistically significantly higher hemoglobin concentration (117 versus 109 g/L (95% CI for the difference = +4.03 to +11.97 g/L)) (outcome 42), a nonsignificant reduction in anemia (hemoglobin less than 110 g/L) (RR 0.12; 95% CI 0.01 to 1.80) (outcome 43), a nonsignificantly higher ferritin concentration (WMD +4.7; 95% CI -6.3 to +15.7 mcg/L) (outcome 44), and a nonsignificant reduction in the risk of low (less than 10 mcg/L) ferritin concentration (RR 0.42; 95% CI 0.12 to 1.54) (outcome 45) among infants in the EBF group. Of note in this study is that the exclusive and mixed breastfeeding continued in both groups until at least 12 months (a criterion for selection into the Pisacane 1995 study).

Kramer 2000a recorded only one and two deaths (outcome 46) among the 621 and 2862 Belarussian infants in the EBF and MBF groups, respectively (RR 2.30; 95% CI 0.21 to 25.37). The EBF had a significantly reduced risk of one or more episodes of gastrointestinal infection in the first 12 months of life (RR 0.67; 95% CI 0.46 to 0.97) (outcome 47), which was maintained in a multivariate mixed model controlling for geographic origin, urban versus rural location, maternal education, and number of siblings in the household (adjusted OR 0.61; 95% CI 0.41 to 0.93). No significant reduction in risk was observed for hospitalization for gastrointestinal infection, however (RR 0.79; 95% CI 0.42 to 1.49) (outcome 48). In the above-mentioned Australian cohort study, Oddy 1999 found no significant reduction of risk for one or more episodes of upper respiratory tract infection (outcome 49) in the EBF group (RR 1.07; 95% CI 0.96 to 1.20). Neither Oddy 1999 nor Kramer 2000a found a significantly reduced risk of two or more such episodes (pooled RR 0.91; 95% CI 0.82 to 1.02) (outcome 50). Nor did Oddy 1999 find a significant reduction in risk of four or more episodes of upper respiratory infection (RR 0.82; 95% CI 0.52 to 1.29) (outcome 51) or of one or more episodes of lower respiratory tract infection (RR 1.07; 95% CI 0.86 to 1.33) (outcome 52). Kramer 2000a found a small and nonsignificant reduction in risk of two or more respiratory tract infections (upper and lower combined) (RR 0.90; 95% CI 0.79 to 1.03) (outcome 53). The combined crude results of Oddy 1999 and Kramer 2000a show a substantial and statistically significant reduction in risk for hospitalization for respiratory tract infection (pooled RR 0.75; 95% CI 0.60 to 0.94), but the crude risk reduc-

tion in Kramer 2000a was nearly abolished and became statistically nonsignificant in a multivariate mixed model controlling for geographic region, urban versus rural location, maternal education and cigarette smoking, and number of siblings in the household (adjusted OR 0.96; 95% CI 0.71 to 1.30) (outcome 54).

In a study from Tucson, Arizona, (Duncan 1993) reported no difference in the average number of episodes of acute otitis media in the first 12 months of life (outcome 55) in the exclusive versus MBF groups (1.48 versus 1.52 episodes, respectively) (95% CI for the difference -0.49 to +0.41 episodes). Duncan 1993 and Kramer 2000a both found a slightly elevated risk for one or more episodes of otitis media (pooled RR 1.28; 95% CI 1.04 to 1.57) (outcome 56), but Duncan 1993 found a nonsignificant reduction in risk for frequent otitis media (RR 0.81; 95% CI 0.43 to 1.52) (outcome 57).

Comparison five: observational studies of prolonged (more than six months) exclusive versus mixed breastfeeding, developed countries

A small observational cohort study from the Baltimore-Washington area (U.S.) (Ahn 1980) reported "no differences in the overall rates of gain in weight and length" for the first year of life in infants who were exclusively breastfed beyond six months versus those exclusively breastfed for less than six months and mixed breastfed thereafter. The actual data were not reported, however, and thus cannot be assessed quantitatively in this review.

One small Finnish study (Savilahti 1987a) reported no difference in lipid concentrations at nine months among infants exclusively breastfed for nine months versus those exclusively breastfed for six months and mixed breastfed from six to nine months. Similar concentrations were observed for very low density lipoprotein, low density lipoprotein, high-density lipoprotein-2, high-density lipoprotein-3, apoprotein B, and total triglycerides (outcomes one to six).

DISCUSSION

Neither the controlled clinical trials nor the observational studies (predominantly cohort studies) from either developing or developed countries suggest that infants who continue to be exclusively breastfed for six months show deficits in weight or length gain from three to seven months or thereafter. Owing to the large sample sizes required to detect modest effects on the incidence of low (less than -2) anthropometric z-scores, however, the data are insufficient to rule out a modest increase in risk of undernutrition with exclusive breastfeeding for six months and grossly inadequate to reach conclusions about the effects of prolonged (more than six months) exclusive breastfeeding.

Consistent with the results of previous observational studies, none of which met the selection criteria for this review, the large Belarussian study (Kramer 2000a) found a significant reduction in risk of one or more episodes of gastrointestinal infection. Two recent studies from Iran (Khadivzadeh 2004) and Nigeria (Onayade 2004) reported reductions in risk of both gastrointestinal and respiratory infection. Combined data from Finland, Australia, and Belarus do not suggest a protective effect against short- or long-term atopic outcomes.

The data are conflicting with respect to iron status, but the controlled trials from Honduras (Cohen 1994a; Dewey 1999a) suggest that, at least in developing-country settings where maternal iron status (and thus newborn iron stores) may be suboptimal, exclusive breastfeeding without iron supplementation may compromise hematologic status by six months of age. The reasons for the superior hematologic status reported in Italian infants exclusively breastfed for at least seven months are unclear.

Data from the two Honduran trials (Cohen 1994a; Dewey 1999a) and the Bangladeshi cohort study (Huffman 1987) suggest that exclusive breastfeeding through six months is associated with delayed resumption of menses, at least in settings with high breastfeeding frequency. The more prolonged lactational amenorrhea represents an additional advantage of continued exclusive breastfeeding in developing-country settings.

The two Honduran trials (Cohen 1994a; Dewey 1999a) also found prolonged exclusive breastfeeding to be associated with more rapid maternal postpartum weight loss. Such an effect would be an additional benefit if it were generalizable to developed-country settings where gestational weight gains and postpartum weight retention are high, but would be a disadvantage if it applied to undernourished women in developing countries.

In the two Honduran trials (Cohen 1994a; Dewey 1999a), mothers allocated to the prolonged exclusive breastfeeding group reported that their infants crawled at a significantly younger age. No such difference was seen, however, in the age at which the infants first sat from lying position, and the results for walking by 12 months differed in the two trials. The inconsistency of these results, coupled with the potential for biased maternal reporting due to nonblinding, suggest the need for cautious interpretation and further study.

AUTHORS' CONCLUSIONS

Implications for practice

We found no objective evidence of a 'weanling's dilemma'. Besides their reduced morbidity due to gastrointestinal infection, infants breastfed exclusively for six or more months had no observable deficits in growth, and their mothers were more likely to remain amenorrheic for six months postpartum. No benefits of introducing complementary foods between four and six months have been demonstrated, with the exception of improved iron status in one developing-country setting (Honduras). Since the latter benefit

can be achieved more effectively by medicinal iron supplementation (e.g., vitamin drops), it does not appear to justify incurring the adverse effects of liquid or solid food supplementation on infectious morbidity, and lactational amenorrhea. Thus, with the caveat that individual infants must still be managed individually, so that insufficient growth or other adverse outcomes are not ignored and appropriate interventions are provided, the available evidence demonstrates no apparent risks in recommending, as a general policy, exclusive breastfeeding for the first six months of life in both developing and developed-country settings. In fact, in response to the original version of this review, World Health Organization and the World Health Assembly modified its recommendations for the duration of exclusive breastfeeding (WHO 2001b).

Implications for research

The investigators involved in the two Honduran trials took a step in the right direction when they opted for an experimental design to overcome problems with confounding (particularly confounding by indication) and selection bias inherent in observational designs. The results of observational studies from developing countries are consistent with the results of the two Honduran trials, especially with respect to growth. Nonetheless, the small number of studies and of infants studied, as well as uncertainty about the net direction and magnitude of potential biases, underscore the need for further research, particularly to rule out modest differences in risk of undernutrition.

It would seem prudent, therefore, to undertake larger, truly randomized trials of exclusive breastfeeding for six months to exclude differences in risk of malnutrition in developing countries, and to confirm or undermine the findings on infectious morbidity. Because of the strong potential for contamination (similar practices among women who interact with one another), cluster randomization by clinic or even community may well be the preferred research design strategy. Longer-term impacts on child intelligence, neuromotor development, blood pressure, growth, and atopic disease and on maternal and child social and emotional are also worth pursuing.

NOTES

This review has been processed through the Cochrane Pregnancy and Childbirth Group although its subject matter falls outside the scope of the Group. The Group's scope does include the initiation of breastfeeding, but not the timing of its cessation. However, the topic is clearly of global importance and because it did not readily fit within the scope of any Cochrane review group, the Pregnancy and Childbirth Group was happy to assist with publication. This review was based on a systematic review by M Kramer, that was commissioned by the World Health Organization (WHO). The WHO review was very extensively peer reviewed by experts in review methodology and statistics, and in infant nutrition and lactation, including experts that the Review Group would have approached for our own refereeing purposes. We have therefore not sought an initial protocol, nor subjected the Cochrane review to further peer review of this type. The review has, however, been reviewed by the Consumer Panel of the Pregnancy and Childbirth Group.

There are other unusual features of this review:
(1) Its title does not fit with the standard Cochrane format but we have been unable to construct a satisfactory title that does, whilst doing justice to the scope of the topic.
(2) It includes data from studies in addition to randomised trials.
(3) Maintenance and updating will be the sole responsibility of the contact author as the search strategy of our Review Group does not extend to this topic.

Jim Neilson
Co-ordinating Editor
Cochrane Pregnancy and Childbirth Group

POTENTIAL CONFLICT OF INTEREST

Dr Kramer is the principal investigator of one of the studies (Kramer 2000a) included in this review.

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** Indicates the major publication for the study*

TABLES

Characteristics of included studies

Study	**Adair 1993a**
Methods	Design: prospective cohort. Quality assessment Control for confounding: A. Follow up: A. Blinding: A for weight, B for length.
Participants	1204 Filipino infants.
Interventions	EBF = little or no nutritive foods or fluids other than BF for 6 months (n = 370). MBF = BF with introduction of nutritive foods or liquids at 4 months (n = 834).
Outcomes	Weight and length gain 4-6 months.
Notes	Multivariate analysis did not affect outcome comparison, but data not presented.
Allocation concealment	D – Not used

Study	**Ahn 1980**
Methods	Design: retrospective cohort. Quality assessment

Characteristics of included studies (*Continued*)

	Control for confounding: B. Follow up: C. Blinding: A for weight, B for length.
Participants	96 healthy U.S. infants living in Baltimore-Washington area who were EBF for at least 6 months.
Interventions	EBF = BF with no solids or liquids other than human milk for > 6 months (n = 50). MBF = EBF for <= 6 months, then MBF until > 6 months (n = 46).
Outcomes	Weight and length gain in first 12 months.
Notes	1. No quantitative data provided. 2. Data requested on weight and length gain and illnesses in first year.
Allocation concealment	D – Not used

Study	**Akeson 1996a**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: C. Blinding: A for weight and blood analyses, B for length.
Participants	44 healthy Swedish infants EBF for the first 3 months.
Interventions	EBF = BF + < 125 ml/day of formula for >= 6 months (n = 26). MBF = EBF for >= 3 months, then BF >= 2 times/day + > 125 ml/day of formula for >= 6 months (n = 18).
Outcomes	Weight and length gain 4-8 months, 6-9, and 8-12 months; total and essential amino acid concentrations at 6 months.
Notes	1. N's in tables not provided for weight and length. 2. Identical data for length gain for the 2 groups at 8-12 months: misprint?
Allocation concealment	D – Not used

Study	**Brown 1991a**
Methods	Design: prospective cohort. Quality assessment Control for confounding: B. Follow up: C. Blinding: A for weight, B for length.
Participants	36 poor, peri-urban Peruvian infants.
Interventions	EBF = little or no nutritive foods or fluids other than BF for 6 months (n = 15). MBF = BF with introduction of nutritive foods and fluids at 4 months (n = 21).
Outcomes	Weight and length gain 4-6 months.
Notes	Multivariate analysis did not affect outcome comparison, but data not presented.
Allocation concealment	D – Not used

Study	**Castillo 1996**
Methods	Design: cross-sectional. Quality assessment Control for confounding: C. Follow up: C. Blinding: A for weight, B for length.
Participants	1122 Chilean children 3.0-5.9 months of age.

Characteristics of included studies (*Continued*)

Interventions	EBF = BF only (unclear if water, juices, or other liquids permitted) (n = 974). MBF = EBF for >= 2.9 months, then BF + solid food (n = 148).
Outcomes	Low WAZ, LAZ, high WLZ.
Notes	1. Cannot use data quantitatively, because prevalences, confidence intervals, and SEs not provided. 2. Low WAZ and LAZ defined as <- 1, high WLZ as >+ 1.
Allocation concealment	D – Not used

Study	**Cohen 1994a**
Methods	Design: controlled trial. Quality assessment Randomization: C. Follow up: C. Blinding: A for weight and maternal postpartum weight loss, B for length, developmental milestones, and lactational amenorrhea. Jadad scale Randomization: 0/2. Double-blinding: 0/2. Withdrawals: 1/1. Total Jadad scale score: 1/5.
Participants	141 Honduran infants of low-income families with poor sanitation.
Interventions	EBF = BF with no other liquids or solids until 6 months (n = 50). MBF = introduction of complementary solid food at 4 months with either ad libitum nursing (SF) or maintenance of baseline nursing frequency (SF-M) (n = 91).
Outcomes	Weight and length gain 4-6 and 6-12 months; WAZ, LAZ, and WLZ at 6 months; receipt of Fe supplements 6-9 months; hemoglobin and ferritin at 6 months; % of days with fever, cough, nasal congestion, nasal discharge, hoarseness, and diarrhea; age first crawled, age first sat from lying position, walking by 12 months; maternal postpartum weight loss 4-6 months; resumption of menses by 6 months.
Notes	1. Nonrandom allocation. 2. Cluster allocation by week of birth, while analyses done at individual level. 3. Analysis not based on intention to treat. 4. SF-M and SF groups combined as MBF group.
Allocation concealment	C – Inadequate

Study	**Dewey 1999a**
Methods	Design: controlled trial. Quality assessment Randomization: B. Follow up: C. Blinding: A for weight, B for length. Jadad scale Randomization: 1/2. Double-blinding: 0/2. Withdrawals: 1/1. Total Jadad scale score: 2/5.
Participants	119 LBW Honduran term infants.
Interventions	EBF = BF with no other liquids or solids until 6 months (n = 59). MBF = introduction of complementary solid food at 4 months with maintenance of baseline nursing frequency (n = 60).

Characteristics of included studies (*Continued*)

Outcomes	Weight and length gain 4-6 and 6-12 months; WAZ, LAZ, and WLZ at 6 months; plasma zinc concentration at 6 months; % of days with fever, cough, nasal congestion, nasal discharge, hoarseness, and diarrhea; age first crawled, age first sat from lying position, walking by 12 months; maternal postpartum weight loss 4-6 months; resumption of menses by 6 months.
Notes	1. Cluster randomized by week of birth, while analyses done at individual level. 2. Analysis not based on intention to treat.
Allocation concealment	A – Adequate

Study	**Duncan 1993**
Methods	Design: prospective cohort. Quality assessment Control for confounding: A. Follow up: B. Blinding: B.
Participants	279 healthy U.S. infants.
Interventions	EBF = EBF for >= 6 months (n = 138). MBF = EBF for 4 months with introduction of formula or solid foods between 4 and 6 months (n = 141).
Outcomes	Number of episodes of OM, one or more episodes of OM, and frequent OM in first 12 months.
Notes	
Allocation concealment	D – Not used

Study	**Heinig 1993**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: C. Blinding: A for weight, B for length and sleeping time.
Participants	60 healthy U.S. infants living in Davis, CA.
Interventions	EBF = BF ± <= 120 ml/day of other milk or formula for >= 12 months and no solids < 6 months (n = 19). MBF = BF ± <= 120 ml/day of other milk or formula for >= 12 months; solids introduced at 4-6 months (n = 41).
Outcomes	Monthly weight and length gain at 6-9 and 9-12 months; total sleeping time at 9 months.
Notes	1. Data on weight and length gain 4-6 months included in pooled analysis of WHO 1994. 2. No quantitative data presented on morbidity.
Allocation concealment	D – Not used

Study	**Huffman 1987**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: B. Blinding: A.
Participants	1018 Bangladeshi women with live births.
Interventions	EBF = BF with no other liquids or solids for >= 7 months (n = 647). MBF = EBF for 4 months with introduction of liquid or solid supplements before 7 months (n = 371).

Characteristics of included studies (*Continued*)

Outcomes	Duration of lactational amenorrhea.
Notes	1. Over 95% of study women BF > 16 months, so all MBF women assumed to continue BF >= 6 months. 2. Multivariate (Cox) regression controlled for maternal education, parity, religion, and weight, but reference group EBF < 1 month.
Allocation concealment	D – Not used

Study	**Kajosaari 1983**
Methods	Design: prospective cohort. Quality assessment Control for confounding: B. Follow up: C. Blinding: C.
Participants	135 healthy Finnish infants of atopic parents.
Interventions	EBF = BF without cow milk-based formula; occasional water permitted; solids introduced at about 6 months (n = 70). MBF = BF with introduction of solids at about 3 months (n = 65)
Outcomes	Atopic eczema and food allergy at 1 year; any atopy, atopic eczema, pollen allergy, asthma, food allergy, and allergy to animal dander at 5 years.
Notes	Discrepancy between 1- and 5-year follow-up reports regarding sample sizes per group (inverted from 1 report to the other).
Allocation concealment	D – Not used

Study	**Khadivzadeh 2004**
Methods	Design: prospective cohort. Quality assessment Control for confounding: A. Follow up: A. Blinding: A for weight, B for morbidity measures.
Participants	193 healthy, term Iranian infants followed at 1 of 5 randomly urban health centres.
Interventions	EBF = no other liquid or solid before 6 months (n = 98). MBF = EBF for 4 months, then complementary foods.
Outcomes	Weight and length gains; incidence of respiratory and gastrointestinal infection during the period of 4 to 6 months.
Notes	1. EBF and MBF infants 'matched' for sex and for weight and length at 4 months, but matching criteria for weight and length not provided. 2. 2 EBF and 5 MBF infants excluded for "noncompliance" with self-selected group assignment.
Allocation concealment	D – Not used

Study	**Khan 1984**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: C. Blinding: A for weight, B for length.
Participants	48 rural Bangladeshi children.
Interventions	EBF = no other liquid or semi-solid food (water permitted) and introduction of supplementation between 12 and 15 months.

Characteristics of included studies (*Continued*)

	MBF = BF + introduction of supplements between 6 and 15 months.
Outcomes	Weight and length through 24 months; number of diarrheal episodes; average duration of diarrhea.
Notes	1. Graphical presentation of data only without SDs, thus precluding quantitative reporting. 2. Misprint in legend for Figure 2.
Allocation concealment	D – Not used

Study	**Kramer 2000a**
Methods	Design: prospective cohort nested within randomized trial. Quality assessment Control for confounding: A. Follow up: A. Blinding: A for weight, B for length and head circumference.
Participants	3483 healthy, term Belarussian infants.
Interventions	EBF = no liquids or solids other than breast milk for >= 6 months (n = 621). MBF = EBF for 3 months with introduction of nonbreast milk liquids or solids, or both, by 6 months (n = 2862).
Outcomes	Monthly weight and length gain 3-6, 6-9, and 9-12 months; WAZ, LAZ, WLZ, and head circumference at 6, 9, and 12 months; death; occurrence of and hospitalization for gastrointestinal and respiratory infection; atopic eczema and recurrent wheezing in first 12 months.
Notes	Growth outcomes analyzed using multilevel regression controlling for geographic region, urban vs rural location, maternal education, and size or growth <= 3 months.
Allocation concealment	D – Not used

Study	**Oddy 1999**
Methods	Design: prospective cohort within randomized trial. Quality assessment Control for confounding: C. Follow up: A for 1-year outcomes, B for asthma at 6 years, C for skin-prick tests at 6 years. Blinding: B.
Participants	510 Australian infants.
Interventions	EBF = no nonbreast milk or solids for >= 6 months (n = 246). MBF = EBF for 4 months, with introduction of nonbreast milk or solids, or both, at 4-6 months (n = 264).
Outcomes	Occurrence of and hospitalization for upper and lower respiratory tract infection and recurrent wheezing in first 12 months; asthma and skin-prick tests at 6 years.
Notes	1. Published article includes multivariate control for confounders, but data included here are raw and unpublished. 2. Current asthma at 6 years defined as doctor-diagnosed + wheeze in previous year without a cold + receipt of asthma medication.
Allocation concealment	D – Not used

Study	**Onayade 2004**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: A for illness episodes, C for weight. Blinding: A for weight, B for morbidity measures.

Characteristics of included studies (*Continued*)

Participants	309 healthy, term infants born in Nigerian urban university teaching hospital.
Interventions	EBF = no other liquid or solid for >= 6 months (n = 264). MBF = EBF for 4 to < 6 months, then water, formula, or cereal (n = 45).
Outcomes	Respiratory infection, gastrointestinal infection, weight, and length.
Notes	1. Only 34 of 45 MBF infants had recorded weights an lengths. 2. Error in Table 4: recorded n = 266 (vs 264 total) EBF infants with recorded weight and length. 3. No control for apparent (but small) sociodemographic differences between groups.
Allocation concealment	D – Not used

Study	**Pisacane 1995**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: C. Blinding: A.
Participants	30 term, appropriate-for-gestational-age Italian infants recruited at 6 months and BF for first year of life.
Interventions	EBF = BF only without any other fluids or solids for >= 7 months (n = 9). MBF = EBF for 4-6 months with other foods introduced before 7 months (n = 21).
Outcomes	Hemoglobin and serum ferritin concentrations at 12 months.
Notes	
Allocation concealment	D – Not used

Study	**Rao 1992**
Methods	Design: cross-sectional. Quality assessment Control for confounding: C. Follow up: C. Blinding: A for weight, B for length.
Participants	31 poor East Indian children < 3 years living under poor hygienic conditions.
Interventions	EBF = no supplementation with other milk or traditional solid foods for 6-12 months (n = 11). MBF = EBF for 6 months, then supplementation with other milk or traditional foods from 6-12 months (n = 20).
Outcomes	Weight-for-age < 75% of reference mean.
Notes	1. Study population included all children < 3 years living in 3 villages. 2. Data extracted for males only, because large proportion of females not initially EBF for >= 6 months.
Allocation concealment	D – Not used

Study	**Savilahti 1987a**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: C. Blinding: A.
Participants	26 healthy Finnish infants.
Interventions	EBF = BF without supplementary formula or solid foods for 9 months (n = 7). MBF = BF with introduction of solids at 6 months (n = 19).

Characteristics of included studies (*Continued*)

Outcomes	VLDL, LDL, HDL2, HDL3, apoprotein B, and total triglyceride concentration at 9 months.
Notes	Atopic outcomes not compared in EBF vs MBF groups as defined here.
Allocation concealment	D – Not used

Study	**Simondon 1997a**
Methods	Design: prospective cohort. Quality assessment Control for confounding: A for monthly weight and length gain 4-6 months, C for other outcomes. Follow up: B. Blinding: A for weight and length.
Participants	370 Senegalese infants recruited at 2-3 months.
Interventions	EBF = breast milk and water only until at least 6-7 months (n = 154). MBF = breast milk, water, and introduction of complementary food between 4 and 7 months of age (n = 216).
Outcomes	Monthly weight and length gain 4-6 and 6-9 months; WAZ, LAZ, WLZ, and mid-upper arm circumference at 4-5, 6-7, and 9-10 months; duration of lactational amenorrhea.
Notes	1. EBF = 'very late' group, MBF = 'early' and 'late' groups combined. 2. Monthly weight and length gains 4-6 months based on multivariate control for maternal size and education and z-score at 2-3 months.
Allocation concealment	D – Not used

Study	**WHO 1994a**
Methods	Design: prospective cohort. Quality assessment Control for confounding: C. Follow up: C. Blinding: A for weight, B for length.
Participants	Pooled sample of healthy developed-country infants (n = 358).
Interventions	EBF = BF ± other liquids for >= 6 months (n = 200). MBF = BF ± other liquids for >= 4 months with other milk ± solids introduced between 4 and 6 months (n = 158).
Outcomes	Monthly weight and length gain 4-6 months.
Notes	Multivariate control for initial weight and length, but data not presented.
Allocation concealment	D – Not used

Study	**WHO 1997**
Methods	Design: prospective cohort. Quality assessment Control for confounding: A. Follow up: C. Blinding: A for weight, B for length.
Participants	Pooled sample of mid-to high-SES infants from 2 developed and 3 developing countries (n = 556).
Interventions	EBF = BF ± noncaloric liquids for >= 6 months (n = 179). MBF = BF ± caloric liquids or solids introduced at 4-6 months (n = 377).
Outcomes	Monthly weight and length gain 4-8 months.

Notes	1. Multilevel regression used to control for maternal size and education and infant size and growth < 4 months. 2. Large losses to follow up; retained sample 'similar' to full sample, but details not provided.
Allocation concealment	D – Not used

BF: breastfeeding
EBF: exclusive breastfeeding
HDL2: high-density lipoprotein-2
HDL3: high-density lipoprotein-3
LAZ: length-for-age z-score
LBW: low birthweight
LDL: low density lipoprotein
MBF: mixed breastfeeding
OM: otitis media
SD: standard deviation
SE: standard error
SES: socioeconomic status
VLDL: very low density lipoprotein
vs: versus
WAZ: weight-for-age z-score
WLZ: weight-for-length z-score

Characteristics of excluded studies

Study	Reason for exclusion
Chantry 2006	The group with full breastfeeding from 4 to < 6 months did not necessarily continue mixed (partial) breastfeeding to at least 6 months.
Ly 2006	Both intervention and control groups were free to consume locally available complementary foods prior to 4 months and during the intervention period from 4 to 7 months.
Wang 2005	Those infants in the control group (mixed breastfeeding at ages 4-6 months) were not necesarily exclusively breastfed until 4 months.

ANALYSES

Comparison 01. Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Monthly weight gain from 4-6 months (g/mo)	2	265	Weighted Mean Difference (Fixed) 95% CI	20.78 [-21.99, 63.54]
02 Monthly weight gain from 6-12 months (g/mo)	2	233	Weighted Mean Difference (Fixed) 95% CI	-2.62 [-25.85, 20.62]
03 Monthly length gain 4-6 months (cm/mo)	2	265	Weighted Mean Difference (Fixed) 95% CI	0.10 [-0.04, 0.24]
04 Monthly length gain 6-12 months (cm/mo)	2	233	Weighted Mean Difference (Fixed) 95% CI	-0.04 [-0.10, 0.02]
05 Weight-for-age z-score at 6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	0.18 [-0.06, 0.41]
06 Length-for-age z-score at 6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	0.11 [-0.11, 0.33]
07 Weight-for-length z-score at 6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	0.09 [-0.13, 0.31]

08 Weight-for-age z-score < -2 at 6 months	2	260	Relative Risk (Fixed) 95% CI	2.14 [0.74, 6.24]
09 Length-for-age z-score < -2 at 6 months	2	260	Relative Risk (Fixed) 95% CI	1.18 [0.56, 2.50]
10 Weight-for-length z-score < -2 at 6 months	2	260	Relative Risk (Fixed) 95% CI	1.38 [0.17, 10.98]
11 Receipt of Fe supplements 6-9 months	1	139	Relative Risk (Fixed) 95% CI	1.20 [0.91, 1.58]
12 Hemoglobin concentration (g/L) at 6 months	1	139	Weighted Mean Difference (Fixed) 95% CI	-5.00 [-8.46, -1.54]
13 Hemoglobin concentration < 110 g/L at 6 months	1	139	Relative Risk (Fixed) 95% CI	1.20 [0.91, 1.58]
14 Hemoglobin concentration < 103 g/L at 6 months	1	139	Relative Risk (Fixed) 95% CI	1.29 [0.75, 2.23]
15 Hematocrit (%) at 6 months	1	139	Weighted Mean Difference (Fixed) 95% CI	-1.20 [-2.15, -0.25]
16 Hematocrit < 33% at 6 months	1	139	Relative Risk (Fixed) 95% CI	1.50 [0.85, 2.64]
17 Plasma ferritin concentration (mcg/L) at 6 months	1	135	Weighted Mean Difference (Fixed) 95% CI	-18.90 [-37.31, -0.49]
18 Plasma ferritin concentration < 12 mcg/L at 6 months	1	135	Relative Risk (Fixed) 95% CI	2.34 [0.86, 6.35]
19 Plasma ferritin concentration < 15 mcg/L at 6 months	1	135	Relative Risk (Fixed) 95% CI	2.93 [1.13, 7.56]
20 Plasma zinc concentration < 70 mcg/dL at 6 months	1	101	Relative Risk (Fixed) 95% CI	0.75 [0.43, 1.33]
21 % of days with fever 4-6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	0.26 [-1.29, 1.81]
22 % of days with cough 4-6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	2.83 [-2.22, 7.87]
23 % of days with nasal congestion 4-6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	0.11 [-4.41, 4.63]
24 % of days with nasal discharge 4-6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	0.26 [-2.60, 3.12]
25 % of days with hoarseness 4-6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	-0.19 [-1.17, 0.79]
26 % of days with diarrhea 4-6 months	2	260	Weighted Mean Difference (Fixed) 95% CI	1.15 [-0.35, 2.65]
27 % of days with fever 6-12 months	2	258	Weighted Mean Difference (Fixed) 95% CI	-0.39 [-2.80, 2.02]
28 % of days with nasal congestion 6-12 months	2	258	Weighted Mean Difference (Fixed) 95% CI	3.11 [-0.12, 6.35]
29 % of days with diarrhea 6-12 months	2	258	Weighted Mean Difference (Fixed) 95% CI	-0.74 [-2.34, 0.86]
30 Age first crawled (mo)	2	240	Weighted Mean Difference (Fixed) 95% CI	-0.80 [-1.26, -0.34]
31 Age first sat from lying position (mo)	2	238	Weighted Mean Difference (Fixed) 95% CI	-0.17 [-0.56, 0.21]
32 Did not walk by 12 months	2	233	Relative Risk (Fixed) 95% CI	0.89 [0.72, 1.09]
33 Maternal postpartum weight loss 4-6 months (kg)	2	260	Weighted Mean Difference (Fixed) 95% CI	0.42 [0.02, 0.82]
34 Maternal resumption of menses 6 months postpartum	2	189	Relative Risk (Fixed) 95% CI	0.58 [0.33, 1.03]

Comparison 02. Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Monthly weight gain 4-6 months (g/mo)	4	1803	Weighted Mean Difference (Fixed) 95% CI	-10.10 [-27.68, 7.48]
02 Monthly weight gain 6-9 months (g/mo)	1	319	Weighted Mean Difference (Fixed) 95% CI	-6.00 [-54.15, 42.15]
03 Monthly length gain 4-6 months (cm/mo)	4	1803	Weighted Mean Difference (Fixed) 95% CI	0.04 [-0.02, 0.11]
04 Monthly length gain 6-9 months (cm/mo)	1	319	Weighted Mean Difference (Fixed) 95% CI	0.04 [-0.06, 0.14]
05 Weight-for-age z-score at 6-7 months	1	370	Weighted Mean Difference (Fixed) 95% CI	0.13 [-0.09, 0.35]
06 Weight-for-age z-score at 9-10 months	1	319	Weighted Mean Difference (Fixed) 95% CI	0.09 [-0.15, 0.33]
07 Length-for-age z-score at 6-7 months	1	370	Weighted Mean Difference (Fixed) 95% CI	0.04 [-0.14, 0.22]
08 Length-for-age z-score at 9-10 months	1	319	Weighted Mean Difference (Fixed) 95% CI	0.11 [-0.09, 0.31]
09 Weight-for-length z-score at 6-7 months	1	370	Weighted Mean Difference (Fixed) 95% CI	0.11 [-0.09, 0.31]
10 Weight-for-length z-score at 9-10 months	1	319	Weighted Mean Difference (Fixed) 95% CI	0.01 [-0.21, 0.23]
11 Weight-for-age z-score < -2 at 6-7 months	1	370	Relative Risk (Fixed) 95% CI	0.92 [0.54, 1.58]
12 Weight-for-age z-score < -2 at 9-10 months	1	319	Relative Risk (Fixed) 95% CI	0.93 [0.64, 1.36]
13 Length-for-age z-score < -2 at 6-7 months	1	370	Relative Risk (Fixed) 95% CI	1.20 [0.57, 2.53]
14 Length-for-age z-score < -2 at 9-10 months	1	319	Relative Risk (Fixed) 95% CI	1.21 [0.62, 2.37]
15 Weight-for-length z-score < -2 at 6-7 months	1	370	Relative Risk (Fixed) 95% CI	0.42 [0.12, 1.50]
16 Weight-for-length z-score < -2 at 9-10 months	1	319	Relative Risk (Fixed) 95% CI	0.82 [0.39, 1.71]
17 Mid-upper arm circumference at 6-7 months (cm)	1	370	Weighted Mean Difference (Fixed) 95% CI	0.20 [-0.04, 0.44]
18 Mid-upper arm circumference at 9-10 months (cm)	1	319	Weighted Mean Difference (Fixed) 95% CI	0.10 [-0.16, 0.36]
19 One or more episodes of gastrointestinal infection at 4-6 months	1	193	Relative Risk (Fixed) 95% CI	0.41 [0.21, 0.78]
20 One or more episodes of respiratory infection at 4-6 months	1	193	Relative Risk (Fixed) 95% CI	0.68 [0.43, 1.06]
21 Resumption of menses by 6-7 months postpartum	1	686	Relative Risk (Fixed) 95% CI	0.19 [0.05, 0.79]

Comparison 03. Prolonged (> 6 months) exclusive versus mixed breastfeeding, developing countries, observational studies

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Weight-for-age < 75% of reference mean	1	31	Relative Risk (Fixed) 95% CI	0.61 [0.26, 1.43]

Comparison 04. Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Monthly weight gain 3-8 months (g/mo)	4	4388	Weighted Mean Difference (Fixed) 95% CI	-12.45 [-23.46, -1.44]
02 Monthly weight gain 6-9 months (g/mo)	2	3432	Weighted Mean Difference (Fixed) 95% CI	-2.26 [-16.94, 12.42]
03 Monthly weight gain 8-12 months (g/mo)	3	3450	Weighted Mean Difference (Fixed) 95% CI	-1.82 [-16.72, 13.08]
04 Monthly length gain 3-8 months (cm/mo)	4	4385	Weighted Mean Difference (Fixed) 95% CI	-0.04 [-0.07, -0.00]
05 Monthly length gain 6-9 months (cm/mo)	2	3430	Weighted Mean Difference (Fixed) 95% CI	-0.04 [-0.10, 0.01]
06 Monthly length gain 8-12 months (cm/mo)	3	3448	Weighted Mean Difference (Fixed) 95% CI	0.09 [0.03, 0.14]
07 Weight-for-age z-score at 6 months	1	3455	Weighted Mean Difference (Fixed) 95% CI	-0.09 [-0.16, -0.02]
08 Weight-for-age z-score at 9 months	1	3400	Weighted Mean Difference (Fixed) 95% CI	-0.10 [-0.18, -0.02]
09 Weight-for-age z-score at 12 months	1	3458	Weighted Mean Difference (Fixed) 95% CI	-0.09 [-0.17, -0.01]
10 Length-for-age z-score at 6 months	1	3454	Weighted Mean Difference (Fixed) 95% CI	-0.12 [-0.20, -0.04]
11 Length-for-age z-score at 9 months	1	3398	Weighted Mean Difference (Fixed) 95% CI	-0.14 [-0.22, -0.06]
12 Length-for-age z-score at 12 months	1	3458	Weighted Mean Difference (Fixed) 95% CI	-0.02 [-0.10, 0.06]
13 Weight-for-length z-score at 6 months	1	3454	Weighted Mean Difference (Fixed) 95% CI	0.02 [-0.07, 0.11]
14 Weight-for-length z-score at 9 months	1	3398	Weighted Mean Difference (Fixed) 95% CI	0.03 [-0.06, 0.12]
15 Weight-for-length z-score at 12 months	1	3458	Weighted Mean Difference (Fixed) 95% CI	-0.08 [-0.17, 0.01]
16 Weight-for-age z-score < -2 at 6 months	1	3461	Relative Risk (Fixed) 95% CI	0.92 [0.04, 19.04]
17 Weight-for-age z-score < -2 at 9 months	1	3408	Relative Risk (Fixed) 95% CI	1.52 [0.16, 14.62]
18 Weight-for-age z-score < -2 at 12 months	1	3466	Relative Risk (Fixed) 95% CI	1.15 [0.13, 10.31]
19 Length-for-age z-score < -2 at 6 months	1	3460	Relative Risk (Fixed) 95% CI	1.53 [0.84, 2.78]

20 Length-for-age z-score < -2 at 9 months	1	3406	Relative Risk (Fixed) 95% CI	1.46 [0.80, 2.64]
21 Length-for-age z-score < -2 at 12 months	1	3466	Relative Risk (Fixed) 95% CI	0.66 [0.23, 1.87]
22 Weight-for-length z-score < -2 at 6 months	1	3460	Relative Risk (Fixed) 95% CI	0.31 [0.02, 5.34]
23 Weight-for-length z-score < -2 at 9 months	1	3406	Relative Risk (Fixed) 95% CI	1.14 [0.24, 5.37]
24 Weight-for-length z-score < -2 at 12 months	1	3466	Relative Risk (Fixed) 95% CI	1.15 [0.13, 10.31]
25 Head circumference at 6 months (cm)	1	3440	Weighted Mean Difference (Fixed) 95% CI	-0.10 [-0.23, 0.03]
26 Head circumference at 9 months (cm)	1	3389	Weighted Mean Difference (Fixed) 95% CI	0.07 [-0.06, 0.20]
27 Head circumference at 12 months (cm)	1	3450	Weighted Mean Difference (Fixed) 95% CI	0.19 [0.06, 0.32]
28 Sleeping time at 9 months (min/day)	1	50	Weighted Mean Difference (Fixed) 95% CI	1.00 [-36.65, 38.65]
29 Total essential amino acid concentration (umol/L) at 6 months	1	44	Weighted Mean Difference (Fixed) 95% CI	22.00 [-59.60, 103.60]
30 Total amino acid concentration (umol/L) at 6 months	1	44	Weighted Mean Difference (Fixed) 95% CI	73.00 [-118.22, 264.22]
31 Atopic eczema in first 12 months	2	3618	Relative Risk (Fixed) 95% CI	0.73 [0.49, 1.08]
32 Food allergy at 1 year (by history)	1	135	Relative Risk (Fixed) 95% CI	0.19 [0.08, 0.48]
33 Food allergy at 1 year (by double challenge)	1	135	Relative Risk (Fixed) 95% CI	0.77 [0.25, 2.41]
34 Two or more episodes of wheezing in first 12 months	2	3993	Relative Risk (Fixed) 95% CI	0.79 [0.49, 1.28]
35 Any atopy at 5 years	1	113	Relative Risk (Fixed) 95% CI	0.68 [0.40, 1.17]
36 Atopic eczema at 5 years	1	113	Relative Risk (Fixed) 95% CI	0.97 [0.50, 1.89]
37 Pollen allergy at 5 years	1	113	Relative Risk (Fixed) 95% CI	0.53 [0.28, 1.01]
38 Asthma at 5-6 years	2	552	Relative Risk (Fixed) 95% CI	0.91 [0.61, 1.36]
39 Food allergy at 5 years (by history)	1	113	Relative Risk (Fixed) 95% CI	0.61 [0.12, 3.19]
40 Allergy to animal dander at 5 years	1	113	Relative Risk (Fixed) 95% CI	0.81 [0.24, 2.72]
41 Positive skin prick test at 6 years	1	331	Relative Risk (Fixed) 95% CI	0.99 [0.73, 1.35]
42 Hemoglobin concentration (g/L) at 12 months	1	30	Weighted Mean Difference (Fixed) 95% CI	8.00 [4.03, 11.97]
43 Hemoglobin concentration < 110 g/L at 12 months	1	30	Relative Risk (Fixed) 95% CI	0.12 [0.01, 1.80]
44 Serum ferritin concentration (mcg/L) at 12 months	1	30	Weighted Mean Difference (Fixed) 95% CI	4.70 [-6.30, 15.70]
45 Serum ferritin concetration < 10 mcg/L at 12 months	1	30	Relative Risk (Fixed) 95% CI	0.42 [0.12, 1.54]
46 Death in first 12 months	1	3483	Relative Risk (Fixed) 95% CI	2.30 [0.21, 25.37]

47 One or more episodes of gastrointestinal infection in first 12 months	1	3483	Relative Risk (Fixed) 95% CI	0.67 [0.46, 0.97]
48 Hospitalization for gastrointestinal infection in first 12 months	1	3483	Relative Risk (Fixed) 95% CI	0.79 [0.42, 1.49]
49 One or more episodes of upper respiratory tract infection in first 12 months	1	510	Relative Risk (Fixed) 95% CI	1.07 [0.96, 1.20]
50 Two or more episodes of upper respiratory tract infection in first 12 months	2	3993	Relative Risk (Fixed) 95% CI	0.91 [0.82, 1.02]
51 Four or more episodes of upper respiratory tract infection in first 12 months	1	510	Relative Risk (Fixed) 95% CI	0.82 [0.52, 1.29]
52 One or more episodes of lower respiratory tract infection in first 12 months	1	510	Relative Risk (Fixed) 95% CI	1.07 [0.86, 1.33]
53 Two or more episodes of respiratory tract infection (upper or lower) in first 12 months	1	3483	Relative Risk (Fixed) 95% CI	0.90 [0.79, 1.03]
54 Hospitalization for respiratory tract infection in first 12 months	2	3993	Relative Risk (Fixed) 95% CI	0.75 [0.60, 0.94]
55 Number of episodes of otitis media in first 12 months	1	279	Weighted Mean Difference (Fixed) 95% CI	-0.04 [-0.49, 0.41]
56 One or more episodes of otitis media in first 12 months	2	3762	Relative Risk (Fixed) 95% CI	1.28 [1.04, 1.57]
57 Frequent otitis media in first 12 months	1	279	Relative Risk (Fixed) 95% CI	0.81 [0.43, 1.52]

Comparison 05. Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies

Outcome title	No. of studies	No. of participants	Statistical method	Effect size
01 Very low density lipoprotein concentration (mmol/L) at 9 months	1	26	Weighted Mean Difference (Fixed) 95% CI	0.05 [-0.10, 0.20]
02 Low density lipoproteinconcentration (mmol/L) at 9 months	1	26	Weighted Mean Difference (Fixed) 95% CI	-0.10 [-0.88, 0.68]
03 High-density lipoprotein-2 concentration (mmol/L) at 9 months	1	26	Weighted Mean Difference (Fixed) 95% CI	0.08 [-0.05, 0.21]
04 High-density lipoprotein-3 concentration (mmol/L) at 9 months	1	26	Weighted Mean Difference (Fixed) 95% CI	0.00 [-0.07, 0.07]
05 Apoprotein B concentration (mg/dL) at 9 months	1	26	Weighted Mean Difference (Fixed) 95% CI	5.00 [-14.93, 24.93]

06 Total triglyceride concentration (mmol/L) at 9 months	1	26	Weighted Mean Difference (Fixed) 95% CI	0.30 [-0.23, 0.83]

INDEX TERMS

Medical Subject Headings (MeSH)

Breast Feeding [*statistics & numerical data]; Child Development; Growth; Infant Nutrition Physiology; Maternal Welfare; Time Factors

MeSH check words

Female; Humans; Infant

COVER SHEET

Title	Optimal duration of exclusive breastfeeding
Authors	Kramer MS, Kakuma R
Contribution of author(s)	Ritsuko Kakuma: carried out the initial screening of all citations located in the literature search, independently rated each study for quality, independently extracted the data and entered them into Review Manager, and reviewed the drafts for accuracy. Mike Kramer: planned the review, made the final selection of included studies, independently rated the study quality and extracted the data into Review Manager, and prepared the text.
Issue protocol first published	2002/1
Review first published	2002/1
Date of most recent amendment	23 May 2007
Date of most recent SUBSTANTIVE amendment	21 November 2001
What's New	December 2006 Search updated. We identified five new trials; two have been included (Khadivzadeh 2004; Onayade 2004) and three have been excluded (Chantry 2006; Ly 2006; Wang 2005). The conclusions of the review have not changed.
Date new studies sought but none found	Information not supplied by author
Date new studies found but not yet included/excluded	Information not supplied by author
Date new studies found and included/excluded	30 December 2006
Date authors' conclusions section amended	Information not supplied by author
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GRAPHS AND OTHER TABLES

Analysis 01.01. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 01 Monthly weight gain from 4-6 months (g/mo)

Review: Optimal duration of exclusive breastfeeding

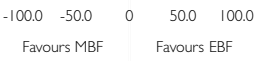
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 01 Monthly weight gain from 4-6 months (g/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	50	546.00 (178.00)	91	514.00 (154.00)		53.2	32.00 [-26.61, 90.61]
Dewey 1999a	63	511.50 (173.00)	61	503.50 (182.00)		46.8	8.00 [-54.54, 70.54]
Total (95% CI)	113		152			100.0	20.78 [-21.99, 63.54]

Test for heterogeneity chi-square=0.30 df=1 p=0.58 I^2 =0.0%

Test for overall effect z=0.95 p=0.3



Analysis 01.02. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 02 Monthly weight gain from 6-12 months (g/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 02 Monthly weight gain from 6-12 months (g/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	47	212.81 (91.85)	87	216.55 (84.54)		53.7	-3.74 [-35.44, 27.96]
Dewey 1999a	51	221.49 (87.20)	48	222.80 (86.18)		46.3	-1.31 [-35.47, 32.85]
Total (95% CI)	98		135			100.0	-2.62 [-25.85, 20.62]

Test for heterogeneity chi-square=0.01 df=1 p=0.92 I^2 =0.0%

Test for overall effect z=0.22 p=0.8

Analysis 01.03. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 03 Monthly length gain 4-6 months (cm/mo)

Review: Optimal duration of exclusive breastfeeding

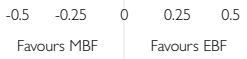
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 03 Monthly length gain 4-6 months (cm/mo)

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	50	1.95 (0.60)	91	1.90 (0.55)		48.8	0.05 [-0.15, 0.25]
Dewey 1999a	63	2.30 (0.65)	61	2.15 (0.45)		51.2	0.15 [-0.05, 0.35]
Total (95% CI)	113		152			100.0	0.10 [-0.04, 0.24]

Test for heterogeneity chi-square=0.49 df=1 p=0.49 I^2 =0.0%

Test for overall effect z=1.41 p=0.2



Analysis 01.04. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 04 Monthly length gain 6-12 months (cm/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 04 Monthly length gain 6-12 months (cm/mo)

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	47	1.19 (0.18)	87	1.20 (0.24)		64.3	-0.01 [-0.08, 0.06]
Dewey 1999a	51	1.14 (0.24)	48	1.23 (0.25)		35.7	-0.09 [-0.19, 0.01]
Total (95% CI)	98		135			100.0	-0.04 [-0.10, 0.02]

Test for heterogeneity chi-square=1.69 df=1 p=0.19 I^2 =40.9%

Test for overall effect z=1.31 p=0.2

Analysis 01.05. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 05 Weight-for-age z-score at 6 months

Review: Optimal duration of exclusive breastfeeding

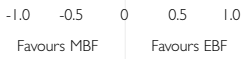
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 05 Weight-for-age z-score at 6 months

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	50	0.15 (1.03)	91	-0.09 (0.92)		46.9	0.24 [-0.10, 0.58]
Dewey 1999a	59	-0.75 (1.02)	60	-0.87 (0.75)		53.1	0.12 [-0.20, 0.44]
Total (95% CI)	109		151			100.0	0.18 [-0.06, 0.41]

Test for heterogeneity chi-square=0.25 df=1 p=0.62 I^2 =0.0%

Test for overall effect z=1.47 p=0.1



Analysis 01.06. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 06 Length-for-age z-score at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 06 Length-for-age z-score at 6 months

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	50	-0.48 (0.94)	91	-0.62 (0.94)		45.7	0.14 [-0.18, 0.46]
Dewey 1999a	59	-1.09 (0.89)	60	-1.17 (0.76)		54.3	0.08 [-0.22, 0.38]
Total (95% CI)	109		151			100.0	0.11 [-0.11, 0.33]

Test for heterogeneity chi-square=0.07 df=1 p=0.79 I^2 =0.0%

Test for overall effect z=0.96 p=0.3

Analysis 01.07. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 07 Weight-for-length z-score at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 07 Weight-for-length z-score at 6 months

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	50	0.60 (0.74)	91	0.49 (0.95)		60.0	0.11 [-0.17, 0.39]
Dewey 1999a	59	0.12 (0.93)	60	0.06 (1.00)		40.0	0.06 [-0.29, 0.41]
Total (95% CI)	109		151			100.0	0.09 [-0.13, 0.31]

Test for heterogeneity chi-square=0.05 df=1 p=0.83 I^2 =0.0%

Test for overall effect z=0.80 p=0.4

Analysis 01.08. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 08 Weight-for-age z-score < -2 at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 08 Weight-for-age z-score < -2 at 6 months

Study	EBF	MBF	Relative Risk (Fixed)	Weight	Relative Risk (Fixed)
	n/N	n/N	95% CI	(%)	95% CI
Cohen 1994a	2/50	0/91		8.2	9.02 [0.44, 184.27]
Dewey 1999a	6/59	4/60		91.8	1.53 [0.45, 5.13]
Total (95% CI)	109	151		100.0	2.14 [0.74, 6.24]

Total events: 8 (EBF), 4 (MBF)

Test for heterogeneity chi-square=1.17 df=1 p=0.28 I^2 =14.8%

Test for overall effect z=1.40 p=0.2

Analysis 01.09. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 09 Length-for-age z-score < -2 at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 09 Length-for-age z-score < -2 at 6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Cohen 1994a	4/50	6/91		38.0	1.21 [0.36, 4.10]
Dewey 1999a	8/59	7/60		62.0	1.16 [0.45, 3.00]
Total (95% CI)	109	151		100.0	1.18 [0.56, 2.50]

Total events: 12 (EBF), 13 (MBF)

Test for heterogeneity chi-square=0.00 df=1 p=0.96 I^2 =0.0%

Test for overall effect z=0.44 p=0.7

Analysis 01.10. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 10 Weight-for-length z-score < -2 at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 10 Weight-for-length z-score < -2 at 6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Cohen 1994a	0/50	1/91		68.3	0.60 [0.02, 14.49]
Dewey 1999a	1/59	0/60		31.7	3.05 [0.13, 73.39]
Total (95% CI)	109	151		100.0	1.38 [0.17, 10.98]

Total events: 1 (EBF), 1 (MBF)

Test for heterogeneity chi-square=0.50 df=1 p=0.48 I^2 =0.0%

Test for overall effect z=0.30 p=0.8

Analysis 01.11. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 11 Receipt of Fe supplements 6-9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 11 Receipt of Fe supplements 6-9 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Cohen 1994a	33/50	49/89		100.0	1.20 [0.91, 1.58]
Total (95% CI)	50	89		100.0	1.20 [0.91, 1.58]
Total events: 33 (EBF), 49 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.30 p=0.2					

Analysis 01.12. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 12 Hemoglobin concentration (g/L) at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 12 Hemoglobin concentration (g/L) at 6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	50	104.00 (10.00)	89	109.00 (10.00)		100.0	-5.00 [-8.46, -1.54]
Total (95% CI)	50		89			100.0	-5.00 [-8.46, -1.54]
Test for heterogeneity: not applicable							
Test for overall effect z=2.83 p=0.005							

Analysis 01.13. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 13 Hemoglobin concentration < 110 g/L at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 13 Hemoglobin concentration < 110 g/L at 6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Cohen 1994a	33/50	49/89		100.0	1.20 [0.91, 1.58]
Total (95% CI)	50	89		100.0	1.20 [0.91, 1.58]
Total events: 33 (EBF), 49 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.30 p=0.2					

Analysis 01.14. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 14 Hemoglobin concentration < 103 g/L at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 14 Hemoglobin concentration < 103 g/L at 6 months

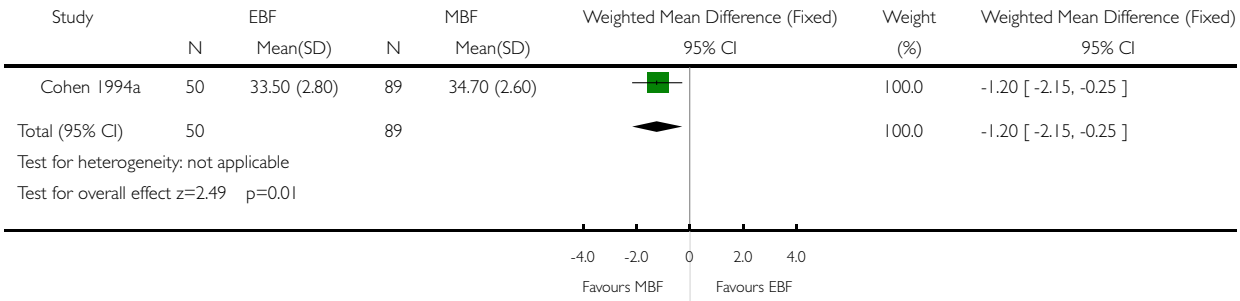
Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Cohen 1994a	16/50	22/89		100.0	1.29 [0.75, 2.23]
Total (95% CI)	50	89		100.0	1.29 [0.75, 2.23]
Total events: 16 (EBF), 22 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.93 p=0.4					

Analysis 01.15. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 15 Hematocrit (%) at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 15 Hematocrit (%) at 6 months

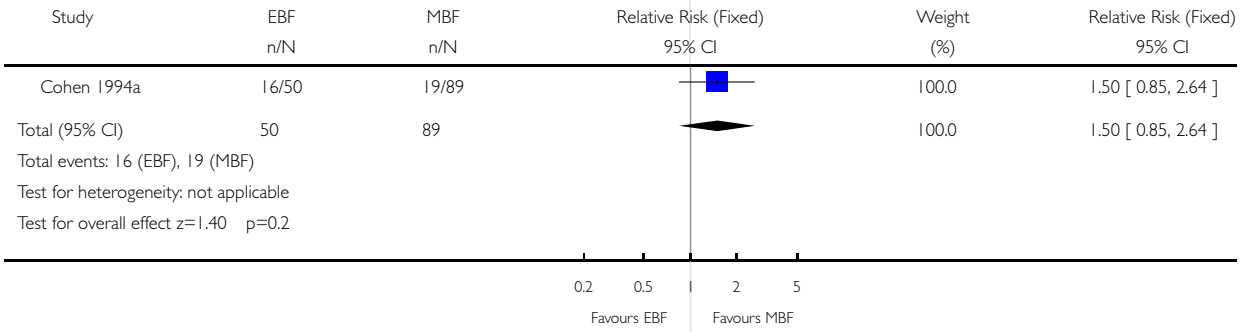


Analysis 01.16. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 16 Hematocrit < 33% at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 16 Hematocrit < 33% at 6 months



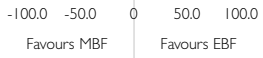
Analysis 01.17. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 17 Plasma ferritin concentration (mcg/L) at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 17 Plasma ferritin concentration (mcg/L) at 6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	49	48.40 (44.20)	86	67.30 (64.50)		100.0	-18.90 [-37.31, -0.49]
Total (95% CI)	49		86			100.0	-18.90 [-37.31, -0.49]
Test for heterogeneity: not applicable							
Test for overall effect z=2.01 p=0.04							



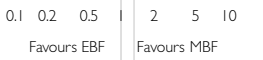
Analysis 01.18. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 18 Plasma ferritin concentration < 12 mcg/L at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 18 Plasma ferritin concentration < 12 mcg/L at 6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Cohen 1994a	8/49	6/86		100.0	2.34 [0.86, 6.35]
Total (95% CI)	49	86		100.0	2.34 [0.86, 6.35]
Total events: 8 (EBF), 6 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.67 p=0.1					



Analysis 01.19. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 19 Plasma ferritin concentration < 15 mcg/L at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 19 Plasma ferritin concentration < 15 mcg/L at 6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Cohen 1994a	10/49	6/86		100.0	2.93 [1.13, 7.56]
Total (95% CI)	49	86		100.0	2.93 [1.13, 7.56]
Total events: 10 (EBF), 6 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.22 p=0.03					

Analysis 01.20. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 20 Plasma zinc concentration < 70 mcg/dL at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 20 Plasma zinc concentration < 70 mcg/dL at 6 months

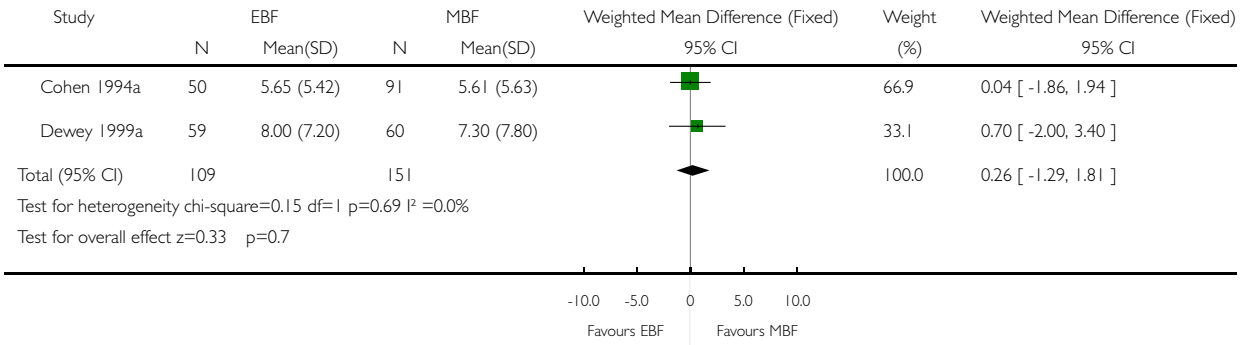
Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Dewey 1999a	15/53	18/48		100.0	0.75 [0.43, 1.33]
Total (95% CI)	53	48		100.0	0.75 [0.43, 1.33]
Total events: 15 (EBF), 18 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.98 p=0.3					

Analysis 01.21. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 21 % of days with fever 4-6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 21 % of days with fever 4-6 months

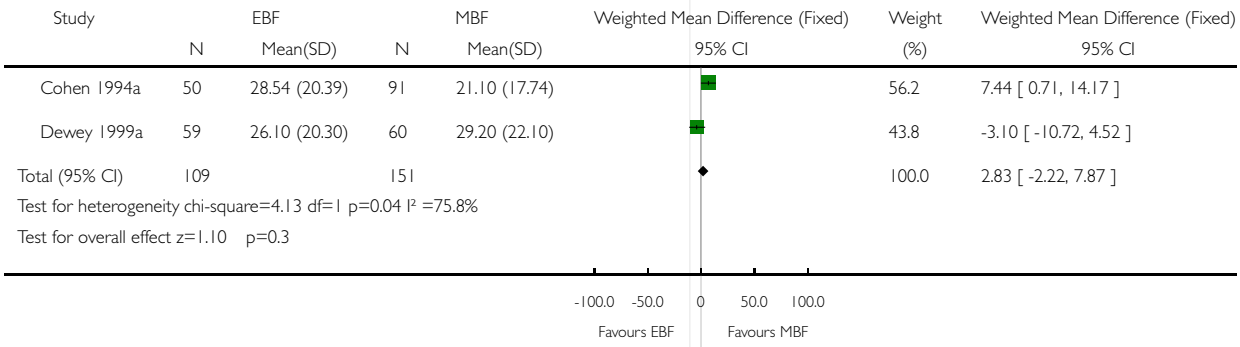


Analysis 01.22. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 22 % of days with cough 4-6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 22 % of days with cough 4-6 months



Analysis 01.23. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 23 % of days with nasal congestion 4-6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 23 % of days with nasal congestion 4-6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	50	22.25 (18.12)	91	19.49 (15.25)		58.4	2.76 [-3.16, 8.68]
Dewey 1999a	59	15.40 (15.00)	60	19.00 (23.20)		41.6	-3.60 [-10.61, 3.41]
Total (95% CI)	109		151			100.0	0.11 [-4.41, 4.63]

Test for heterogeneity chi-square=1.85 df=1 p=0.17 I^2 =45.8%

Test for overall effect z=0.05 p=1

Analysis 01.24. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 24 % of days with nasal discharge 4-6 months

Review: Optimal duration of exclusive breastfeeding

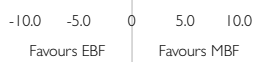
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 24 % of days with nasal discharge 4-6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	50	8.69 (10.26)	91	6.63 (8.94)		71.3	2.06 [-1.33, 5.45]
Dewey 1999a	59	12.00 (12.20)	60	16.20 (17.10)		28.7	-4.20 [-9.53, 1.13]
Total (95% CI)	109		151			100.0	0.26 [-2.60, 3.12]

Test for heterogeneity chi-square=3.78 df=1 p=0.05 I^2 =73.5%

Test for overall effect z=0.18 p=0.9



Analysis 01.25. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 25 % of days with hoarseness 4-6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 25 % of days with hoarseness 4-6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	50	1.44 (2.73)	91	1.66 (4.10)		74.5	-0.22 [-1.35, 0.91]
Dewey 1999a	59	2.50 (4.30)	60	2.60 (6.30)		25.5	-0.10 [-2.04, 1.84]
Total (95% CI)	109		151			100.0	-0.19 [-1.17, 0.79]

Test for heterogeneity chi-square=0.01 df=1 p=0.92 I^2 =0.0%

Test for overall effect z=0.38 p=0.7

Analysis 01.26. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 26 % of days with diarrhea 4-6 months

Review: Optimal duration of exclusive breastfeeding

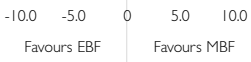
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 26 % of days with diarrhea 4-6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Cohen 1994a	50	4.15 (5.69)	91	3.76 (4.72)		65.7	0.39 [-1.46, 2.24]
Dewey 1999a	59	5.40 (8.50)	60	2.80 (5.40)		34.3	2.60 [0.04, 5.16]
Total (95% CI)	109		151			100.0	1.15 [-0.35, 2.65]

Test for heterogeneity chi-square=1.88 df=1 p=0.17 I^2 =46.7%

Test for overall effect z=1.50 p=0.1



Analysis 01.27. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 27 % of days with fever 6-12 months

Review: Optimal duration of exclusive breastfeeding

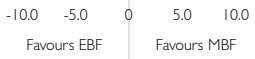
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 27 % of days with fever 6-12 months

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	49	9.48 (9.49)	91	9.44 (8.49)		57.5	0.04 [-3.14, 3.22]
Dewey 1999a	58	8.21 (8.94)	60	9.18 (11.43)		42.5	-0.97 [-4.67, 2.73]
Total (95% CI)	107		151			100.0	-0.39 [-2.80, 2.02]

Test for heterogeneity chi-square=0.16 df=1 p=0.68 I^2 =0.0%

Test for overall effect z=0.32 p=0.8



Analysis 01.28. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 28 % of days with nasal congestion 6-12 months

Review: Optimal duration of exclusive breastfeeding

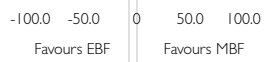
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 28 % of days with nasal congestion 6-12 months

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	49	9.01 (11.57)	91	6.75 (10.31)		69.9	2.26 [-1.61, 6.13]
Dewey 1999a	58	15.62 (19.64)	60	10.53 (12.02)		30.1	5.09 [-0.81, 10.99]
Total (95% CI)	107		151			100.0	3.11 [-0.12, 6.35]

Test for heterogeneity chi-square=0.62 df=1 p=0.43 I^2 =0.0%

Test for overall effect z=1.88 p=0.06



Analysis 01.29. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 29 % of days with diarrhea 6-12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 29 % of days with diarrhea 6-12 months

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	49	3.15 (5.77)	91	3.70 (6.68)		56.8	-0.55 [-2.67, 1.57]
Dewey 1999a	58	3.72 (6.02)	60	4.71 (7.40)		43.2	-0.99 [-3.42, 1.44]
Total (95% CI)	107		151			100.0	-0.74 [-2.34, 0.86]

Test for heterogeneity chi-square=0.07 df=1 p=0.79 I^2 =0.0%

Test for overall effect z=0.91 p=0.4

Analysis 01.30. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 30 Age first crawled (mo)

Review: Optimal duration of exclusive breastfeeding

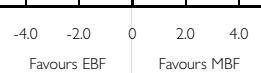
Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 30 Age first crawled (mo)

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	47	6.30 (1.80)	89	7.25 (1.56)		56.6	-0.95 [-1.56, -0.34]
Dewey 1999a	54	6.80 (1.70)	50	7.40 (1.90)		43.4	-0.60 [-1.29, 0.09]
Total (95% CI)	101		139			100.0	-0.80 [-1.26, -0.34]

Test for heterogeneity chi-square=0.55 df=1 p=0.46 I^2 =0.0%

Test for overall effect z=3.42 p=0.0006



Analysis 01.31. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 31 Age first sat from lying position (mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 31 Age first sat from lying position (mo)

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	46	7.00 (1.50)	89	6.90 (1.15)		60.9	0.10 [-0.39, 0.59]
Dewey 1999a	53	7.40 (1.60)	50	8.00 (1.60)		39.1	-0.60 [-1.22, 0.02]
Total (95% CI)	99		139			100.0	-0.17 [-0.56, 0.21]

Test for heterogeneity chi-square=3.00 df=1 p=0.08 I^2 =66.7%

Test for overall effect z=0.88 p=0.4

Analysis 01.32. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 32 Did not walk by 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 32 Did not walk by 12 months

Study	EBF	MBF	Relative Risk (Fixed)	Weight	Relative Risk (Fixed)
	n/N	n/N	95% CI	(%)	95% CI
Cohen 1994a	19/47	53/87		50.6	0.66 [0.45, 0.98]
Dewey 1999a	41/50	36/49		49.4	1.12 [0.90, 1.38]
Total (95% CI)	97	136		100.0	0.89 [0.72, 1.09]

Total events: 60 (EBF), 89 (MBF)

Test for heterogeneity chi-square=6.65 df=1 p=0.010 I^2 =85.0%

Test for overall effect z=1.14 p=0.3

Analysis 01.33. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 33 Maternal postpartum weight loss 4-6 months (kg)

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 33 Maternal postpartum weight loss 4-6 months (kg)

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Cohen 1994a	50	0.70 (1.50)	91	0.10 (1.70)		54.4	0.60 [0.06, 1.14]
Dewey 1999a	59	0.30 (1.60)	60	0.10 (1.70)		45.6	0.20 [-0.39, 0.79]
Total (95% CI)	109		151			100.0	0.42 [0.02, 0.82]

Test for heterogeneity chi-square=0.95 df=1 p=0.33 I^2 =0.0%

Test for overall effect z=2.04 p=0.04

Analysis 01.34. Comparison 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials, Outcome 34 Maternal resumption of menses 6 months postpartum

Review: Optimal duration of exclusive breastfeeding

Comparison: 01 Exclusive versus mixed breastfeeding 4-6 months, developing countries, controlled trials

Outcome: 34 Maternal resumption of menses 6 months postpartum

Study	EBF	MBF	Relative Risk (Fixed)	Weight	Relative Risk (Fixed)
	n/N	n/N	95% CI	(%)	95% CI
Cohen 1994a	8/40	16/66		48.1	0.83 [0.39, 1.75]
Dewey 1999a	5/45	12/38		51.9	0.35 [0.14, 0.91]
Total (95% CI)	85	104		100.0	0.58 [0.33, 1.03]

Total events: 13 (EBF), 28 (MBF)

Test for heterogeneity chi-square=1.91 df=1 p=0.17 I^2 =47.6%

Test for overall effect z=1.85 p=0.06

Analysis 02.01. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 01 Monthly weight gain 4-6 months (g/mo)

Review: Optimal duration of exclusive breastfeeding

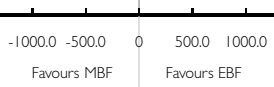
Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 01 Monthly weight gain 4-6 months (g/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Adair 1993a	370	336.00 (157.00)	834	350.00 (167.00)		80.4	-14.00 [-33.61, 5.61]
Brown 1991a	15	402.00 (198.00)	21	359.00 (168.00)		2.0	43.00 [-80.30, 166.30]
Khadivzadeh 2004	98	461.00 (250.00)	95	507.50 (209.50)		7.3	-46.50 [-111.50, 18.50]
Simondon 1997a	154	324.80 (250.00)	216	288.90 (286.00)		10.3	35.90 [-19.00, 90.80]
Total (95% CI)	637		1166			100.0	-10.10 [-27.68, 7.48]

Test for heterogeneity chi-square=4.77 df=3 p=0.19 I^2 =37.1%

Test for overall effect z=1.13 p=0.3



Analysis 02.02. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 02 Monthly weight gain 6-9 months (g/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 02 Monthly weight gain 6-9 months (g/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Simondon 1997a	129	190.00 (210.00)	190	196.00 (223.00)		100.0	-6.00 [-54.15, 42.15]
Total (95% CI)	129		190			100.0	-6.00 [-54.15, 42.15]

Test for heterogeneity: not applicable

Test for overall effect z=0.24 p=0.8

Analysis 02.03. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 03 Monthly length gain 4-6 months (cm/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 03 Monthly length gain 4-6 months (cm/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Adair 1993a	370	1.60 (0.80)	834	1.60 (0.75)		49.2	0.00 [-0.10, 0.10]
Brown 1991a	15	1.63 (0.27)	21	1.57 (0.44)		8.4	0.06 [-0.17, 0.29]
Khadivzadeh 2004	98	1.80 (0.65)	95	1.75 (0.55)		15.8	0.05 [-0.12, 0.22]
Simondon 1997a	154	1.55 (0.66)	216	1.43 (0.59)		26.6	0.12 [-0.01, 0.25]
Total (95% CI)	637		1166			100.0	0.04 [-0.02, 0.11]

Test for heterogeneity chi-square=2.13 df=3 p=0.55 I^2 =0.0%

Test for overall effect z=1.31 p=0.2

Analysis 02.04. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 04 Monthly length gain 6-9 months (cm/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 04 Monthly length gain 6-9 months (cm/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Simondon 1997a	129	1.28 (0.42)	190	1.24 (0.44)		100.0	0.04 [-0.06, 0.14]
Total (95% CI)	129		190			100.0	0.04 [-0.06, 0.14]

Test for heterogeneity: not applicable

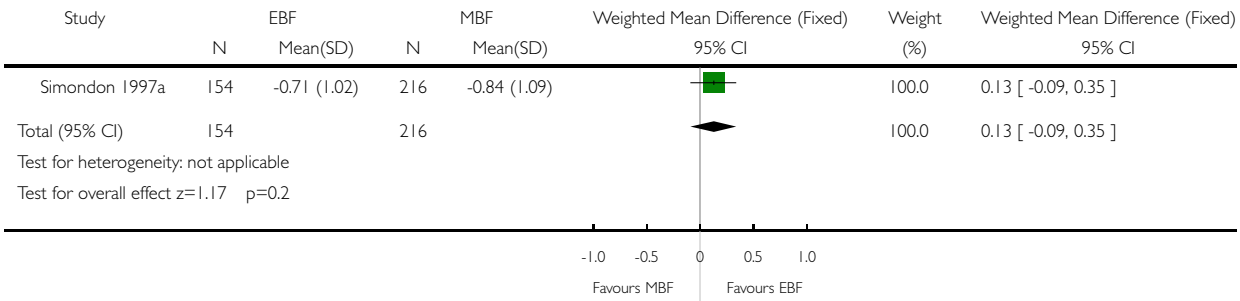
Test for overall effect z=0.82 p=0.4

Analysis 02.05. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 05 Weight-for-age z-score at 6-7 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 05 Weight-for-age z-score at 6-7 months

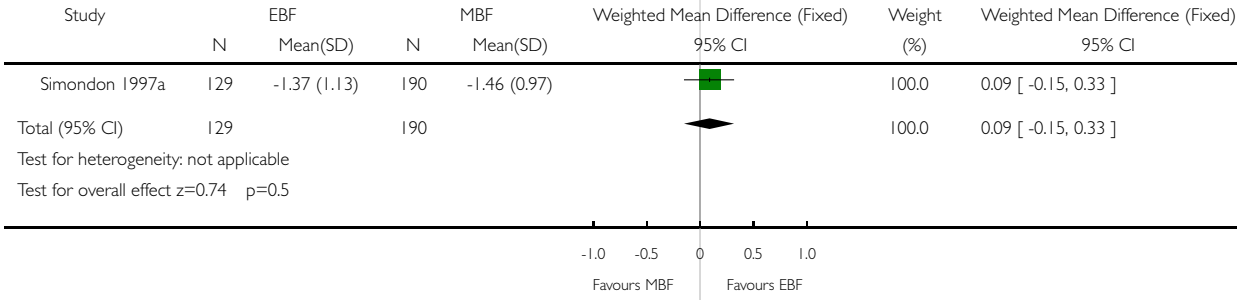


Analysis 02.06. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 06 Weight-for-age z-score at 9-10 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 06 Weight-for-age z-score at 9-10 months

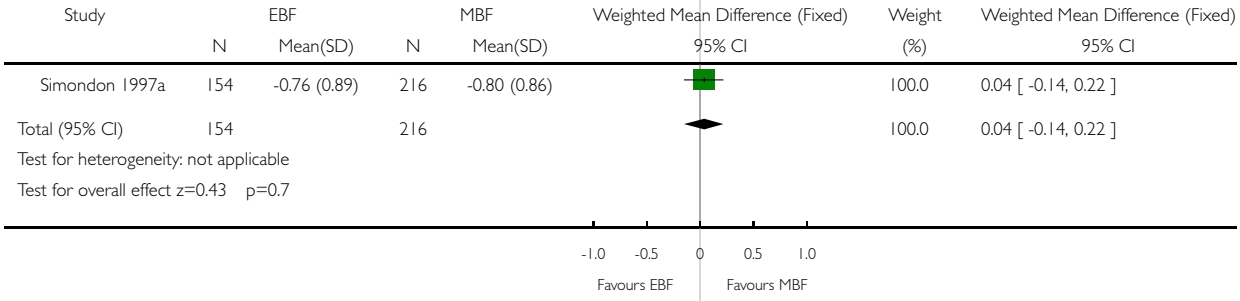


Analysis 02.07. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 07 Length-for-age z-score at 6-7 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 07 Length-for-age z-score at 6-7 months

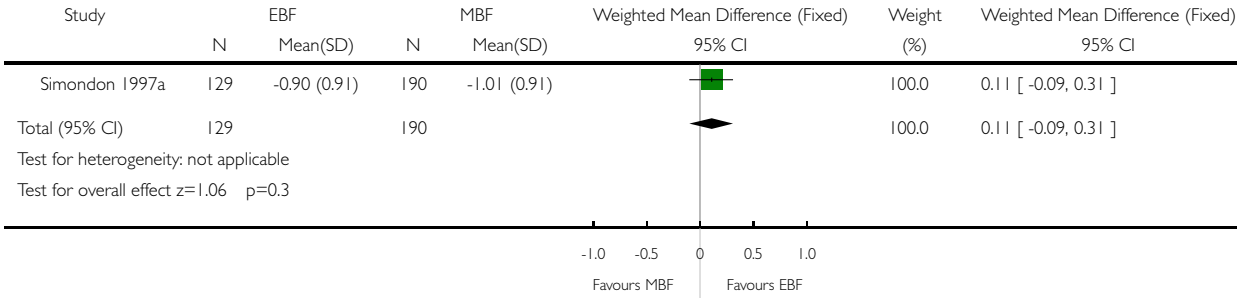


Analysis 02.08. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 08 Length-for-age z-score at 9-10 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 08 Length-for-age z-score at 9-10 months

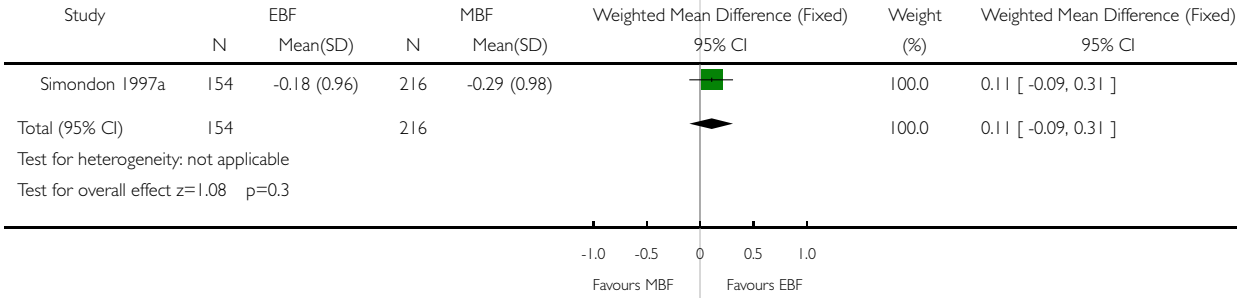


Analysis 02.09. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 09 Weight-for-length z-score at 6-7 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 09 Weight-for-length z-score at 6-7 months

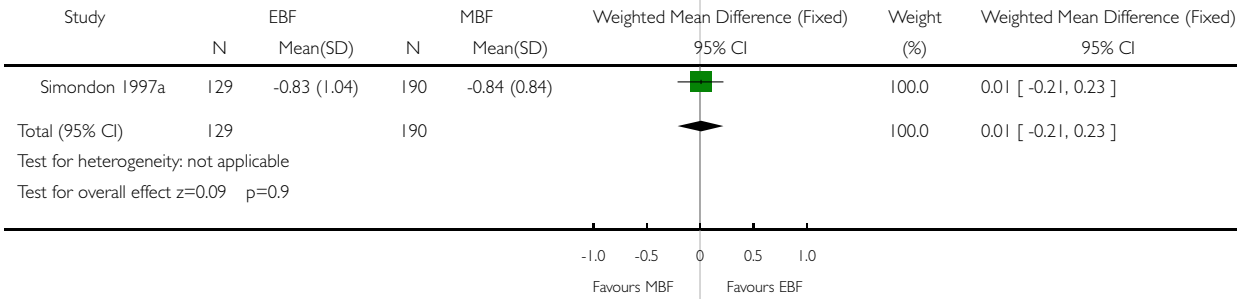


Analysis 02.10. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 10 Weight-for-length z-score at 9-10 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 10 Weight-for-length z-score at 9-10 months



Analysis 02.11. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 11 Weight-for-age z-score < -2 at 6-7 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 11 Weight-for-age z-score < -2 at 6-7 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Simondon 1997a	19/154	29/216		100.0	0.92 [0.54, 1.58]
Total (95% CI)	154	216		100.0	0.92 [0.54, 1.58]
Total events: 19 (EBF), 29 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.31 p=0.8					

Analysis 02.12. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 12 Weight-for-age z-score < -2 at 9-10 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 12 Weight-for-age z-score < -2 at 9-10 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Simondon 1997a	33/129	52/190		100.0	0.93 [0.64, 1.36]
Total (95% CI)	129	190		100.0	0.93 [0.64, 1.36]
Total events: 33 (EBF), 52 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.35 p=0.7					

Analysis 02.13. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 13 Length-for-age z-score < -2 at 6-7 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 13 Length-for-age z-score < -2 at 6-7 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Simondon 1997a	12/154	14/216		100.0	1.20 [0.57, 2.53]
Total (95% CI)	154	216		100.0	1.20 [0.57, 2.53]
Total events: 12 (EBF), 14 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.49 p=0.6					

Analysis 02.14. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 14 Length-for-age z-score < -2 at 9-10 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 14 Length-for-age z-score < -2 at 9-10 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Simondon 1997a	14/129	17/190		100.0	1.21 [0.62, 2.37]
Total (95% CI)	129	190		100.0	1.21 [0.62, 2.37]
Total events: 14 (EBF), 17 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.56 p=0.6					

Analysis 02.15. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 15 Weight-for-length z-score < -2 at 6-7 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 15 Weight-for-length z-score < -2 at 6-7 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Simondon 1997a	3/154	10/216		100.0	0.42 [0.12, 1.50]
Total (95% CI)	154	216		100.0	0.42 [0.12, 1.50]
Total events: 3 (EBF), 10 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.33 p=0.2					

Analysis 02.16. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 16 Weight-for-length z-score < -2 at 9-10 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 16 Weight-for-length z-score < -2 at 9-10 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Simondon 1997a	10/129	18/190		100.0	0.82 [0.39, 1.71]
Total (95% CI)	129	190		100.0	0.82 [0.39, 1.71]
Total events: 10 (EBF), 18 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.53 p=0.6					

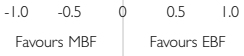
Analysis 02.17. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 17 Mid-upper arm circumference at 6-7 months (cm)

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 17 Mid-upper arm circumference at 6-7 months (cm)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Simondon 1997a	154	13.30 (1.10)	216	13.10 (1.20)		100.0	0.20 [-0.04, 0.44]
Total (95% CI)	154		216			100.0	0.20 [-0.04, 0.44]
Test for heterogeneity: not applicable							
Test for overall effect z=1.66 p=0.1							



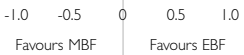
Analysis 02.18. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 18 Mid-upper arm circumference at 9-10 months (cm)

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 18 Mid-upper arm circumference at 9-10 months (cm)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Simondon 1997a	129	13.40 (1.20)	190	13.30 (1.10)		100.0	0.10 [-0.16, 0.36]
Total (95% CI)	129		190			100.0	0.10 [-0.16, 0.36]
Test for heterogeneity: not applicable							
Test for overall effect z=0.76 p=0.5							



Analysis 02.19. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 19 One or more episodes of gastrointestinal infection at 4-6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 19 One or more episodes of gastrointestinal infection at 4-6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Khadivzadeh 2004	11/98	26/95		100.0	0.41 [0.21, 0.78]
Total (95% CI)	98	95		100.0	0.41 [0.21, 0.78]
Total events: 11 (EBF), 26 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.70 p=0.007					

Analysis 02.20. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 20 One or more episodes of respiratory infection at 4-6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 20 One or more episodes of respiratory infection at 4-6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Khadivzadeh 2004	23/98	33/95		100.0	0.68 [0.43, 1.06]
Total (95% CI)	98	95		100.0	0.68 [0.43, 1.06]
Total events: 23 (EBF), 33 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.70 p=0.09					

Analysis 02.21. Comparison 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies, Outcome 21 Resumption of menses by 6-7 months postpartum

Review: Optimal duration of exclusive breastfeeding

Comparison: 02 Exclusive versus mixed breastfeeding 3-7 months, developing countries, observational studies

Outcome: 21 Resumption of menses by 6-7 months postpartum

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Simondon 1997a	2/198	26/488		100.0	0.19 [0.05, 0.79]
Total (95% CI)	198	488		100.0	0.19 [0.05, 0.79]
Total events: 2 (EBF), 26 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.28 p=0.02					

Analysis 03.01. Comparison 03 Prolonged (> 6 months) exclusive versus mixed breastfeeding, developing countries, observational studies, Outcome 01 Weight-for-age < 75% of reference mean

Review: Optimal duration of exclusive breastfeeding

Comparison: 03 Prolonged (> 6 months) exclusive versus mixed breastfeeding, developing countries, observational studies

Outcome: 01 Weight-for-age < 75% of reference mean

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Rao 1992	4/11	12/20		100.0	0.61 [0.26, 1.43]
Total (95% CI)	11	20		100.0	0.61 [0.26, 1.43]
Total events: 4 (EBF), 12 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.14 p=0.3					

Analysis 04.01. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 01 Monthly weight gain 3-8 months (g/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 01 Monthly weight gain 3-8 months (g/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Akeson 1996a	10	498.00 (118.00)	9	438.00 (127.00)		1.0	60.00 [-50.60, 170.60]
Kramer 2000a	619	612.20 (180.00)	2836	641.00 (186.00)		48.9	-28.80 [-44.55, -13.05]
WHO 1994a	200	463.00 (142.00)	158	470.00 (159.00)		12.1	-7.00 [-38.65, 24.65]
WHO 1997	179	418.75 (100.39)	377	413.80 (100.39)		38.0	4.95 [-12.91, 22.81]
Total (95% CI)	1008		3380			100.0	-12.45 [-23.46, -1.44]

Test for heterogeneity chi-square=9.55 df=3 p=0.02 I^2 =68.6%

Test for overall effect z=2.22 p=0.03

Analysis 04.02. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 02 Monthly weight gain 6-9 months (g/mo)

Review: Optimal duration of exclusive breastfeeding

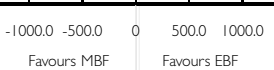
Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 02 Monthly weight gain 6-9 months (g/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Heinig 1993	17	322.00 (103.00)	33	259.00 (124.00)		5.1	63.00 [-1.71, 127.71]
Kramer 2000a	611	449.70 (171.00)	2771	455.50 (177.00)		94.9	-5.80 [-20.88, 9.28]
Total (95% CI)	628		2804			100.0	-2.26 [-16.94, 12.42]

Test for heterogeneity chi-square=4.12 df=1 p=0.04 I^2 =75.7%

Test for overall effect z=0.30 p=0.8



Analysis 04.03. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 03 Monthly weight gain 8-12 months (g/mo)

Review: Optimal duration of exclusive breastfeeding

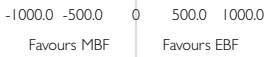
Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 03 Monthly weight gain 8-12 months (g/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Akeson 1996a	3	282.00 (88.00)	5	288.00 (93.00)		1.3	-6.00 [-134.69, 122.69]
Heinig 1993	15	241.00 (104.00)	31	240.00 (126.00)		4.7	1.00 [-67.83, 69.83]
Kramer 2000a	609	353.90 (176.00)	2787	355.80 (172.00)		94.0	-1.90 [-17.27, 13.47]
Total (95% CI)	627		2823			100.0	-1.82 [-16.72, 13.08]

Test for heterogeneity chi-square=0.01 df=2 p=0.99 I^2 =0.0%

Test for overall effect z=0.24 p=0.8



Analysis 04.04. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 04 Monthly length gain 3-8 months (cm/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 04 Monthly length gain 3-8 months (cm/mo)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Akeson 1996a	10	1.80 (0.24)	9	1.68 (0.30)		2.0	0.12 [-0.13, 0.37]
Kramer 2000a	618	1.93 (0.64)	2836	2.04 (0.70)		38.4	-0.11 [-0.17, -0.05]
WHO 1994a	200	1.72 (0.43)	156	1.76 (0.48)		13.3	-0.04 [-0.14, 0.06]
WHO 1997	179	1.87 (0.29)	377	1.85 (0.29)		46.3	0.02 [-0.03, 0.07]
Total (95% CI)	1007		3378			100.0	-0.04 [-0.07, 0.00]

Test for heterogeneity chi-square=12.63 df=3 p=0.006 I^2 =76.2%

Test for overall effect z=2.00 p=0.05

Analysis 04.05. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 05 Monthly length gain 6-9 months (cm/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 05 Monthly length gain 6-9 months (cm/mo)

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Heinig 1993	17	1.40 (0.40)	33	1.30 (0.30)		6.5	0.10 [-0.12, 0.32]
Kramer 2000a	610	1.49 (0.65)	2770	1.54 (0.65)		93.5	-0.05 [-0.11, 0.01]
Total (95% CI)	627		2803			100.0	-0.04 [-0.10, 0.01]
Test for heterogeneity chi-square=1.73 df=1 p=0.19 I^2 =42.3%							
Test for overall effect z=1.43 p=0.2							

Analysis 04.06. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 06 Monthly length gain 8-12 months (cm/mo)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 06 Monthly length gain 8-12 months (cm/mo)

Study	EBF		MBF		Weighted Mean Difference (Fixed)	Weight	Weighted Mean Difference (Fixed)
	N	Mean(SD)	N	Mean(SD)	95% CI	(%)	95% CI
Akeson 1996a	3	1.32 (0.27)	5	1.32 (0.27)		2.1	0.00 [-0.39, 0.39]
Heinig 1993	15	1.40 (0.30)	31	1.30 (0.30)		9.0	0.10 [-0.08, 0.28]
Kramer 2000a	608	1.43 (0.68)	2786	1.34 (0.63)		88.9	0.09 [0.03, 0.15]
Total (95% CI)	626		2822			100.0	0.09 [0.03, 0.14]
Test for heterogeneity chi-square=0.22 df=2 p=0.90 I^2 =0.0%							
Test for overall effect z=3.14 p=0.002							

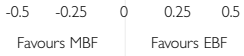
Analysis 04.07. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 07 Weight-for-age z-score at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 07 Weight-for-age z-score at 6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	619	0.54 (0.84)	2836	0.63 (0.83)		100.0	-0.09 [-0.16, -0.02]
Total (95% CI)	619		2836			100.0	-0.09 [-0.16, -0.02]
Test for heterogeneity: not applicable							
Test for overall effect z=2.42 p=0.02							



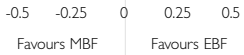
Analysis 04.08. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 08 Weight-for-age z-score at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 08 Weight-for-age z-score at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	611	0.49 (0.88)	2789	0.59 (0.86)		100.0	-0.10 [-0.18, -0.02]
Total (95% CI)	611		2789			100.0	-0.10 [-0.18, -0.02]
Test for heterogeneity: not applicable							
Test for overall effect z=2.55 p=0.01							



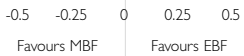
Analysis 04.09. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 09 Weight-for-age z-score at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 09 Weight-for-age z-score at 12 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	616	0.54 (0.94)	2842	0.63 (0.86)		100.0	-0.09 [-0.17, -0.01]
Total (95% CI)	616		2842			100.0	-0.09 [-0.17, -0.01]
Test for heterogeneity: not applicable							
Test for overall effect z=2.19 p=0.03							



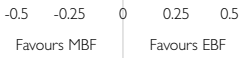
Analysis 04.10. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 10 Length-for-age z-score at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 10 Length-for-age z-score at 6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	618	-0.05 (0.95)	2836	0.07 (0.94)		100.0	-0.12 [-0.20, -0.04]
Total (95% CI)	618		2836			100.0	-0.12 [-0.20, -0.04]
Test for heterogeneity: not applicable							
Test for overall effect z=2.85 p=0.004							



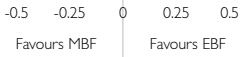
Analysis 04.11. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 11 Length-for-age z-score at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 11 Length-for-age z-score at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	610	-0.05 (0.97)	2788	0.09 (0.96)		100.0	-0.14 [-0.22, -0.06]
Total (95% CI)	610		2788			100.0	-0.14 [-0.22, -0.06]
Test for heterogeneity: not applicable							
Test for overall effect z=3.23 p=0.001							



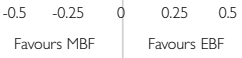
Analysis 04.12. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 12 Length-for-age z-score at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 12 Length-for-age z-score at 12 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	616	0.13 (0.90)	2842	0.15 (0.91)		100.0	-0.02 [-0.10, 0.06]
Total (95% CI)	616		2842			100.0	-0.02 [-0.10, 0.06]
Test for heterogeneity: not applicable							
Test for overall effect z=0.50 p=0.6							



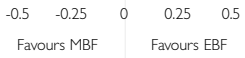
Analysis 04.13. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 13 Weight-for-length z-score at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 13 Weight-for-length z-score at 6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	618	0.65 (0.97)	2836	0.63 (1.01)		100.0	0.02 [-0.07, 0.11]
Total (95% CI)	618		2836			100.0	0.02 [-0.07, 0.11]
Test for heterogeneity: not applicable							
Test for overall effect z=0.46 p=0.6							



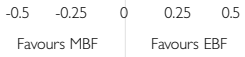
Analysis 04.14. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 14 Weight-for-length z-score at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 14 Weight-for-length z-score at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	610	0.75 (0.98)	2788	0.72 (0.99)		100.0	0.03 [-0.06, 0.12]
Total (95% CI)	610		2788			100.0	0.03 [-0.06, 0.12]
Test for heterogeneity: not applicable							
Test for overall effect z=0.68 p=0.5							



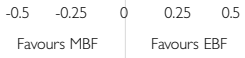
Analysis 04.15. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 15 Weight-for-length z-score at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 15 Weight-for-length z-score at 12 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	616	0.71 (0.99)	2842	0.79 (0.95)		100.0	-0.08 [-0.17, 0.01]
Total (95% CI)	616		2842			100.0	-0.08 [-0.17, 0.01]
Test for heterogeneity: not applicable							
Test for overall effect z=1.83 p=0.07							



Analysis 04.16. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 16 Weight-for-age z-score < -2 at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 16 Weight-for-age z-score < -2 at 6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	0/620	2/2841		100.0	0.92 [0.04, 19.04]
Total (95% CI)	620	2841		100.0	0.92 [0.04, 19.04]
Total events: 0 (EBF), 2 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.06 p=1					

Analysis 04.17. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 17 Weight-for-age z-score < -2 at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 17 Weight-for-age z-score < -2 at 9 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	1/612	3/2796		100.0	1.52 [0.16, 14.62]
Total (95% CI)	612	2796		100.0	1.52 [0.16, 14.62]
Total events: 1 (EBF), 3 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.36 p=0.7					

Analysis 04.18. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 18 Weight-for-age z-score < -2 at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 18 Weight-for-age z-score < -2 at 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	1/617	4/2849		100.0	1.15 [0.13, 10.31]
Total (95% CI)	617	2849		100.0	1.15 [0.13, 10.31]
Total events: 1 (EBF), 4 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.13 p=0.9					

Analysis 04.19. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 19 Length-for-age z-score < -2 at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 19 Length-for-age z-score < -2 at 6 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	14/619	42/2841		100.0	1.53 [0.84, 2.78]
Total (95% CI)	619	2841		100.0	1.53 [0.84, 2.78]
Total events: 14 (EBF), 42 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.39 p=0.2					

Analysis 04.20. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 20 Length-for-age z-score < -2 at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 20 Length-for-age z-score < -2 at 9 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	14/611	44/2795		100.0	1.46 [0.80, 2.64]
Total (95% CI)	611	2795		100.0	1.46 [0.80, 2.64]
Total events: 14 (EBF), 44 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.24 p=0.2					

Analysis 04.21. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 21 Length-for-age z-score < -2 at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 21 Length-for-age z-score < -2 at 12 months

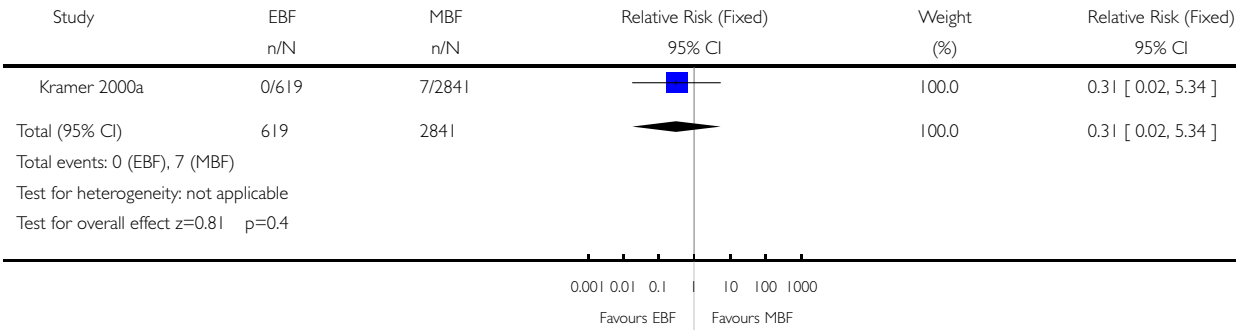
Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	4/617	28/2849		100.0	0.66 [0.23, 1.87]
Total (95% CI)	617	2849		100.0	0.66 [0.23, 1.87]
Total events: 4 (EBF), 28 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.78 p=0.4					

Analysis 04.22. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 22 Weight-for-length z-score < -2 at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 22 Weight-for-length z-score < -2 at 6 months

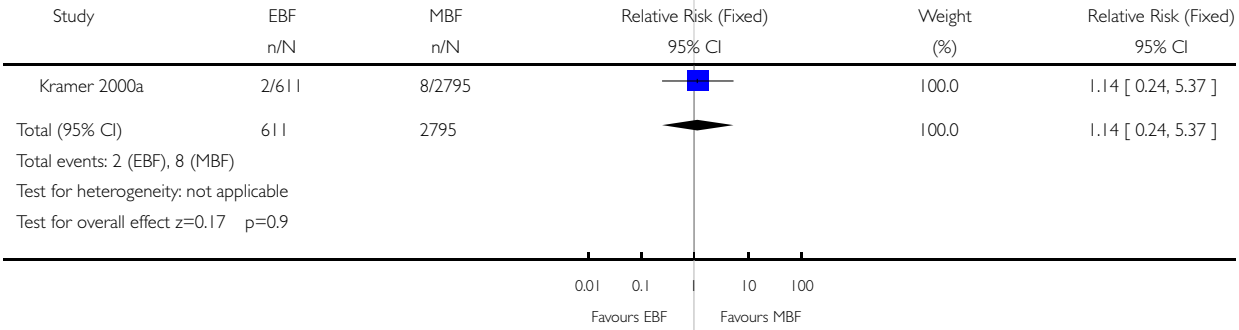


Analysis 04.23. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 23 Weight-for-length z-score < -2 at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 23 Weight-for-length z-score < -2 at 9 months



Analysis 04.24. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 24 Weight-for-length z-score < -2 at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 24 Weight-for-length z-score < -2 at 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	1/617	4/2849		100.0	1.15 [0.13, 10.31]
Total (95% CI)	617	2849		100.0	1.15 [0.13, 10.31]
Total events: 1 (EBF), 4 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.13 p=0.9					

Analysis 04.25. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 25 Head circumference at 6 months (cm)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 25 Head circumference at 6 months (cm)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	615	43.34 (1.53)	2825	43.44 (1.46)		100.0	-0.10 [-0.23, 0.03]
Total (95% CI)	615		2825			100.0	-0.10 [-0.23, 0.03]
Test for heterogeneity: not applicable							
Test for overall effect z=1.48 p=0.1							

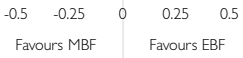
Analysis 04.26. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 26 Head circumference at 9 months (cm)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 26 Head circumference at 9 months (cm)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	609	45.52 (1.46)	2780	45.45 (1.43)		100.0	0.07 [-0.06, 0.20]
Total (95% CI)	609		2780			100.0	0.07 [-0.06, 0.20]
Test for heterogeneity: not applicable							
Test for overall effect z=1.08 p=0.3							



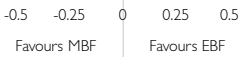
Analysis 04.27. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 27 Head circumference at 12 months (cm)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 27 Head circumference at 12 months (cm)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Kramer 2000a	614	47.25 (1.50)	2836	47.06 (1.49)		100.0	0.19 [0.06, 0.32]
Total (95% CI)	614		2836			100.0	0.19 [0.06, 0.32]
Test for heterogeneity: not applicable							
Test for overall effect z=2.85 p=0.004							



Analysis 04.28. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 28 Sleeping time at 9 months (min/day)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 28 Sleeping time at 9 months (min/day)

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Heinig 1993	17	729.00 (66.00)	33	728.00 (61.00)		100.0	1.00 [-36.65, 38.65]
Total (95% CI)	17		33			100.0	1.00 [-36.65, 38.65]
Test for heterogeneity: not applicable							
Test for overall effect z=0.05 p=1							

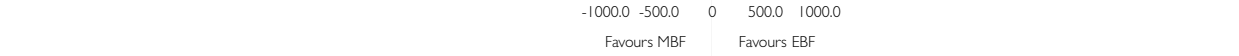
Analysis 04.29. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 29 Total essential amino acid concentration (umol/L) at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 29 Total essential amino acid concentration (umol/L) at 6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Akeson 1996a	26	1045.00 (150.00)	18	1023.00 (125.00)		100.0	22.00 [-59.60, 103.60]
Total (95% CI)	26		18			100.0	22.00 [-59.60, 103.60]
Test for heterogeneity: not applicable							
Test for overall effect z=0.53 p=0.6							



Analysis 04.30. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 30 Total amino acid concentration (umol/L) at 6 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 30 Total amino acid concentration (umol/L) at 6 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Akeson 1996a	26	2974.00 (331.00)	18	2901.00 (309.00)		100.0	73.00 [-118.22, 264.22]
Total (95% CI)	26		18			100.0	73.00 [-118.22, 264.22]
Test for heterogeneity: not applicable							
Test for overall effect z=0.75 p=0.5							

Analysis 04.31. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 31 Atopic eczema in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 31 Atopic eczema in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	10/70	23/65		46.2	0.40 [0.21, 0.78]
Kramer 2000a	17/621	78/2862		53.8	1.00 [0.60, 1.69]
Total (95% CI)	691	2927		100.0	0.73 [0.49, 1.08]
Total events: 27 (EBF), 101 (MBF)					
Test for heterogeneity chi-square=4.54 df=1 p=0.03 I^2 =78.0%					
Test for overall effect z=1.57 p=0.1					

Analysis 04.32. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 32 Food allergy at 1 year (by history)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 32 Food allergy at 1 year (by history)

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	5/70	24/65		100.0	0.19 [0.08, 0.48]
Total (95% CI)	70	65		100.0	0.19 [0.08, 0.48]
Total events: 5 (EBF), 24 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=3.57 p=0.0004					

Analysis 04.33. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 33 Food allergy at 1 year (by double challenge)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 33 Food allergy at 1 year (by double challenge)

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	5/70	6/65		100.0	0.77 [0.25, 2.41]
Total (95% CI)	70	65		100.0	0.77 [0.25, 2.41]
Total events: 5 (EBF), 6 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.44 p=0.7					

Analysis 04.34. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 34 Two or more episodes of wheezing in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 34 Two or more episodes of wheezing in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	2/621	6/2862		6.5	1.54 [0.31, 7.59]
Oddy 1999	22/246	32/264		93.5	0.74 [0.44, 1.23]
Total (95% CI)	867	3126		100.0	0.79 [0.49, 1.28]
Total events: 24 (EBF), 38 (MBF)					
Test for heterogeneity chi-square=0.73 df=1 p=0.39 I^2 =0.0%					
Test for overall effect z=0.95 p=0.3					

Analysis 04.35. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 35 Any atopy at 5 years

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 35 Any atopy at 5 years

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	14/51	25/62		100.0	0.68 [0.40, 1.17]
Total (95% CI)	51	62		100.0	0.68 [0.40, 1.17]
Total events: 14 (EBF), 25 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.40 p=0.2					

Analysis 04.36. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 36 Atopic eczema at 5 years

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 36 Atopic eczema at 5 years

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	12/51	15/62		100.0	0.97 [0.50, 1.89]
Total (95% CI)	51	62		100.0	0.97 [0.50, 1.89]
Total events: 12 (EBF), 15 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.08 p=0.9					

Analysis 04.37. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 37 Pollen allergy at 5 years

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 37 Pollen allergy at 5 years

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	10/51	23/62		100.0	0.53 [0.28, 1.01]
Total (95% CI)	51	62		100.0	0.53 [0.28, 1.01]
Total events: 10 (EBF), 23 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.94 p=0.05					

Analysis 04.38. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 38 Asthma at 5-6 years

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 38 Asthma at 5-6 years

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	4/51	9/62		18.9	0.54 [0.18, 1.65]
Oddy 1999	33/207	37/232		81.1	1.00 [0.65, 1.54]
Total (95% CI)	258	294		100.0	0.91 [0.61, 1.36]
Total events: 37 (EBF), 46 (MBF)					
Test for heterogeneity chi-square=1.02 df=1 p=0.31 I^2 =1.6%					
Test for overall effect z=0.45 p=0.7					

Analysis 04.39. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 39 Food allergy at 5 years (by history)

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 39 Food allergy at 5 years (by history)

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	2/51	4/62		100.0	0.61 [0.12, 3.19]
Total (95% CI)	51	62		100.0	0.61 [0.12, 3.19]
Total events: 2 (EBF), 4 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.59 p=0.6					

Analysis 04.40. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 40 Allergy to animal dander at 5 years

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 40 Allergy to animal dander at 5 years

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kajosaari 1983	4/51	6/62		100.0	0.81 [0.24, 2.72]
Total (95% CI)	51	62		100.0	0.81 [0.24, 2.72]
Total events: 4 (EBF), 6 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.34 p=0.7					

Analysis 04.41. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 41 Positive skin prick test at 6 years

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 41 Positive skin prick test at 6 years

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Oddy 1999	53/160	57/171		100.0	0.99 [0.73, 1.35]
Total (95% CI)	160	171		100.0	0.99 [0.73, 1.35]
Total events: 53 (EBF), 57 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.04 p=1					

Analysis 04.42. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 42 Hemoglobin concentration (g/L) at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 42 Hemoglobin concentration (g/L) at 12 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Pisacane 1995	9	117.00 (4.00)	21	109.00 (7.00)		100.0	8.00 [4.03, 11.97]
Total (95% CI)	9		21			100.0	8.00 [4.03, 11.97]
Test for heterogeneity: not applicable							
Test for overall effect z=3.95 p=0.00008							

Analysis 04.43. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 43 Hemoglobin concentration < 110 g/L at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 43 Hemoglobin concentration < 110 g/L at 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Pisacane 1995	0/9	9/21		100.0	0.12 [0.01, 1.80]
Total (95% CI)	9	21		100.0	0.12 [0.01, 1.80]
Total events: 0 (EBF), 9 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.54 p=0.1					

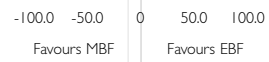
Analysis 04.44. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 44 Serum ferritin concentration (mcg/L) at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 44 Serum ferritin concentration (mcg/L) at 12 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Pisacane 1995	9	17.00 (15.00)	21	12.30 (11.70)		100.0	4.70 [-6.30, 15.70]
Total (95% CI)	9		21			100.0	4.70 [-6.30, 15.70]
Test for heterogeneity: not applicable							
Test for overall effect z=0.84 p=0.4							



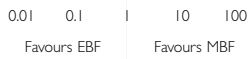
Analysis 04.45. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 45 Serum ferritin concetration < 10 mcg/L at 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 45 Serum ferritin concetration < 10 mcg/L at 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Pisacane 1995	2/9	11/21		100.0	0.42 [0.12, 1.54]
Total (95% CI)	9	21		100.0	0.42 [0.12, 1.54]
Total events: 2 (EBF), 11 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.30 p=0.2					



Analysis 04.46. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 46 Death in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 46 Death in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	1/621	2/2862		100.0	2.30 [0.21, 25.37]
Total (95% CI)	621	2862		100.0	2.30 [0.21, 25.37]
Total events: 1 (EBF), 2 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.68 p=0.5					

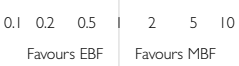
Analysis 04.47. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 47 One or more episodes of gastrointestinal infection in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 47 One or more episodes of gastrointestinal infection in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	31/621	213/2862		100.0	0.67 [0.46, 0.97]
Total (95% CI)	621	2862		100.0	0.67 [0.46, 0.97]
Total events: 31 (EBF), 213 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=2.13 p=0.03					



Analysis 04.48. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 48 Hospitalization for gastrointestinal infection in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 48 Hospitalization for gastrointestinal infection in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	11/621	64/2862		100.0	0.79 [0.42, 1.49]
Total (95% CI)	621	2862		100.0	0.79 [0.42, 1.49]
Total events: 11 (EBF), 64 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.72 p=0.5					

Analysis 04.49. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 49 One or more episodes of upper respiratory tract infection in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 49 One or more episodes of upper respiratory tract infection in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Oddy 1999	179/246	179/264		100.0	1.07 [0.96, 1.20]
Total (95% CI)	246	264		100.0	1.07 [0.96, 1.20]
Total events: 179 (EBF), 179 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.23 p=0.2					

Analysis 04.50. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 50 Two or more episodes of upper respiratory tract infection in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 50 Two or more episodes of upper respiratory tract infection in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	175/621	887/2862		71.3	0.91 [0.79, 1.04]
Oddy 1999	114/246	132/264		28.7	0.93 [0.77, 1.11]
Total (95% CI)	867	3126		100.0	0.91 [0.82, 1.02]
Total events: 289 (EBF), 1019 (MBF)					
Test for heterogeneity chi-square=0.03 df=1 p=0.87 I^2 =0.0%					
Test for overall effect z=1.59 p=0.1					

Analysis 04.51. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 51 Four or more episodes of upper respiratory tract infection in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 51 Four or more episodes of upper respiratory tract infection in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Oddy 1999	29/246	38/264		100.0	0.82 [0.52, 1.29]
Total (95% CI)	246	264		100.0	0.82 [0.52, 1.29]
Total events: 29 (EBF), 38 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.87 p=0.4					

Analysis 04.52. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 52 One or more episodes of lower respiratory tract infection in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 52 One or more episodes of lower respiratory tract infection in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Oddy 1999	107/264	93/246		100.0	1.07 [0.86, 1.33]
Total (95% CI)	264	246		100.0	1.07 [0.86, 1.33]
Total events: 107 (EBF), 93 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.63 p=0.5					

Analysis 04.53. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 53 Two or more episodes of respiratory tract infection (upper or lower) in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 53 Two or more episodes of respiratory tract infection (upper or lower) in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	190/621	969/2862		100.0	0.90 [0.79, 1.03]
Total (95% CI)	621	2862		100.0	0.90 [0.79, 1.03]
Total events: 190 (EBF), 969 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=1.54 p=0.1					

Analysis 04.54. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 54 Hospitalization for respiratory tract infection in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 54 Hospitalization for respiratory tract infection in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Kramer 2000a	69/621	411/2862		89.4	0.77 [0.61, 0.98]
Oddy 1999	9/246	18/264		10.6	0.54 [0.25, 1.17]
Total (95% CI)	867	3126		100.0	0.75 [0.60, 0.94]
Total events: 78 (EBF), 429 (MBF)					
Test for heterogeneity chi-square=0.77 df=1 p=0.38 I^2 =0.0%					
Test for overall effect z=2.48 p=0.01					

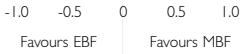
Analysis 04.55. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 55 Number of episodes of otitis media in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 55 Number of episodes of otitis media in first 12 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Duncan 1993	138	1.48 (1.95)	141	1.52 (1.85)		100.0	-0.04 [-0.49, 0.41]
Total (95% CI)	138		141			100.0	-0.04 [-0.49, 0.41]
Test for heterogeneity: not applicable							
Test for overall effect z=0.18 p=0.9							



Analysis 04.56. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 56 One or more episodes of otitis media in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 56 One or more episodes of otitis media in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Duncan 1993	75/138	60/141		53.1	1.28 [1.00, 1.63]
Kramer 2000a	41/621	147/2862		46.9	1.29 [0.92, 1.80]
Total (95% CI)	759	3003		100.0	1.28 [1.04, 1.57]
Total events: 116 (EBF), 207 (MBF)					
Test for heterogeneity chi-square=0.00 df=1 p=0.98 I^2 =0.0%					
Test for overall effect z=2.38 p=0.02					

Analysis 04.57. Comparison 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies, Outcome 57 Frequent otitis media in first 12 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 04 Exclusive versus mixed breastfeeding 3-7 months, developed countries, observational studies

Outcome: 57 Frequent otitis media in first 12 months

Study	EBF n/N	MBF n/N	Relative Risk (Fixed) 95% CI	Weight (%)	Relative Risk (Fixed) 95% CI
Duncan 1993	15/138	19/141		100.0	0.81 [0.43, 1.52]
Total (95% CI)	138	141		100.0	0.81 [0.43, 1.52]
Total events: 15 (EBF), 19 (MBF)					
Test for heterogeneity: not applicable					
Test for overall effect z=0.66 p=0.5					

Analysis 05.01. Comparison 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies, Outcome 01 Very low density lipoprotein concentration (mmol/L) at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies

Outcome: 01 Very low density lipoprotein concentration (mmol/L) at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Savilahti 1987a	7	0.23 (0.19)	19	0.18 (0.13)		100.0	0.05 [-0.10, 0.20]
Total (95% CI)	7		19			100.0	0.05 [-0.10, 0.20]
Test for heterogeneity: not applicable							
Test for overall effect z=0.64 p=0.5							

Analysis 05.02. Comparison 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies, Outcome 02 Low density lipoproteinconcentration (mmol/L) at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies

Outcome: 02 Low density lipoproteinconcentration (mmol/L) at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Savilahti 1987a	7	2.70 (0.95)	19	2.80 (0.73)		100.0	-0.10 [-0.88, 0.68]
Total (95% CI)	7		19			100.0	-0.10 [-0.88, 0.68]

Test for heterogeneity: not applicable

Test for overall effect z=0.25 p=0.8

Analysis 05.03. Comparison 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies, Outcome 03 High-density lipoprotein-2 concentration (mmol/L) at 9 months

Review: Optimal duration of exclusive breastfeeding

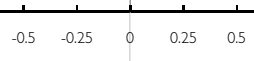
Comparison: 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies

Outcome: 03 High-density lipoprotein-2 concentration (mmol/L) at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Savilahti 1987a	7	0.55 (0.15)	19	0.47 (0.13)		100.0	0.08 [-0.05, 0.21]
Total (95% CI)	7		19			100.0	0.08 [-0.05, 0.21]

Test for heterogeneity: not applicable

Test for overall effect z=1.25 p=0.2



Analysis 05.04. Comparison 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies, Outcome 04 High-density lipoprotein-3 concentration (mmol/L) at 9 months

Review: Optimal duration of exclusive breastfeeding

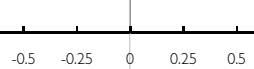
Comparison: 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies

Outcome: 04 High-density lipoprotein-3 concentration (mmol/L) at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Savilahti 1987a	7	0.50 (0.07)	19	0.50 (0.10)		100.0	0.00 [-0.07, 0.07]
Total (95% CI)	7		19			100.0	0.00 [-0.07, 0.07]

Test for heterogeneity: not applicable

Test for overall effect z=0.00 p=1



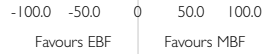
Analysis 05.05. Comparison 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies, Outcome 05 Apoprotein B concentration (mg/dL) at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies

Outcome: 05 Apoprotein B concentration (mg/dL) at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Savilahti 1987a	7	87.00 (23.00)	19	82.00 (23.00)		100.0	5.00 [-14.93, 24.93]
Total (95% CI)	7		19			100.0	5.00 [-14.93, 24.93]
Test for heterogeneity: not applicable							
Test for overall effect z=0.49 p=0.6							



Analysis 05.06. Comparison 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies, Outcome 06 Total triglyceride concentration (mmol/L) at 9 months

Review: Optimal duration of exclusive breastfeeding

Comparison: 05 Exclusive versus mixed breastfeeding > 7 months, developed countries, observational studies

Outcome: 06 Total triglyceride concentration (mmol/L) at 9 months

Study	EBF N	EBF Mean(SD)	MBF N	MBF Mean(SD)	Weighted Mean Difference (Fixed) 95% CI	Weight (%)	Weighted Mean Difference (Fixed) 95% CI
Savilahti 1987a	7	1.50 (0.39)	19	1.20 (1.00)		100.0	0.30 [-0.23, 0.83]
Total (95% CI)	7		19			100.0	0.30 [-0.23, 0.83]
Test for heterogeneity: not applicable							
Test for overall effect z=1.10 p=0.3