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Review

A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding

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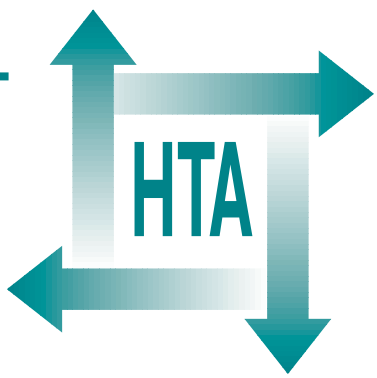
Health Technology Assessment
NHS R&D HTA Programme



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A systematic review to evaluate the effectiveness of interventions to promote the initiation of breastfeeding

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This report is one of a series covering acute care, diagnostics and imaging, methodology, pharmaceuticals, population screening, and primary and community care. It was identified as a priority by the Primary and Community Care Panel and funded as project number 96/47/01.

The views expressed in this publication are those of the authors and not necessarily those of the Standing Group, the Commissioning Board, the Panel members or the Department of Health. The editors wish to emphasise that funding and publication of this research by the NHS should not be taken as implicit support for the recommendations for policy contained herein. In particular, policy options in the area of screening will be considered by the National Screening Committee. This Committee, chaired by the Chief Medical Officer, will take into account the views expressed here, further available evidence and other relevant considerations.

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Glossary and list of abbreviations

Technical terms and abbreviations are used throughout this report. The meaning is usually clear from the context but a glossary is provided for the non-specialist reader. In some cases usage differs in the literature but the term has a constant meaning throughout this review.

Glossary

Baby Friendly Hospital Initiative: the ten steps to successful breastfeeding (WHO/UNICEF) The 'Ten steps to successful breastfeeding' are set out in the joint WHO/UNICEF statement 'Protecting, promoting and supporting breastfeeding: the special role of maternity services'.[27] The WHO/UNICEF Baby Friendly Hospital Initiative was developed to ensure that every facility providing maternity services fully practises all ten steps to successful breastfeeding and to take action to give effect to the principles and aim of all Articles of the International Code of Marketing of Breast Milk Substitutes.[30]

The Baby Friendly Initiative in the community. A seven point plan for the protection, promotion and support of breastfeeding in community health care settings[29] The Seven Point Plan is the result of a widespread consultation procedure in the UK involving health professionals, service providers, mother support groups, professional organisations and other interested parties. It therefore reflects consensus in the UK on what constitutes best practice in the care for and support of breastfeeding mothers and babies by community health services.

Before–after study A study design where a group is studied before and after an intervention.[62] Two types of before–after studies were included in this review. (1) Cohort studies observe a single sample from baseline to follow-up and report outcome assessment both before and after the intervention. (2) Cross-sectional studies recruit a sample from a defined population at one point in time and measure the outcome of interest; the intervention is then implemented, and outcomes from another sample from the same population at a later point in time are compared with the previous group.

General health sector initiatives Health sector initiatives that do not have a particular framework or contextual setting which require examination as a specific subgroup.

Health education interventions Interventions that provide factual or technical information about breastfeeding to a specific target group in a hospital or community setting. Health education interventions are grounded in professional expertise and are usually delivered during the pregnancy. Examples include breastfeeding literature or group education classes for pregnant women.

Health sector initiatives Interventions that aim to change the institutional or organisational nature of health services in favour of promoting breastfeeding. These interventions are mostly conducted within the hospital setting and may have several components implemented at one time. Examples include the introduction of a breastfeeding policy, rooming-in facilities (baby stays in same room as mother, day and night), removal of artificial milk from discharge packs or training of health professionals. Some of these initiatives appear to be grounded in recommendations of the Baby Friendly Hospital Initiative.[27]

Health sector initiatives – Baby Friendly Hospital Initiative Health sector initiatives that have explicitly stated the Baby Friendly Hospital Initiative as the framework for the development and implementation of the intervention(s).

Health sector initiatives – social support from health professionals Health sector initiatives where a health professional working within the health sector, for example a nurse or

continued

Glossary *contd*

midwife, provides one-to-one advice and support on breastfeeding.

Health sector initiatives – training of health professionals Health sector initiatives that have provided professional training on breastfeeding to health sector staff as a single intervention.

Health sector initiatives – US Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC Program) Different health sector initiatives that have been delivered at the local level as part of the national WIC Program targeting women of low incomes in the USA.

Independent inquiry into inequalities in health[44] This report was commissioned by the Department of Health, UK, to review the evidence on inequalities in health in England, including time trends, and, as a contribution to the development of the government's strategy for health, to identify areas for policy development likely to reduce these inequalities.

International Code of Marketing of Breast Milk Substitutes[30] An international voluntary agreement adopted by the World Health Assembly to contribute to the provision of safe and adequate nutrition for infants, by the protection and promotion of breastfeeding, and by ensuring the proper use of artificial foods, where these are necessary.

Media campaigns Interventions that are more commonly received by a wider audience, for example all women of childbearing age or a defined community, and use a public medium such as television, press or magazines. The information may or may not be grounded in professional expertise.

Multifaceted interventions Interventions that have more than one component, which are delivered to the same target group at the same time; for example, health education activities combined with a peer support programme.

Non-randomised controlled trial (non-RCT) An experimental study in which participants are allocated to receive either an experimental or a control intervention, using non-random methods. The relative effectiveness of the interventions is assessed by comparing event rates and outcomes in the two groups.[62]

Peer support programmes Interventions where support on issues relating to breastfeeding are provided by people outside of a professional capacity, who have been trained in order to gain specialist knowledge of breastfeeding. Typically, this support is provided by peers, namely mothers who have successfully breastfed, and subsequently received training to work as a peer counsellor in a voluntary capacity within their resident community. Most of these programmes are grounded in the La Leche League model of peer support.

Randomised controlled trial (RCT) An experimental study in which participants are randomised to receive either an experimental or a control treatment or intervention. The relative effectiveness of the interventions is assessed by comparing event rates and outcomes in the two groups.[62]

Reducing health inequalities: an action report[2] This report sets out the action to be taken across government, and through partnerships between the various local and regional organisations in England, to reduce health inequalities. The report details the breadth of the government response to the recommendations of the independent inquiry chaired by Sir Donald Acheson.

Saving lives: our healthier nation[1] This White Paper sets out the health strategy for England with particular reference to the case for tackling health inequalities.

List of abbreviations

ANOVA	analysis of variance
bf	breastfeeding*
BFA	baby feeding advisor
BFHI	Baby Friendly Hospital Initiative
CI	confidence interval*
DHSS	Department of Health and Social Security
HIV-1	human immunodeficiency virus-1
HSI	health sector initiative
HV	health visitor*
MIP	mother–infant pair
n.s.	not significant*
OR	odds ratio*
RCT	randomised controlled trial
RR	relative risk†
SD	standard deviation
UNICEF	United Nations Children's Fund
WIC	US Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants, and Children

* Used only in appendices
† Used only in figures

Executive summary

Background

Human breastmilk provides complete nutrition for infants and helps protect against certain childhood diseases. Despite this, rates of initiation of breastfeeding in the UK remain low relative to other countries. In 'Our healthier nation' action report, the government has highlighted the promotion of breastfeeding in order to assist improvements in health and to reduce the health inequalities of mothers and children in the UK.

Objectives

The primary aim of this systematic review was to evaluate existing evidence to identify which promotion programmes are effective at increasing the number of women who start to breastfeed. In addition, the review aimed to assess the impact of such programmes on the duration and/or exclusivity of breastfeeding and the intermediate and process outcomes. Where the strength and quality of the evidence permitted, the review aimed to identify implications for practice within the UK and priority areas for future research.

Methods

Data sources

A range of electronic databases were searched from inception to November 1998, several relevant journals were hand-searched, and references of retrieved papers were examined. Relevant experts, organisations and lay groups were contacted to help identify further published or unpublished material. Additionally, an expert panel was consulted.

Selection criteria

Four types of criteria were used to select eligible studies for this review:

- study design – randomised controlled trials (RCTs), non-RCTs with concurrent controls, and before–after studies (cohort or cross-sectional)
- participants – pregnant women, mothers in the immediate postpartum period before the first breastfeed, any participant linked to pregnant women or new mothers, or any participant who may breastfeed in the future, or be linked to a breastfeeding woman in the future
- interventions – any type of intervention designed to promote the uptake of breastfeeding was included; control groups could receive an alternative breastfeeding promotion programme or standard care
- outcomes – the primary outcome was initiation of breastfeeding; secondary outcomes (duration and exclusivity of breastfeeding) were included if initiation was reported in the same study; intermediate and process outcomes were also included, and need not necessarily be associated with reported initiation rates.

Data extraction and validity assessment

Data were extracted into structured tables. All included studies were checked against a comprehensive methodological checklist. Different checklists were used for RCTs, non-RCTs and before–after studies. Data extraction and validity assessment were independently checked by a second reviewer.

Data synthesis

The studies were grouped according to intervention type, and were combined using a narrative synthesis. For individual RCTs and non-RCTs reporting initiation of breastfeeding, relative risks with associated 95% confidence intervals were estimated, with calculations performed on an intention-to-treat basis where possible. Pooling of relative risks was considered inappropriate owing to the lack of similarity across the studies.

Results

A total of 59 studies met the selection criteria, comprising 14 RCTs, 16 non-RCTs and 29 before–after studies.

Interventions were grouped into the following categories:

- health education
- health sector initiatives (HSI) – general
- HSI – Baby Friendly Hospital Initiative (BFHI)
- HSI – training of health professionals

- HSI – US Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)
- HSI – social support from health professionals
- peer support
- media campaigns
- multifaceted interventions.

In many cases, studies were dissimilar in terms of the type of intervention(s), participants and the definitions of outcomes. Methodological problems of some studies also limited interpretation of findings. Whilst the results from before–after studies should be viewed with some caution, inclusion of these studies provided a useful evidence base for evaluation of more complex interventions.

Health education (nine RCTs, seven non-RCTs, three before–after studies)

Breastfeeding literature alone, or combined with a more formal, non-interactive method of health education, appears to have limited impact on initiation rates. Small, informal, group health education classes, delivered in the antenatal period, can be an effective intervention to increase initiation rates, and in some cases the duration of breastfeeding, among women from different income or ethnic groups.

HSI: general, and based on the BFHI (two RCTs, three non-RCTs, four before–after studies)

Institutional changes in hospital practices to promote breastfeeding, either as part of, or independent to, the BFHI, can be effective at increasing both the initiation and duration of breastfeeding, particularly in developing countries. These may include stand-alone interventions such as rooming-in, or a package of interventions, such as rooming-in, early contact and health education.

HSI: WIC (two RCTs, three non-RCTs, five before–after studies)

In most studies, WIC programs were effective at increasing both the initiation and duration of breastfeeding among women of low-income groups in the USA. Effective WIC interventions included one-to-one health education in the antenatal period, peer counselling in the ante- and postnatal periods, or a combination of one-to-one health education and peer counselling in the ante- and postnatal periods.

HSI: training of health professionals (five before–after studies)

The limited evidence available suggests that these programmes may be useful in improving the knowledge of midwives and nurses; however, favourable results were not shown in terms of changes in attitudes of health professionals, or changes in breastfeeding rates.

HSI: social support from health professionals (one RCT)

The social support intervention did not produce significantly increased rates of initiation compared with standard care.

Peer support (two non-RCTs)

Both studies showed peer support programmes, when delivered as a stand-alone intervention to women in low-income groups, to be an effective intervention at increasing initiation rates (and duration) among women who had expressed a wish to breastfeed.

Media campaigns (two before–after studies)

The limited evidence available suggests that a media campaign as a stand-alone intervention, and particularly television commercials, may improve attitudes towards, and increase initiation rates of, breastfeeding.

Multifaceted interventions (one non-RCT, 10 before–after studies)

Several studies found multifaceted interventions to be effective in increasing initiation rates (and duration and exclusivity of breastfeeding). Most of the multifaceted interventions that were found to be effective comprised a media campaign and/or a peer support programme combined with structural changes to the health sector (HSI) or, in fewer cases, combined with health education activities.

Conclusions

Three types of intervention have been shown to be useful in the promotion of breastfeeding when delivered as a stand-alone intervention in developed countries. Informal, small group health education, delivered during the antenatal period, appears to be effective at increasing initiation rates among women from different income groups and from some minority ethnic groups. There is also some evidence to show that one-to-one health education can be effective at increasing initiation rates among women on low incomes. Peer support programmes, delivered in the ante- and postnatal periods, have also been shown to be effective at increasing both initiation and duration rates of breastfeeding among women on low incomes, and

particularly among women who have expressed a wish to breastfeed.

Packages of interventions have also been shown to be effective at increasing the initiation and, in most cases, the duration of breastfeeding in developed countries. Effective packages appear to include a peer support programme and/or a media campaign combined with structural changes to the health sector and/or health education activities.

Structural changes in hospital practices to promote breastfeeding (HSI) have been shown to be effective at increasing both initiation and duration of breastfeeding in developing countries. Rooming-in, as either a stand-alone intervention or as one component of a package of interventions, is a key example of an effective HSI.

Implications for practice

The authors' judgement is that there is sufficient evidence of effectiveness for practitioners and policy-makers to consider the following:

- an internal review of existing breastfeeding education programmes to increase the availability of good practice health education programmes
- increased implementation of peer support programmes, particularly targeting women from low-income groups
- implementation of a 'package' of interventions at national and local levels with particular emphasis on peer support programmes and good practice health education activities combined with structural changes to maternity ward practices
- revision of the 'Good practice guidance to the NHS' on breastfeeding.

Recommendations for future research

Priorities for further research, not in order of importance, are:

- further evaluations of the impact of training programmes for health professionals
- further research relating to the effectiveness of media campaigns
- evaluation of health education approaches targeting women on low incomes as well as their significant others
- evaluation of the impact of breastfeeding promotion programmes within different ethnic groups
- evaluation of changes in the routine supply of artificial milk in maternity units
- greater methodological rigour in future research
- standardisation of the definition of 'initiation of breastfeeding'.

Chapter 1
Introduction

Background

A recent action report arising from the White Paper 'Our healthier nation'[1] states that a high priority is to be given to policies aimed at improving health and reducing health inequalities in women of childbearing age, expectant mothers and young children in the UK. Specific policies highlighted as a way of improving health and reducing inequalities include those to increase the uptake of breastfeeding and to promote social and emotional support for parents and children.[2]

This recommendation is grounded in the evidence for the short- and long-term benefits of breastfeeding, and the WHO recommendation that all infants should be fed exclusively on breastmilk from birth until 4–6 months of age.[3] Widespread support for the promotion of breastfeeding in the USA and UK is demonstrated by the policy statements on breastfeeding by the American Academy of Pediatrics[4] and the British Paediatric Association.[5]

Human breastmilk not only provides complete nutrition for the full physical and mental development of healthy infants in the first critical months of life, but also protects against common childhood infections and diseases throughout childhood and into adulthood. Babies who are not fully breastfed for the first 3–4 months of age have been shown to suffer health problems such as gastroenteritis,[6] respiratory infection,[7,8] otitis media,[9,10] urinary tract infection,[11,12] atopic disease if a family history of atopy is present,[13–15] and juvenile onset insulin-dependent diabetes mellitus.[16,17]

In addition, breastfeeding is beneficial to the mother's health. Women who do not breastfeed are significantly more likely to develop epithelial ovarian cancer[18,19] and premenopausal breast cancer[20–22] compared with women who do breastfeed. Results from one study suggested that women who do not breastfeed are at greater risk of hip fractures in their old age than women who bottle-feed their infants,[23] although a recent review of several large international studies on this issue concluded that "there is no evidence that lactation, even when frequent and prolonged, has a long-term influence on the bone health in later life of individual women".[24]

Other benefits to the breastfeeding mother include the increased likelihood that she will use up the body fat deposited in pregnancy.[25] Cost savings will also be made; approximately £350 needed to feed a baby on artificial formula (except in the case of mothers participating in the UK Welfare Food Scheme and receiving subsidised formula milk powder) will be saved, as well as the effort of the preparation of bottle-feeds.[26]

Since the 1980s, there have been a number of key national and international initiatives to increase the number of women starting and continuing to breastfeed. International initiatives include the Baby Friendly Hospital Initiative (BFHI) arising from the WHO/UNICEF policy statement on the special role of maternity services to protect, promote and support breastfeeding.[27] In 1993, the UK developed its own national programme for implementation within the hospital sector[28] and, more recently, the Seven Point Plan has focused on the community-based healthcare sector.[29]

In 1981, the World Health Assembly adopted the International Code of Marketing of Breast Milk Substitutes to contribute to the provision of safe and adequate nutrition for infants by the protection and promotion of breastfeeding, and by ensuring the proper use of artificial foods, where these are necessary.[30] In 1983, the British government endorsed this code.[31] A 1989 government circular asked health authorities in the UK to implement the government's measures to secure the aim and principles of the WHO Code in relation to antenatal and postnatal care and the purchase and sale of infant formulas.[32] This regulation was extended in 1995 to prohibit the provision of any gifts promoting artificial foods to pregnant women or their families.[33]

Other national initiatives in the UK included a series of government reports published by the Committee on Medical Aspects of Food Policy Infant Feeding Panel.[34–36] These reports highlighted the importance of demand feeding, rooming-in and early initiation. The 1988 Joint Breastfeeding Initiative was a government initiative,

which aimed to promote improvements in maintenance rates of breastfeeding through non-governmental support organisations.[37] A key professional initiative to promote breastfeeding was the publication of the Royal College of Midwives' handbook entitled *Successful breastfeeding*, which aimed to make breastfeeding advice offered by midwives consistent and evidence-based.[38]

Another more recent government initiative in the UK was a report of good practice guidance on breastfeeding to the NHS, which aimed to provide a guide for all people working in the NHS on practices to promote the initiation and duration of breastfeeding.[33]

Despite these initiatives, successive surveys conducted every 5 years, initially by the Office of Population Censuses and Surveys, and more recently by the Office of National Statistics, have shown that the incidence and prevalence of breastfeeding have remained largely static since 1980. The most recent national figures available, from the survey carried out in 1995, show that only 62%* of women started to breastfeed in England and Wales, 48% in Scotland, and 41% in Northern Ireland.[39] Furthermore, lower breastfeeding rates in the UK have been shown to be associated with social class: 90% of women from social class I started to breastfeed in 1995 compared with only 50% of women from social class V.[39]

The Department of Health has calculated that the NHS could save £10 for every extra mother who breastfed owing to the reduction in diabetes mellitus, and £35 million each year in treating babies with gastroenteritis.[33] Although these figures are based on speculative estimates, they do illustrate the potential for significant cost savings to the NHS if all babies were breastfed.

In contrast to the UK, the rates of breastfeeding have increased over the last decade in some European countries (most notably Scandinavia) and other industrialised nations (such as Canada, Australia and New Zealand).[40] In Norway, 98% of women were breastfeeding in 1994 and 80% of women were still breastfeeding 3 months after birth.[41] This compares with 27% of babies born in the UK being breastfed at 4 months of age in 1995†.[39] In the UK, duration rates of breastfeeding also vary considerably in relation to social class, with 56% of women from social class I still breastfeeding at 4 months compared with only 13% continuing to 4 months in social class V. Breastfeeding rates from other industrialised nations, most notably Scandinavia, show that it is possible to increase sustained breastfeeding rates, even in cultures where artificial feeding has been considered as the norm.[42,43]

The challenge facing healthcare professionals, managers and policy-makers at this time is how to develop and deliver breastfeeding promotion programmes which are effective in encouraging women to choose to breastfeed, and how to enable those women who choose to breastfeed to do so effectively. In the context of the Acheson report,[44] a more specific challenge is how to address the clear socio-economic bias in the uptake of breastfeeding so that the health benefits of breastfeeding can also be enjoyed by mothers and babies in low-income groups.

Breastfeeding as a public health measure

Breastfeeding is a key public health measure, alongside immunisation and other initiatives, to protect and promote the health of one of the most vulnerable groups of the population – infants and children.

Breastfeeding has many unique strengths as a public health measure which contribute to its particular effectiveness. First, the production of human breastmilk is a completely natural process and provides a nutritional source that changes in synchrony with each baby's growing needs. Manufacturers of artificial foods continue to attempt to emulate these natural and dynamic qualities of breastmilk. Breastmilk remains, however, the most effective infant food to promote and protect the health of individual babies and children.

Furthermore, the dynamic and interactive nature of breastmilk enables the mother to provide passive immunity for her baby against intercurrent infections in her baby's environment, and also enhances the benefits from immunisation through

*Figures standardised for mother's age and age finished full-time education, factors strongly associated with the incidence of breastfeeding.

†These are data for mother's age and age finished full-time education and are not therefore comparable with the figures cited for breastfeeding incidence rates in England and Wales, Scotland and Northern Ireland at that time.

an increased active immune response.[45] The protective health benefits of breastfeeding apply, therefore, as both a primary public health measure in their own right and as a complementary public health measure to enhance the benefits of immunisation programmes.

Secondly, the delivery of breastmilk requires minimum intervention which, with the exception of certain rare organic illnesses, has no adverse physical effects on health. In contrast, potential adverse side effects from feeding artificial foods include contamination,[46] inaccurate preparation of feeds resulting in over- or underconcentration of nutrients,[47–49] and an increased use of resources.[50] One notable exception to this is the case of mothers who are HIV-positive and who live in affluent, more developed countries. Guidelines suggest that the counter-risks of mortality from breastfeeding are greater than those from artificial feeding so that breastfeeding is not recommended as the preferred infant feeding method.[51] More recent research has challenged the basis of these guidelines, however, and has called for an urgent review of breastfeeding policies for human immunodeficiency virus-1 (HIV-1)-infected women. The findings of a study conducted among 549 HIV-1-infected women in Durban, South Africa, indicated that exclusive breastfeeding carried a significantly lower risk of HIV-1 transmission than mixed feeding, and a similar risk to no breastfeeding.[52]

Finally, breastfeeding offers unique circumstances for the development of close, affectionate ties between the mother and her child. Whilst it is difficult to quantify the effect of such emotional gains for the baby, it is likely that the increased sense of security and contentment involved provides a strong foundation for the baby's emotional and mental development.

In conclusion, breastfeeding is highly effective in public health terms for promoting and protecting the physical and mental health of babies and children, with virtually no adverse health effects.

The context of breastfeeding

There are many complex factors influencing a woman's choice of infant feeding method and practices. Some of the social, psychological and clinical factors are more widely recognised; for example, demographic factors such as the mother's age, number of years in full-time education and income level. Internal and external psychological factors are also acknowledged, such as the mother's attitudes towards breast or artificial feeding, and the attitudes of her partner, her mother, or her peers. The organisation of health services has been recognised as a factor contributing towards the choice and ability of a mother to breastfeed, with routine hospital practices often conspiring to promote artificial feeding; for example, separation of the mother and infant, the routine use of artificial foods, and attitudes of health professionals towards infant feeding methods.

Whilst a complete analysis of the determinants of why women do or do not initiate breastfeeding is outside the scope of this review, brief consideration will be given to one of the less well recognised, and perhaps fundamental, factors affecting the choice and ability of women to breastfeed – namely cultural norms. It can be argued that the perceived cultural norm of infant feeding is the underpinning factor with which individuals choose to comply, or from which they choose to deviate. It is within this context that the complex range of psychological, social and clinical factors influence the infant feeding decision and practice of each pregnant and lactating woman. In turn, changes in breastfeeding practices and social and clinical environments influence the development of a new cultural norm towards or against breastfeeding.

At a global level, shifts in cultural norms towards or against breastfeeding and associated infant feeding practices are quite stark. In developing countries, breastfeeding has remained the cultural norm with widespread breastfeeding practices continuing to prevail. Within this, a subculture favouring artificial feeding has emerged among women and families with higher incomes, higher education levels, and increased exposure to western cultural values, which are often perceived as 'superior'. In contrast, artificial feeding has generally become established as the cultural norm in the USA, UK and most of western Europe (with the exception of Scandinavia), where breastfeeding rates remain relatively low despite extensive breastfeeding promotion programmes. In these countries, a subculture has developed among women of higher-income groups who favour breastfeeding as the preferred and 'more acceptable' infant feeding method.

A historical perspective provides some insight into factors that may have contributed to the decline of breastfeeding and the emergence of artificial feeding as a more acceptable cultural norm within the UK. One commonly cited factor is

the exponential growth in the availability and advertising of artificial foods in the early decades of this century, primarily through media advertising and the medical profession.[53,54] Concerns about inadequate nutrition for babies during the war years resulted in the subsidy of artificial foods by Churchill's government in 1940. The provision of free 'National Dried Milk' through baby clinics may have been seen as government and professional endorsement of the use of artificial foods.[55]

As use of artificial foods became more widespread, professional and lay publications appeared to make a concerted effort to also render breastfeeding 'scientific and exact'.[40] A pervasive view, influencing both breastfeeding mothers and health professionals alike, was that the same degree of control and regulation which had been developed for the artificially fed baby should now be imposed upon the breastfed baby.[56] Much of the widespread early discontinuation of breastfeeding that has occurred over the subsequent decades may be attributable to practices that medicalised breastfeeding, such as separation of mothers and babies, restrictions of 4-hourly feeds, test-weighing, and giving of supplementary bottles of artificial food to breastfeeding babies.[40,57] When her baby failed to comply with such time-regulated targets, the mother's natural assumption was that she was failing to supply a reliable and adequate amount of breastmilk, so giving rise to the cultural myth of 'insufficient milk supply'. Decades of women learned either to use bottles as a part of breastfeeding or to turn to them when they 'failed' with breastfeeding. All these issues revealed a fundamental misunderstanding of the process by which the infant regulates milk supply by expressing his/her 'demand' for milk by appetite control.[40]

The changing role of women and society during this time may also have been a factor contributing to the rise of artificial feeding as the cultural norm in the UK. Scowen relates the increase in artificial feeding in the 1960s and early 1970s to women's wish for greater freedom within the context of increased choice, increased availability of contraception and more opportunities to work.[58]

The increasing portrayal of women's breasts in the media as symbols of sexuality, and some men's attitudes towards breasts, may also be factors contributing to the decline in breastfeeding.[59,60] Embarrassment relating to breastfeeding in public and a lack of public facilities for breastfeeding are also likely to play a role. Dolls with bottles or dummies and symbols of bottles used to indicate changing and feeding rooms represent the widespread acceptance of bottle-feeding as the cultural norm. Indeed, the cultural norm against breastfeeding in public is clearly demonstrated by the following quotations, cited in Hoddinott 1999:[55]

> "There are 11 National Parks in Britain ... many have convenient mother and baby facilities. Please note that breastfeeding in public is not considered generally acceptable." (*Days out*; 1996. British Tourist Authority)

> "Breast is best, but not in public." (*The Sunday Independent* 1996 Jul 28)

One likely outcome arising from the current situation of artificial feeding becoming more widespread in the UK is the loss of collective knowledge and experience of breastfeeding in the community.[61] Women giving birth over the last decade in the UK were themselves born when breastfeeding was at its lowest popularity this century, and are therefore more likely to have mothers who did not breastfeed.[55] A recent, well-conducted, qualitative study examining why some women do not want to breastfeed reported that breastfeeding is seldom seen and many women lack the body confidence required to perform it in front of others. Women who had regularly seen other women successfully breastfeeding were more confident and committed to breastfeeding antenatally and more likely to succeed. All women knew that breastfeeding was theoretically better for their baby, but for women with close exposure to breastfeeding this became embodied knowledge which was owned.[55]

In conclusion, many factors over the past century and in more recent times have contributed to breastfeeding becoming increasingly less established as the cultural norm in the UK. This trend appears to have been reversed to some degree among women of higher income groups, but has become relatively stronger among women of lower income groups.

Chapter 2

Aims of this review

This systematic review was commissioned by the NHS R&D Health Technology Assessment programme. The specific aim was to evaluate the effectiveness of interventions that encourage women to start breastfeeding. The effect of interventions that aim to increase both the initiation and the duration/exclusivity of breastfeeding were also examined in this review. However, interventions where the sole aim was to alter the duration or exclusivity of breastfeeding were excluded.

There are many different types of health promotion intervention that can be implemented with the aim of increasing the initiation of breastfeeding. These range from international policies, such as the International Code of Marketing of Breast Milk Substitutes, which provides a regulatory framework to protect breastfeeding practice,[30] through to local health education programmes which aim to increase women's understanding of, and ability to, breastfeed. This review aims to evaluate the impact of all types of breastfeeding promotion intervention.

In summary, this review aims to:

- identify and describe health promotion activity intended to increase the rate of initiation of breastfeeding
- evaluate the effectiveness of any such health promotion activity, in terms of changing the number of women who initiate breastfeeding, based on the following subgroups:
  - healthy public policy
  - supportive environments
  - community action
  - development of personal skills
  - reorientation of health services
- compare the effectiveness of health promotion interventions within and between these areas as appropriate
- assess the impact of these interventions on secondary outcomes (e.g. duration of breastfeeding, exclusivity of breastfeeding, and any other reported beneficial or adverse effects), on intermediate outcomes (e.g. knowledge and attitudes), and process outcomes (e.g. change in cultural norms).

Chapter 3

Scope and methods of this review

A systematic review of the literature was undertaken using guidelines published by the NHS Centre for Reviews and Dissemination.[62]

Criteria for inclusion of studies in the review

Participants

Studies recruiting pregnant women and mothers of newborn infants in the immediate postpartum period were considered for inclusion in the review. Studies recruiting population subgroups of women, such as women from low-income groups, or different ethnic groups, were also eligible. Evaluations involving women and infants with a specific health problem – for example, mothers with eating disorders or AIDS, or infants in intensive care – were excluded from this review owing to the special considerations required to account for the complexity of factors which may affect the outcome in those cases.

Studies of interventions targeting other people were also considered; these participants included those linked to women who may breastfeed, such as partners, other family members, health professionals, and employers. In addition, women who may decide to breastfeed in the future, and participants linked to such women (as described above), were also included.

Interventions

This review included evaluations of any type of intervention designed to promote the initiation of breastfeeding. Control groups could receive standard or routine care, or an alternative breastfeeding promotion programme.

As the aim of this review was **not** to examine interventions **solely** seeking to affect the duration or exclusivity of breastfeeding, evaluations of interventions that were implemented **after** the first breastfeed were excluded. In studies of the introduction of rooming-in practices within a hospital, it was often not clear whether the first breastfeed had taken place in the delivery room prior to commencement of the rooming-in intervention. In these cases, the principle of rooming-in was assumed to have started from the point of birth.

Outcomes

Primary outcomes

The rate of initiation of breastfeeding was the primary outcome of the review. Evaluations of interventions that aimed to encourage the early initiation of breastfeeding, which measured the outcome in terms of 'early' or 'late' initiation, rather than numbers of women starting breastfeeding, were not included in this review.

Secondary outcomes

In studies that measured the primary outcome of initiation of breastfeeding, any additional information relating to duration and/or exclusivity of breastfeeding was also recorded. Evaluations of interventions solely focusing on promoting the duration or exclusivity of breastfeeding, without reporting initiation, were excluded. Other beneficial or adverse effects arising from the interventions were also reported.

Intermediate and/or process outcomes

Intermediate outcomes such as changes in knowledge of, or attitudes towards, breastfeeding were included, as were process outcomes, such as use of artificial foods or a change in hospital practice to promote breastfeeding. Although these outcomes were not the primary outcome of this review, they were included in the review irrespective of whether the primary outcome of initiation was reported in the paper because they were deemed to have the potential to influence the initiation of breastfeeding. Therefore, individual evaluations incorporating intermediate or process outcomes as the primary outcome for that individual study were included in the review.

Study design

Evaluations of effectiveness

Randomised controlled trials (RCTs) and non-RCTs with concurrent controls were included in this review. For categories of interventions where evidence was limited, exceptions to this rule were considered. For example, international comparisons of legislative policies regarding maternity leave may have been conducted using a comparative study design with historical controls.

Studies with before- and after-intervention designs were also included in this review, in recognition of the difficulties inherent in evaluating certain types of health promotion intervention; for example, national policies, changes to hospital organisation and management, media campaigns implemented across an entire community, or multifaceted interventions that include several components. Inclusion of these studies aimed to utilise the available evidence to provide a more comprehensive evaluation of breastfeeding promotion interventions. It is important to note, however, that results from before–after studies are likely to be less robust than those from RCTs and non-RCTs, and any reported effect on breastfeeding uptake cannot be solely attributed to the intervention(s). This is due to potential external factors, present during the period of the intervention and its evaluation phase, which may influence the study outcomes.

Two types of before–after studies were included in this review: cohort and cross-sectional. In cohort studies, a single sample is observed from baseline to follow-up. In cross-sectional studies, a sample of participants from a defined population at one point in time is selected for comparison with another sample from the same population at a later point in time.

Descriptive studies

Descriptive studies were included where appropriate to provide insight into the meanings, experiences and views of the participants, to provide a better understanding of how a health promotion programme can work in one situation but not another.[63] Inclusion of this type of evidence could also be used to validate the results from quantitative studies, or to provide additional explanatory information about the underlying factors or mechanisms of an effective intervention.

Identification of studies

The search strategy was devised by the information service team at the NHS Centre for Reviews and Dissemination, University of York, and was independently checked by the review team and the expert advisory panel to the review. Following comments from the advisory panel, additional terms for artificial feeds were included in the search strategy. A systematic and comprehensive search was conducted on the following electronic databases:

- ASSIA
- British Nursing Index
- CINAHL
- The Cochrane Library CD-ROM
- The Cochrane Pregnancy and Childbirth Group Specialised Register of Controlled Trials
- DHSS Data
- Dissertation Abstracts
- EMBASE
- ERIC
- LILACS (Latin American and Caribbean Center for Health Sciences Information)
- MEDLINE
- PsycLIT
- Science Citation Index
- SIGLE (System for Information on Grey Literature in Europe)
- Social Science Citation Index

The search strategy was developed for MEDLINE and adapted for use with other databases (see appendix 1). All databases were searched from inception to November 1998.

Relevant journals not represented in the Cochrane Controlled Trials Register, which were handsearched, included: *Journal of Human Lactation*, *Health Promotion International, MIDIRS* (Midwives Information and Resource Service), *Midwifery Digest*, and *Health Education Quarterly*. Reference lists of all retrieved papers were examined to identify further studies.

Contact was made with over 400 experts, organisations and lay groups with an interest or involvement in breastfeeding and health promotion to identify other published or unpublished studies.

These comprehensive search measures, particularly those to identify unpublished literature, sought to limit potential publication bias. A total of over 11,000 studies were identified which were of potential relevance to this review.

There was no limitation of study by country of origin, language or date. Most of the studies are from the last two decades and from a range of developed and developing countries. Languages of papers included in this review other than English were Spanish, Portuguese, Japanese, French and German.

Data handling process

Titles and abstracts of identified studies were independently assessed for relevance by two reviewers. Where no clear decision could be made on the basis of the title or abstract, studies were considered relevant. This process identified

over 1100 potentially relevant studies, for which full reports were retrieved for more detailed consideration.

One reviewer used a prescreen form to systematically assess retrieved papers against the inclusion criteria (see appendix 2). Prescreening decisions were independently assessed by a second reviewer, and disagreements were resolved through discussion, or, if necessary, by recourse to a third reviewer. Papers were categorised as follows:

- included in the review
- background/contextual information (e.g. description of an intervention, breastfeeding rates)
- information relating to determinants/factors of breastfeeding
- reject (not focused on initiation of breastfeeding and no other relevant information reported).

Included papers were classified by the type of health promotion intervention, study design and type of outcomes to enable preliminary assessment of the extent and strength of the evidence base (see below, and also *Table 2* on page 11).

The five areas of health promotion action identified in the Ottawa Charter for Health Promotion[64] were used as a framework to assist in classifying the many different types of intervention that may have been implemented to promote breastfeeding. These were:

- **public policy** such as legislation, fiscal measures (e.g. maternity leave)
- **supportive environments** which protect natural resources and generate healthy living and working conditions (e.g. public attitude and infrastructure to support breastfeeding outside the home)
- **community action** which uses existing human and material resources to enhance self help and social support (e.g. La Leche League, National Childbirth Trust)
- **development of personal skills** through the provision of information, education for health, and enhancing life skills (e.g. media campaigns and education programmes)
- **reorientation of health services** to promote health (e.g. the BFHI).

This framework was adapted to suit better the studies included in this review. An additional category, namely multifaceted interventions, was added to reflect evaluations of more than one intervention that had been delivered to the same target group at the same time. The final classification of intervention studies included in this review are detailed in *Table 2* (page 11).

A summary of included and excluded studies as a result of the prescreening process is detailed in *Table 1.*

TABLE 1 *Summary of inclusion and exclusion of identified studies*

Inclusion/exclusion categories	No. of studies
For inclusion	59
Background information	267
Determinants/factors information	214
Excluded studies (evaluations of interventions not meeting the review's inclusion criteria)	99
Other rejects (not relevant to promotion of breastfeeding)	530
Total	**1169**

Data were extracted into standardised, structured tables by one reviewer (see appendix 3, *Tables 4–62*). The data extraction table used for RCTs and non-RCTs was modified for use with before–after studies. The quality of each study was appraised by one reviewer (see appendix 4, *Tables 63–81*). Data extraction and quality appraisal were both checked independently by a second reviewer. Any differences were resolved by discussion, or, if necessary, by recourse to a third reviewer.

A number of evaluations of breastfeeding promotion programmes were closely considered for inclusion in the review, but were eventually excluded because one or more of the review's inclusion criteria were not met. Details of these studies are shown in appendix 5.

Results from primary studies were assessed and summarised in a qualitative synthesis for each type of intervention (see chapter 4) and within types of intervention (see chapter 5). Owing to the heterogeneity of interventions, settings, participants, outcome measures and comparison groups, a quantitative synthesis (meta-analysis) was not considered to be appropriate. Relative risks for initiation rates have been estimated for individual RCTs and non-RCTs, and forest plots have been presented. The methodological issues emerging from the inclusion of different study designs are discussed in chapter 5. On the basis of the

evidence, implications for both practice and future research have been suggested (see chapter 6, 'Implications for practice' and 'Recommendations for future research', pages 55 and 56 respectively). The quality of each study was appraised according to its particular study design (see appendix 4). It was not considered appropriate to allocate a quality score for individual studies owing to the diversity of study designs included in this review. However, the quality of individual studies was taken into account in the development of implications for practice. Studies with methodological weaknesses, which were considered likely to have prejudiced results, were not used in framing the implications for practice in this review.

Chapter 4

Results of the review

Summary of evidence base

A total of 59 studies evaluating the effectiveness of interventions to promote the uptake of breastfeeding met the inclusion criteria for this review.[65–124] The results of one study were reported in two separate papers,[95,96] and for another study relevant data were merged from three separate papers.[120,125,126] As detailed in *Table 2*, the 59 studies include 14 RCTs,[65,66,69–76,92,94–96,113] 16 non-RCTs,[67,68,77–83,87,88,97,98,111,112,114] and 29 before–after studies.[84–86,89–91,93,99–110,115–124]

For the purposes of this review, the types of breastfeeding promotion intervention are defined as follows:

1. **Health education interventions** refer to interventions that provide factual or technical information about breastfeeding to a specific target group in a hospital or community setting. The target group could consist of women or women and healthcare professionals. Health education interventions are grounded in professional expertise and are usually delivered during the pregnancy. Examples include breastfeeding literature or group education classes for pregnant women.
2. **Health sector initiatives (HSIs)** refer to interventions that aim to change the institutional or organisational nature of health services in favour of promoting breastfeeding. These interventions are mostly conducted within the hospital setting and may have several components implemented at the same time. Examples include the introduction of a breastfeeding policy, rooming-in facilities, removal of artificial milk from discharge packs, and training interventions for health professionals. Some of these initiatives incorporate certain practices intrinsic to the BFHI.[27]

    - General HSIs refer to interventions that do not have a particular framework or contextual setting and which require examination as a specific subgroup.
    - HSI – BFHI refers to those interventions that have explicitly stated the BFHI as the framework for the development and implementation of the intervention(s).
    - HSI – US Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC) refers to interventions that have been delivered as part of the national WIC

TABLE 2 *Included studies by intervention type and study design*

Type of intervention	Study design			Total
	RCT	non-RCT	Before–after	
Health education	9	7	3	19
HSI (general)	1	3	3	7
HSI (BFHI)	1	0	1	2
HSI (WIC)	2	3	5	10
HSI (training HPs)	0	0	5	5
HSI (SSHP)	1	0	0	1
Peer support	0	2	0	2
Media campaigns	0	0	2	2
Multifaceted	0	1	10	11
Total	**14**	**16**	**29**	**59**

HPs, health professionals; SSHP, social support from health professionals

Program targeting women of low incomes in the USA.
- HSI – training of health professionals refers to interventions that have provided professional training on breastfeeding to health sector staff as a stand-alone intervention.
- HSI – social support from health professionals refers to interventions where a health professional working within the health sector (e.g. a nurse or midwife) provides one-to-one advice and support on breastfeeding to pregnant women, usually outside the hospital setting, and often in the woman's own home.

3. **Peer support programmes** refer to interventions where support on issues relating to breastfeeding are provided by people who have increased their knowledge as a result of dedicated training, outside a professional capacity. Typically, this support is provided by peers, namely mothers who have themselves successfully breastfed, and have subsequently received training to work as a peer counsellor in a voluntary capacity within their resident community. Most of these programmes are grounded in the La Leche League model of peer support.

4. **Media campaigns** refer to interventions that are more commonly received by a wider audience (e.g. all women of childbearing age, or a defined community) and use a public medium such as television, press, or magazines. The information may or may not be grounded in professional expertise.

5. **Multifaceted interventions** refer to interventions that have more than one component which are delivered to the same target group at the same time (e.g. health education activities combined with a peer support programme).

Inclusion of before–after studies more than doubled the amount of evidence available to assess the effectiveness of HSI interventions. In the case of multifaceted interventions, where two or more combined interventions have been implemented and evaluated as a 'package', before–after studies represent nearly the entire body of evidence. This may reflect the complex nature of such interventions and the associated difficulties with, and cost implications of, evaluating such interventions using a RCT or non-RCT.

Results of health education interventions

Results from RCTs

Number of studies

Nine RCTs of health education interventions were identified (appendix 3, *Tables 4–12*; appendix 4, *Table 63*).[65,69–76]

Characteristics of participants

Of five trials performed in the USA, four studied low-income women.[65,69,70,75] The other study recruited a convenience sample of primigravidae (women undergoing their first pregnancy).[76] Of the remaining four trials, one focused on Vietnamese immigrants in Australia,[74] one on Zulu-speaking women in South Africa,[73] one on women in Ireland,[71] and another on Asian women living in East London.[72]

Characteristics of interventions

Four programmes were geared towards specific cultural or ethnic groups within a community.[65,72–74] In one such case, Vietnamese immigrant women in Australia received a breastfeeding education programme consisting of a videotape followed by a series of small group discussions, all conducted in Vietnamese, with content adapted for specific cultural needs and issues.[74] Another trial focused on Zulu-speaking women in South Africa who received health education from a midwife who was familiar with local language and customs. The programme focused on the benefits of breastfeeding and nursing techniques.[73] A third trial aimed to assess the effects of an antenatal education programme on infant health among Asian women living in East London.[72] The programme included a course of 12 weekly lectures, each lasting one and a half hours, covering fertility, pregnancy, childbirth and child rearing. Sessions were led by a health visitor, midwife or nutritionist and were relayed in Urdu by an interpreter. Literature was also provided and discussion was encouraged. Another trial looked for differences in outcome between participants receiving group or individual education.[65] Black American women of low income were recruited, some of whom were allocated to prenatal breastfeeding classes consisting of group sessions of 50–80 minutes duration with discussion, whilst others received similar coverage of material in one-to-one sessions. Women attended one session initially, and had the option of attending more if they wished. The two intervention groups were also compared with controls who received standard clinic care.

Two of the remaining five were implemented among the general population in the USA.[70,76] One trial evaluated a programme including information on the anatomy and physiology of lactation, benefits of breastfeeding, prenatal breast care, the mechanics of breastfeeding, self-care for the mother, and possible setbacks with suggested solutions, and recruited a convenience sample of women enrolling for childbirth education.[76] Two trials considered the use of breastfeeding education literature as a single intervention.[70,71] The trial conducted in the USA examined the effectiveness of a series of five pamphlets providing information on breastfeeding and bottle-feeding.[70] In another study, women in Ireland received a factsheet covering eight positive aspects of breastfeeding, followed by a questionnaire to reinforce the printed information.[71] One trial examined the use of breastfeeding education literature in the form of pamphlets combined with oral education sessions from a health professional, compared with no intervention.[69] In another trial, the impact of scheduled prenatal advice from a paediatrician in low-income mothers in the USA was studied, without the use of supporting breastfeeding education literature.[75]

Outcome assessment

Eight RCTs reported the primary outcome of initiation of breastfeeding.[65,69–72,74–76] Definitions of initiation varied between studies and included the following: breastfeeding at delivery,[74,75] breastfeeding in hospital,[65] breastfeeding at discharge,[70,71] any breastfeeding during the perinatal period,[72] breastfeeding at 1 month postpartum,[76] and breastfeeding during the first 6 weeks postpartum.[69] All eight RCTs included data on secondary outcomes (mostly duration),[65,69–72,74–76] and four also reported intermediate outcomes.[69,70,74,76] One trial reported solely intermediate outcomes.[73]

Methodological quality of included trials

Two trials reported the use of techniques to produce true randomisation for allocation of interventions,[65,75] otherwise this was either not stated or was unclear. However, in one trial, only two out of the three treatment arms were allocated on a random basis.[65] A single trial discussed the calculation of sample size *a priori*, but unfortunately the calculated numbers could not be recruited.[75] All studies had at least two arms, one trial had three,[65] and one had four.[73] In the trial with four arms, it was unclear whether all the study arms were concurrent.[73] Overall sample sizes ranged from 40 to 247. The majority of trials reported clear inclusion and exclusion criteria, and group comparability at baseline. Only one trial used blinded outcome assessment,[73] and in most cases the use of this was not stated. Three RCTs reported withdrawals per group with reason,[65,71,75] three reported them but either not by group or without reason,[70,72,74] and three gave no details of withdrawals.[69,73,76] Intention-to-treat analysis was not performed in any of the trials. In one trial, patients were regrouped from their original allocated arms to new groups, labelled 'educated' or 'non-educated', on the basis of having attended more than three lectures, or three lectures and less.[72] For this reason, it is not possible to deduce any meaningful findings from this study.

Effectiveness of interventions

Primary outcomes: initiation of breastfeeding

Results for initiation of breastfeeding are taken from the estimated relative risks, computed on an intention-to-treat basis where possible (see *Figures 1* and *2*; see also appendix 6). Results from three trials suggested that health education programmes produced significantly better outcomes when compared with routine or standard care.[65,74,76]

It is important to note, however, that health education programmes varied across trials in terms of methods, content and duration (see section on characteristics of interventions). The treatment of control groups is also likely to vary, even when this is defined as 'routine care' or 'standard care'.

For the trial examining the differences between group education, individual education and standard care, results showed that although either form of instruction was significantly more effective than standard care, there were no statistically significant differences between group and individual education.[65] It should be noted that the largest arm in this trial comprised 56 women, and that control participants were not allocated on a random basis.

Four RCTs showed a trend in favour of health education, but not a statistically significant between-group difference.[70–72,75] In one trial, no details were given of the care of the control group, and outcomes were reported for the overall sample but not per group.[70] It was not possible, therefore, to estimate the relative risk for initiation rates for this particular study. This was one of the smallest trials of health education, with an overall sample size of 44. In another trial, regrouping of patients for the purposes of the analysis warrants caution in interpretation of findings.[72] Since the original group allocation

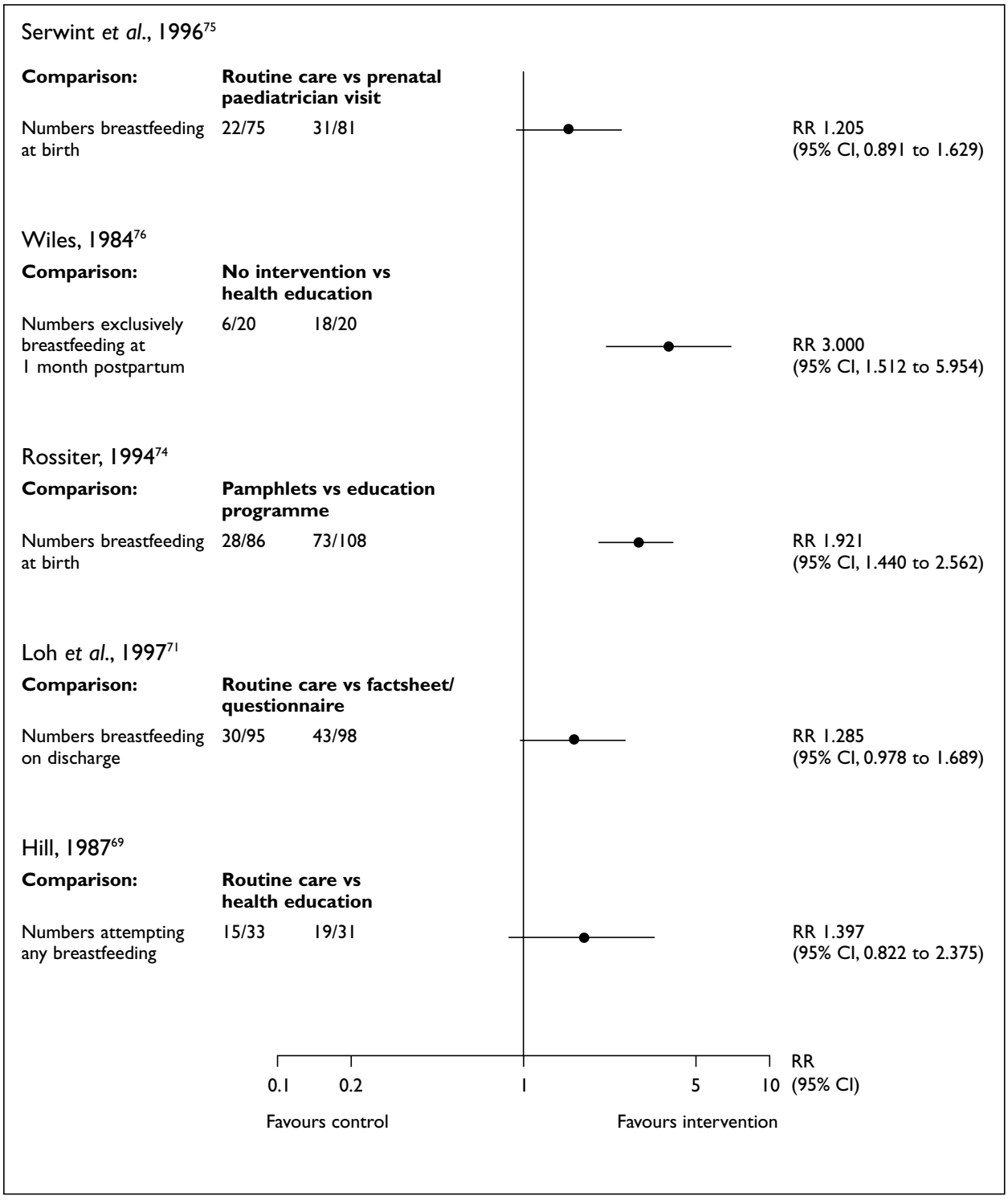


FIGURE 1 *Individual relative risk (RR) estimates for RCTs of health education (outcome: initiation of breastfeeding)*

was not retained for analysis, the relative risk has not been estimated.

One US trial reported a greater proportion of women failing to breastfeed at all in the no-intervention control group compared with an intervention group who had attended a breast-feeding class and received a pamphlet.[69] However, the time at which data were collected in relation to delivery is unclear.

Secondary outcomes: duration and exclusivity of breastfeeding

Most of the secondary outcomes were in terms of duration of breastfeeding. The level of significance was shown to diminish over time in one trial.[74]

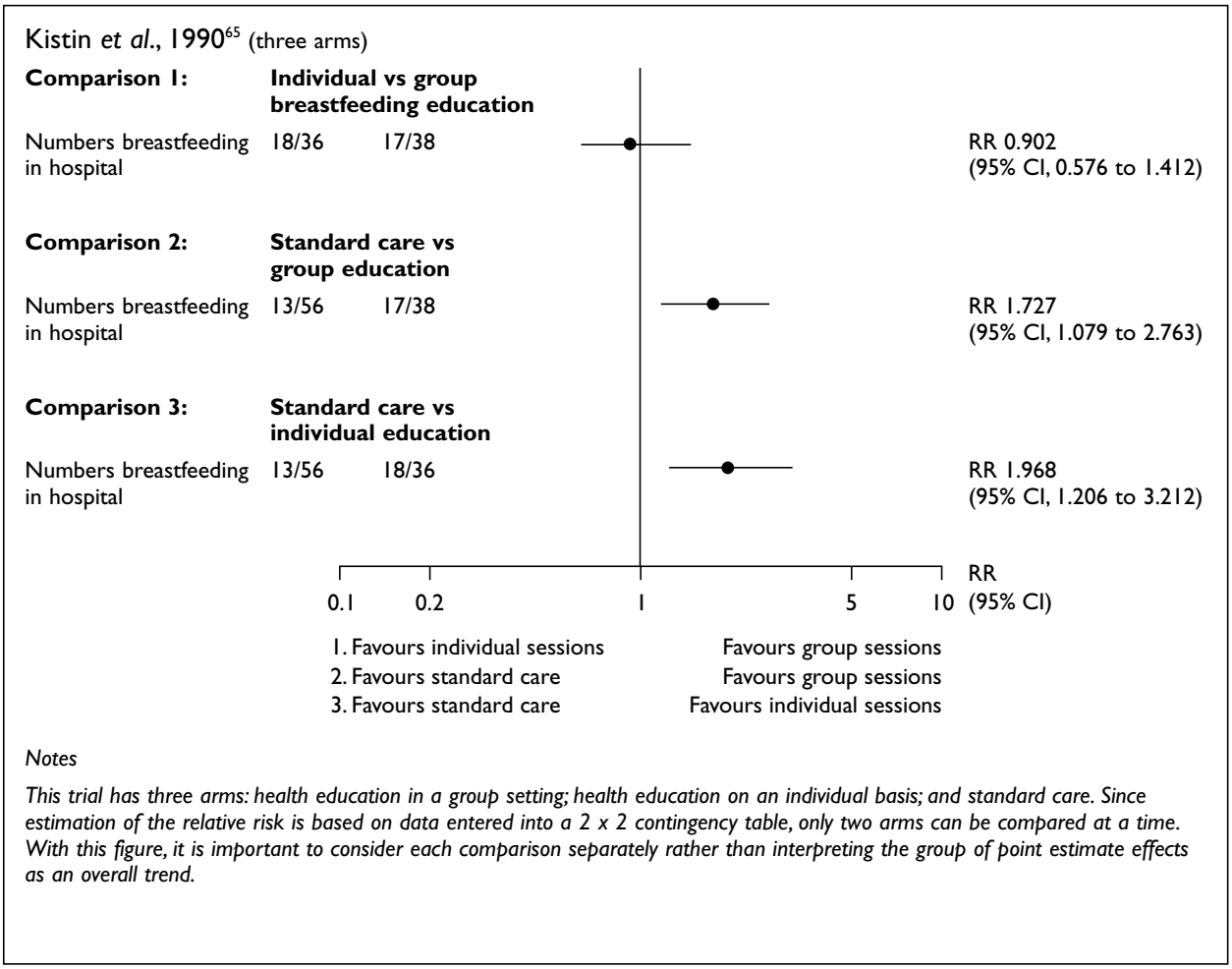


FIGURE 2 *Individual RR estimates for a RCT of health education (outcome: initiation of breastfeeding)*

In another trial, breastfeeding rates were significantly better at 2 weeks for both group and individual education when compared with controls.[65] A similar but non-significant trend was seen at 6 weeks. At 12 weeks, breastfeeding rates among the participants who had received group education were significantly better compared with both those who had received individual sessions, and controls.

Four trials reported non-significant trends in favour of groups receiving a health education intervention throughout the follow-up.[69,71,75,76] A fourth trial showed very similar rates between groups in those still breastfeeding at 2 months.[70] One trial reported exclusive breastfeeding during the perinatal period, but results are difficult to interpret owing to the regrouping of participants for purposes of analysis.[72]

Intermediate outcomes: attitudes towards, and knowledge of, breastfeeding

Five trials reported intermediate outcomes.[69,70,73,74,76] In one trial, a significantly greater improvement in knowledge was demonstrated for the intervention groups compared with controls; however, it is unclear whether the comparison groups were concurrent.[73] Another trial showed significantly greater improvement in both knowledge and attitudes for the intervention groups compared with controls.[74] In another study, the intervention group achieved a significantly greater increase in knowledge compared with the control group, but there was no statistically significant between-group difference for changes in attitudes.[70] In another study, scores from the Neonatal Perception Inventory were included as an outcome. At 1–2 days postpartum there were fewer positive scores and more neutral scores in the intervention group compared with controls; however, by 1 month postpartum the intervention group scores had become significantly more positive and control scores significantly more negative.[76] One trial examined women's perception of their own success in breastfeeding.[69] The between-group difference was not statistically significant.

Overview of different types of outcomes

Trials reporting both primary and secondary outcomes

Eight trials reported both primary and secondary outcomes.[65,69–72,74–76] In one study, both intervention groups (individual and group education) achieved significantly better outcomes compared with controls for initiation of breastfeeding and breastfeeding rates at 2 weeks postpartum.[65] Although both intervention groups continued to achieve higher rates than controls at 6 weeks, the difference was no longer significant. At 12 weeks postpartum, the group who received education in a group setting demonstrated significantly better rates compared with both the other two groups. In another trial, initiation rates (breastfeeding at birth) and breastfeeding rates at 4 weeks postpartum were significantly different in favour of the health education programme (the controls received pamphlets only).[74] However, the difference was non-significant at 6 months postpartum. A US study showed a statistically significant between-group difference for initiation, in favour of the health education programme; however, it was unclear whether the same level of significance remained for rates of exclusive breastfeeding at 1 month postpartum.[76]

An Irish study reported non-significant differences in both initiation and rates of breastfeeding at 4 weeks postpartum.[71] Health education provided by a paediatrician did not produce significantly different results in terms of initiation, or breastfeeding rates up to 60 days postpartum, when compared with no intervention,[75] and another trial showed non-significant between-group differences for both initiation and breastfeeding rates at 6 weeks or longer.[69]

One trial did not report initiation rates per group but stated that the between-group difference was not statistically significant; additionally, breastfeeding rates at 2 months postpartum were not significantly different.[70] The health education programme among Asian women in London reported non-significant increases in both the number of women practising any and exclusive breastfeeding in the perinatal period.[72] However, this analysis was based on regrouping of participants, with loss of initial random allocation to treatment groups; results are therefore unlikely to be valid.

Trials reporting both primary and intermediate outcomes

An American trial found increased rates of breastfeeding at 1 month postpartum (considered as initiation for the purposes of this review) in participants receiving a group education programme compared with no intervention.[76] This coincided with more positive scores for the Neonatal Perception Inventory at 1 month postpartum for the intervention group compared with controls. However, scores had been lower in the intervention group prior to the 1-month assessment.

Trials reporting primary, secondary and intermediate outcomes

Four trials reported all three types of outcomes.[69,70,74,76] One revealed significantly better knowledge scores in intervention participants who had received a series of breastfeeding pamphlets compared with no intervention controls.[70] However, there was no such difference for attitude scores, nor for rates of breastfeeding at 2 weeks postpartum. An Australian trial showed that Vietnamese participants receiving a culturally tailored programme achieved significantly better outcomes in terms of initiation, breastfeeding rates at 4 weeks postpartum, and knowledge and attitudes compared with a control group who received pamphlets.[74] However, the difference in rates of breastfeeding was no longer significant at 6 months. A US study did not demonstrate statistically significant differences between groups for initiation or breastfeeding rates at 1 month postpartum; however, neonatal perception inventory scores changed over time to favour the health education intervention.[76] Another US trial showed no statistically significant differences between groups for initiation, breastfeeding rates at 6 weeks or longer, and women's perceptions of their own breastfeeding success.[69]

Results from non-RCTs

Number of studies

Seven non-RCTs were identified (appendix 3, *Tables 13–19*; appendix 4, *Table 64*).[77–83]

Characteristics of participants

The studies varied in terms of geographical location: four were conducted in developed countries,[78–81] and three in developing countries.[77,82,83]

One study conducted in the UK targeted pregnant women from Urdu-speaking communities in East Berkshire.[78] Two-thirds of the overall sample were multigravidae (pregnant women who have had more than pregnancy), the majority of whom had breastfed a previous child. The women were

selected on the basis of expressing a wish to breastfeed. A study conducted in County Wexford, Ireland recruited pregnant women from a semi-rural population.[79] Although most baseline data are given overall rather than per group, it appears that the relative proportions of primiparae and multiparae per group may not have been comparable. A US study focused on pregnant women who had not breastfed before, who were clients of obstetricians or midwives in private practice.[81] The sample were mostly white, married primiparae. The final study conducted in a developed country recruited mothers attending two maternity hospitals in Gothenberg, Sweden.[80] This study was relatively large with a sample size of 1000 participants in each study group. The maternity hospital at which the intervention group was based had approximately 5% higher rates of initiation versus the control institution at baseline. The authors attribute this to the presence of an established lactation instructor at the intervention hospital.

The studies conducted in developing countries included a study in India that recruited pregnant women from the antenatal clinic population of a hospital in the Punjab.[83] Few details of participant selection and characteristics at baseline were reported. However, the authors state that study groups were comparable for maternal age, education, income and number of antenatal visits. A study conducted in Pakistan recruited women from a slum area of Karachi.[77] Groups were stated to be comparable for mothers' level of literacy, size of family, income, period of stay in Karachi and knowledge of breastfeeding. Another study recruited women of 35 years of age or less who were 6–8 months pregnant and attending one of two study hospitals for antenatal care in Mexico.[82] All participants said they wanted to artificially feed their infants. Groups were comparable at baseline for parity, civil state, education and partners' occupation.

Characteristics of interventions

Education during the antenatal period only

There were six studies in this category.[78–83] Two studies evaluated specific educational materials, namely an educational leaflet,[79] and a culturally tailored video presentation.[78] The breastfeeding leaflet covered common questions, advantages of breastfeeding, milk supply, advice on breastfeeding in public, maternal–infant bonding and involvement of the woman's partner in the breastfeeding decision, and was provided in addition to the usual verbal encouragement to breastfeed.[79] Women in the control group received the usual verbal encouragement, but no leaflet. The video intervention was targeted at Urdu-speaking women living in the UK.[78] The content of the video covered initiation of breastfeeding and discussion of common problems, with speech in Urdu. Participants were given the opportunity to view the video at home as many times as they wished. The control group did not receive the video, and no other details of treatment were reported.

Two further studies compared antenatal education given within a group setting with similar content provided on a one-to-one basis.[81,83] An Indian study evaluated antenatal education delivered by paediatricians, either in small groups or one-to-one.[83] The content of sessions covered various aspects of maternal and child care, including infant feeding. In a US study, group teaching was compared with individual sessions, covering the decision to breastfeed, preparation for breastfeeding, management of lactation, and common areas of concern to parents.[81]

Two studies evaluated a combination of health education advice and written materials during the antenatal period.[80,82] The study conducted in Mexico provided four 30-minute talks at 2–3-week intervals, and covered breasts and breastfeeding, the benefits of breastfeeding, how to breastfeed, and the mother's diet during breastfeeding.[82] Written information was also provided. It is not clear whether the talks were delivered on a one-to-one or group basis, nor how many mothers attended the sessions. The intervention delivered at a maternity hospital in Sweden provided verbal breastfeeding instructions from midwives, as well as a set of pamphlets containing key information in text and pictures.[80] This programme aimed to provide a coordinated three-step information approach where both verbal advice and written information were delivered at the maternity hospital as well as at the antenatal clinic and child welfare clinic. A breastfeeding manual and 2 hours of lectures and discussions were provided to nursing staff in antenatal clinics, maternity hospitals and child welfare clinics. Participants in the control group received the same breastfeeding information at antenatal clinics and in child welfare centres, but not at the comparison maternity hospital.

Education during antenatal and postnatal periods

One evaluation of an education programme comprising both antenatal and postnatal components was identified.[77] This study, implemented in Pakistan, consisted of weekly group lectures to 150 mothers by trained community health workers.

The group lectures were approximately 2 hours long, and incorporated the use of flip charts, slides and videos. Immunisation and other primary healthcare services were also provided. Health education continued in this form for a minimum period of 6 months. The control group did not receive the health education intervention.

Outcome assessment

Primary outcomes

Four out of the seven studies reported initiation of breastfeeding.[78–80,82] Definitions of initiation included initiation after delivery[78] and prior to discharge.[79,82] In the Swedish study, initiation appeared to be defined as occurring either during the hospital stay or at hospital discharge.[80]

Secondary outcomes

Three of the seven studies also assessed secondary outcomes, and again, definitions varied.[78,80,82] These included breastfeeding rates at 4 weeks,[82] 2, 4 and 6 months,[80] and 6 weeks.[78]

Intermediate outcomes

In three studies, the change in knowledge of breastfeeding was assessed.[77,81,83] One study also assessed the number of women having breast-feeding plans at 6 weeks postpartum.[81]

Methodological quality of included trials

All the studies had two treatment arms,[77–83] with sample sizes ranging from 38 to 2000 women. Only one study reported the calculation of sample size *a priori*.[77]

Three studies failed to report explicit inclusion and exclusion criteria for participants.[77,79,83] Five studies reported the method of allocating participants to intervention and control groups.[79–83] In one case women were allocated according to which day of the week they attended antenatal clinics,[79] and another three studies used consecutive allocation.[80,82,83] In one study participants selected their own treatment group.[81] Most studies included a report of baseline group comparability, with one exception.[79] However, in one case, comparability was stated without showing any data.[83]

Most of the studies did not state whether outcome assessment was blinded. One study reported withdrawal rates per group but did not provide reasons for attrition.[80] Three studies reported that there were no withdrawals,[78,82,83] and in another three no details of withdrawals were given.[77,79,81] None of the studies reported explicitly that analysis had been performed on an intention-to-treat basis.

Effectiveness of interventions

Primary outcome: initiation of breastfeeding

Results for initiation of breastfeeding are taken from the estimated relative risks, calculated on an intention-to-treat basis where possible (see *Figure 3*).

In one evaluation of antenatal health education, a statistically significant increase in the number of women initiating breastfeeding was shown (p-value not stated).[80] An estimated relative risk

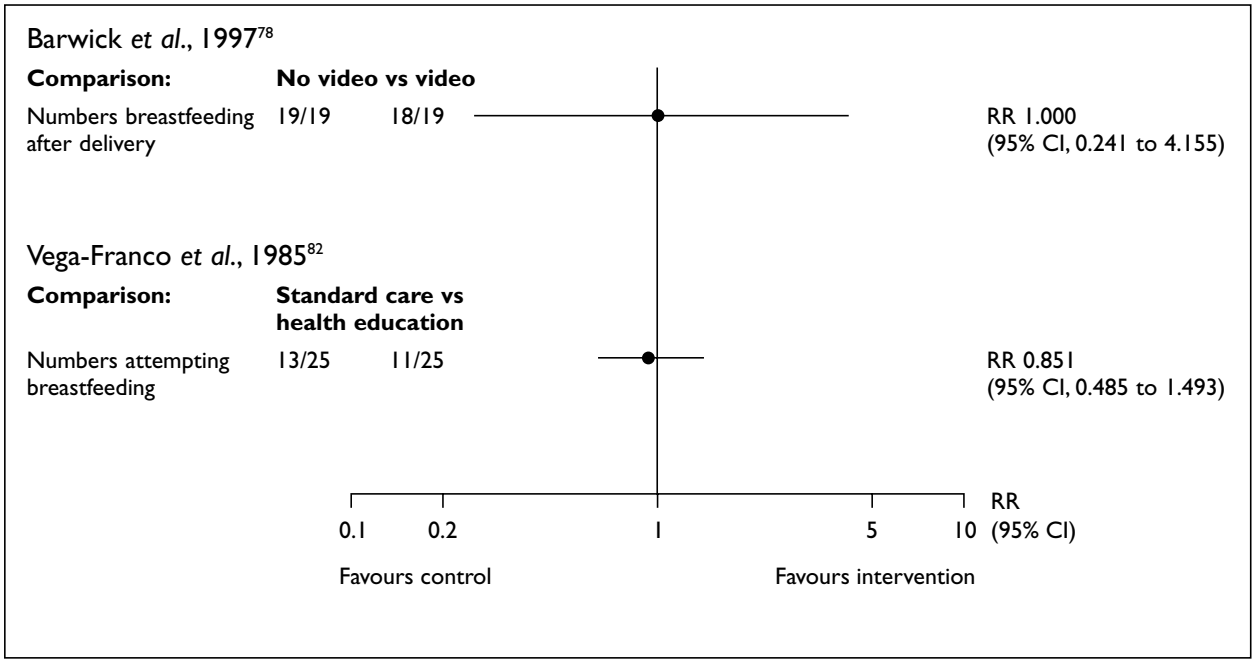


FIGURE 3 *Individual RR estimates for non-RCTs of health education (outcome: initiation of breastfeeding)*

is not presented in *Figure 3* for these findings, however, owing to a lack of raw data.

The two studies concerned with the use of educational materials in the antenatal period did not show statistically significant differences between interventions.[78,79] There was no statistically significant difference between the provision of a breastfeeding leaflet and standard verbal encouragement to breastfeed in the study conducted in Ireland.[79] This study failed to report details of methodology including inclusion criteria for participants, group comparability at baseline and numbers of withdrawals. The outcomes were presented in terms of consistency with antenatal feeding decisions, and it was not possible to estimate the relative risk for numbers of women actually initiating breastfeeding from the data provided. In a second study, a video provided to Urdu-speaking mothers living in the UK did not produce significantly different rates of initiation after delivery compared with controls not receiving the video.[78] The rates of initiation for both groups were very high, and participants had been selected on the basis of wishing to breastfeed. Overall numbers were small (n = 38) and method of allocation to groups was not reported.

The antenatal health education course provided to Mexican women who had all said they wanted to artificially feed their infants showed no statistically significant differences between interventions in relation to initiation rates.[82]

Secondary outcomes: duration and exclusivity of breastfeeding

The study utilising the video for Urdu-speaking women (antenatal input only) reported lower rates of breastfeeding at 6 weeks postpartum in control participants, although not significantly so.[78] A similar pattern of results was seen when primiparae and multiparae were analysed separately.

The antenatal health education course conducted in Mexico among women who said they wanted to artificially feed their infants achieved a positive trend (not statistically significant) for breastfeeding rates at 4 weeks despite this trend not being reported for initiation.[82] However, the numbers presented are unclear and inconsistent with numbers reported for initiation data.

Breastfeeding rates were reported to be higher at 2, 4 and 6 months postpartum in the intervention group who had received verbal advice and short pamphlets at a maternity clinic in Sweden; however, it is not clear if these findings were statistically significant.[80] The groups were smaller for analysis of this outcome (n = 100 per arm).

Intermediate outcomes: attitudes towards, and knowledge of, breastfeeding

Four studies reported intermediate outcomes.[77,80,81,83] One of these studies showed statistically significant between-group differences ($p < 0.0001$) in favour of the health education intervention, in terms of mothers' change in knowledge of breastfeeding.[77] In the Indian study, both intervention and control groups achieved a significantly improved knowledge score compared with baseline, but no between-group differences were demonstrated.[83] In the other study, there was no significant between-group difference for those having breastfeeding plans at 6 weeks postpartum.[81] In addition, it is stated that there were no statistically significant differences between groups in the mean pre- and post-test knowledge scores (raw data not provided per study group). In the final study, it is stated that more mothers in the intervention group showed positive attitudes towards breastfeeding.[80]

Overview of different types of outcomes

Three evaluations of antenatal interventions reported results across different categories of outcomes, namely primary and secondary.[78,80,82] The health education programme conducted in Sweden demonstrated increased rates for the initiation and duration of breastfeeding up to 6 months postpartum, although these findings were reported as statistically significant for initiation rates only.[80] One UK-based study that showed similar high rates of initiation between intervention and control groups demonstrated that rates in both groups had decreased substantially by 6 weeks postpartum.[78] However, numbers recruited were small, and tests for statistical significance were not reported, so it is difficult to interpret this pattern of data. In a Mexican study, there were no statistically significant differences when health education was compared with standard care for initiation and breastfeeding rates at 4 weeks postpartum.[82]

Results from before–after studies

Number of studies

Three before–after studies evaluating health education interventions were identified (appendix 3, *Tables 20–22*; appendix 4, *Tables 65* and *66*).[84–86]

Characteristics of participants

All three studies were conducted in developed countries targeting eligible women among the general population. One study included only

primiparous women eligible for given antenatal classes in New South Wales, Australia.[85] The other two studies had less specific eligibility criteria. In one study, mothers attending two child health clinics in London, UK were selected,[84] and in another all pregnant women registered with a general practice in Staffordshire, UK were selected.[86]

Characteristics of interventions

The two UK-based studies used cross-sectional designs. The study targeting mothers attending child health clinics in London assessed the provision of health education by community staff in both the antenatal and postnatal periods.[84] Frequency of contact was increased, guidelines on the management of breastfeeding problems were formulated, and telephone advice offered. The other study assessed an interactive and informal group approach to health education, regarding any aspect of the pregnancy, for pregnant women registered at a general practice in Staffordshire, UK.[86] The main component of the intervention was an initial 30–60-minute informal group discussion between the pregnant women, the midwife, the doctor, and sometimes a guest speaker. Women were given a leaflet about pregnancy and the birth, and encouraged to take control of decisions around their pregnancy and birthing methods. A further component of the intervention was the development of a cohesive support group among the women; to this end, recently delivered mothers were encouraged to bring their babies to the antenatal clinic.[86]

One study involved a before–after cohort and assessed the impact of the introduction of health education activity. In this study, a retrospective survey of attenders and non-attenders at antenatal classes in New South Wales was carried out to evaluate the impact of an antenatal programme on knowledge and health behaviour.[85]

Outcome assessment

Two studies reported the primary outcome of initiation of breastfeeding.[84,86] Initiation rates were reported during the hospital stay[84] and at 1 week postpartum.[86] Duration rates at 3 and 6 weeks postpartum[84] and 3 months[86] were also reported. One study also measured the frequency and timing of contact with community health professionals, and explored the relationship between social class and breastfeeding uptake through subgroup analysis.[84] Another study presented changes in knowledge of women and their partners following antenatal classes,[85] and another assessed any change in women's levels of anxiety about the pregnancy and their enjoyment of attending the clinic.[86]

Methodological quality of included trials

All studies used a suitable sampling frame.[84–86] Two studies were cross-sectional in design,[84,86] and one used a cohort design.[85] Over 300 participants were recruited in each study.

For both cross-sectional studies, the same sampling frame was used to select before and after groups.[84,86] Study groups were comparable for age in one case and authors adjusted for social class and parity.[86] In the other study, the sample was described in terms of social class and ethnicity.[84] In one study, it appeared that the analysis was conducted on an intention-to-treat basis;[86] in the other this was not stated.[84]

The third study used a cohort design and recruited a group of first-time mothers.[85] The selection criteria for participants were clearly reported, and numbers attending the antenatal classes were provided. The sample was not drawn randomly and there was no report of an *a priori* calculation.

Effectiveness of interventions

Primary outcomes: initiation of breastfeeding

Two studies showed an increase (not statistically significant) in the numbers of women starting to breastfeed.[84,86] In one study that incorporated subgroup analyses, similar increases occurred in both the intervention group which received antenatal contact and weekly home visits by health visitors (increase of 32%), and the intervention group which received antenatal contact and discretionary home visits by health visitors in the postnatal period (increase of 36%).[84] The increases in initiation rates were slightly higher among the occupational groups classified as 'non-manual' (35% increase for the group receiving weekly home visits and 34% increase for the group receiving discretionary home visits) compared with the occupational groups classified as 'manual' (30% increase for both groups). The numbers of participants for subgroup analysis by social class were relatively small (n = 28–78), particularly in the case of the non-manual group receiving the discretionary home-visits (n = 11).[84]

The proportion of women breastfeeding at 1 week postpartum increased from 58% (n = 84/146) to 68% (n = 142/210) following implementation of the group health education delivered at the general practice during the antenatal period.[86] When adjusted for parity and social class, the

reported increase in initiation rates was found to be statistically significant ($p = 0.05$).

Secondary outcomes: duration and exclusivity of breastfeeding

A UK study demonstrated increased rates of breastfeeding at 3 weeks postpartum when the after group was compared with both groups studied before the intervention, and with a concurrent comparison group.[84] The same pattern of results occurred across two occupational categories: non-manual and manual. Breastfeeding rates at 6 weeks postpartum were compared between intervention areas and the concurrent comparison area, and showed increased rates in non-manual workers in favour of the intervention; however, rates across manual workers were similar. The interactive group education provided by health professionals at a general practice also significantly increased rates of breastfeeding at 3 months ($p < 0.05$).[86]

Intermediate or process outcomes: attitudes towards, and knowledge of, breastfeeding

All three studies incorporated intermediate outcomes.[84–86] A health education programme for women attending antenatal classes was assessed and showed that both women and their partners achieved improved knowledge of breastfeeding.[85] A London (UK)-based study examined frequency and timing of contact with a health visitor.[84] Mothers in intervention areas had more contact overall and more frequent contact with a health visitor compared with the comparison area. Based on mean visual analogue scores, one study reported a decrease in anxiety around the pregnancy of 4.6% and an increase of 10.5% in enjoyment of the clinic after the intervention.[86]

Summary of results of health education interventions

In terms of the primary outcome of initiation of breastfeeding, three RCTs showed statistically significant results in favour of the interventions when compared with control programmes consisting of standard or routine care.[65,74,76] One non-RCT also showed statistically significant results in favour of the health education intervention.[80] Three other RCTs, although not showing statistically significant differences, showed improved initiation rates in the intervention groups compared with controls.[70,71,75] These findings were reflected in results (not statistically significant) from one before–after study.[86] Another study showed no statistically significant difference between before and after groups in the number of women starting to breastfeed; however, there were methodological problems.[84]

Findings relating to the duration of breastfeeding were also variable, with two RCTs showing an initial significant effect that diminished over time,[65,74] three showing favourable but non-significant differences for the intervention group throughout follow-up,[71,75,76] and one showing equivalent rates of breastfeeding between groups.[70] A similar variation in results was seen in the non-RCTs and before–after studies.

In terms of intermediate outcomes, improvements in knowledge and/or attitudes were seen in intervention groups in three RCTs.[70,73,74] This was also reflected in one before–after study,[85] but there was less evidence to support this finding in the non-RCTs.[83]

Results of evaluations of HSI interventions – general

Total number of studies

Seven studies were identified which evaluated the effectiveness of general HSIs (appendix 3, *Tables 23–29*; appendix 4, *Tables 67–69*), including one RCT,[66] three non-RCTs[68,87,88] and three before–after studies.[89–91]

Results from a RCT

One RCT was identified, which focused on a single hospital in Nicaragua.[66] Primiparous women from a low-income, urban population who experienced a normal vaginal delivery with no complications were recruited. Participants in one arm of the trial ($n = 136$) received early mother–infant contact for 45 minutes combined with uniform breastfeeding promotion, followed by complete separation until discharge. The second arm ($n = 116$) received rooming-in, defined as continuous postpartum contact until discharge, with 'standardised' breastfeeding promotion. A description of 'standardised' breastfeeding promotion was not provided. Standard care for the control group comprised complete separation of mother–infant pairs (MIPs) throughout hospitalisation with *ad hoc* breastfeeding promotion. The effect of each intervention on initiation rates of breastfeeding at 1 week and on duration rates at 4 months were measured.

The total sample size of this three-armed trial was 375 primiparous mothers. Two of the three groups were randomly allocated with the exception of mothers participating in the rooming-in intervention. Blinded outcome assessment was not reported. Inclusion criteria for participants, group comparability at baseline and numbers of

withdrawals were reported. Analysis was conducted on an intention-to-treat basis.

Results for initiation of breastfeeding are taken from the estimated relative risks, computed on an intention-to-treat basis where possible (see *Figure 4*). These results demonstrated a significant increase in the rates of initiation of breastfeeding after rooming-in when compared with standard care, and results just achieved statistical significance in favour of rooming-in when this was compared with early contact between mother and infant. The difference between early contact and standard care was not statistically significant. The authors conclude, however, that breastfeeding rates at 4 months were not influenced by rooming-in or early contact compared with standard care. This finding was true for both exclusive and mixed breastfeeding.

Results from non-RCTs

Number of studies

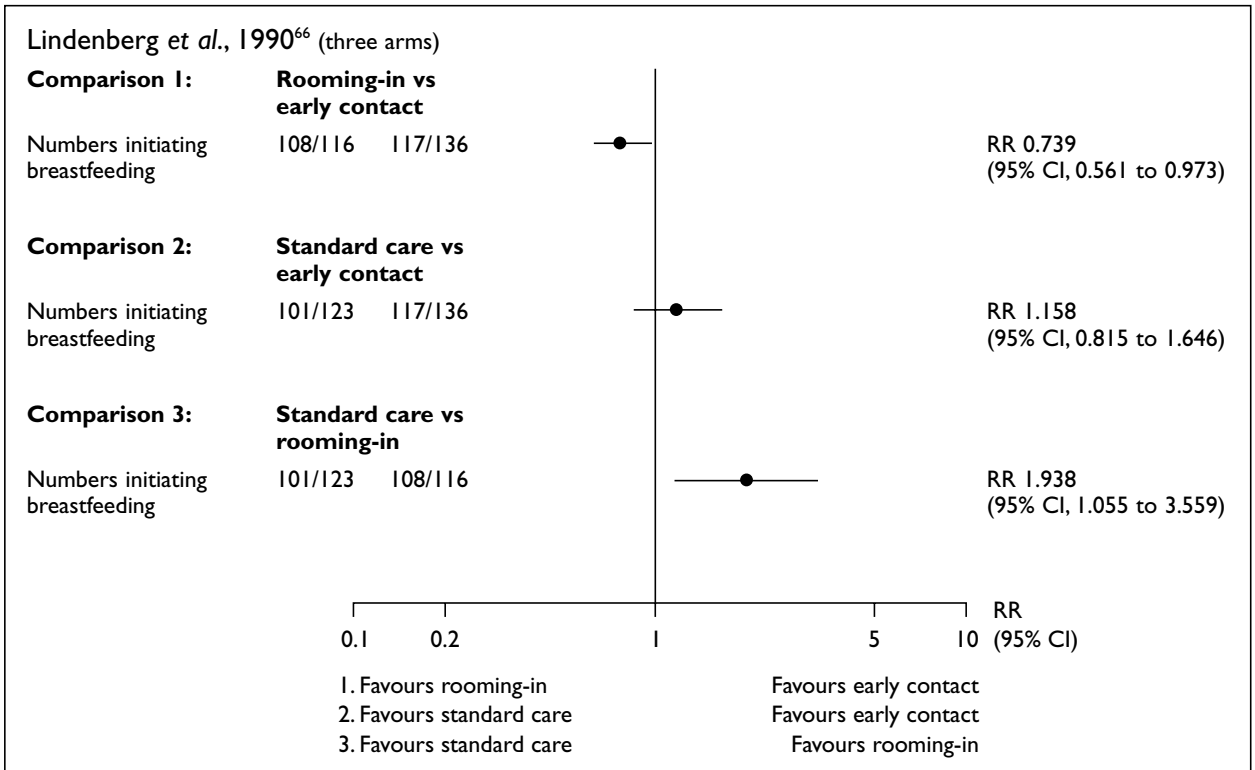
Of the three non-RCTs identified in this category, two were prospective studies with concurrent treatment groups,[68,87] and the other was a controlled before–after study, with both intervention and control institutions followed-up over time.[88]

Characteristics of participants

In a comparison of two American hospitals, no details of inclusion criteria for the women participating were provided.[88] A Brazilian study also compared two hospitals where women delivering healthy singleton infants were included.[68] A study conducted in Jerusalem recruited women and children from two specified neighbourhoods.[87] Mothers delivering twins and those having infants of very low birthweight were excluded.

Characteristics of interventions

The American study evaluated a multifaceted intervention consisting of staff training in lactation management, employment of a breastfeeding counsellor, introduction of written information for patients and staff, and the implementation of rooming-in facilities.[88] The intervention was implemented over a 2-year period. The



Notes

This trial has three arms: early contact; rooming-in; and standard care. Since estimation of the relative risk is based on data entered into a 2 x 2 contingency table, only two arms can be compared at a time. With this figure, it is important to consider each comparison separately rather than interpreting the group of point estimate effects as an overall trend.

FIGURE 4 *Individual RR estimates for a RCT of HSI interventions (general) (outcome: initiation of breastfeeding)*

Brazilian intervention included rooming-in, the promotion of early initiation of breastfeeding, assistance with breastfeeding and breastfeeding talks/information provision.[68] It should be noted that rooming-in and the prohibition of free gifts of infant formula have been mandated by Brazilian law and therefore were standard care for the control group. The study conducted in Jerusalem involved a breastfeeding promotion programme consisting of structured education of mothers by nurses, guidance on breastfeeding, plus encouragement and support.[87]

Outcome assessment

All three trials included primary and secondary outcomes.[68,87,88] One study also reported the process outcome of rates of rooming-in,[88] and another presented the numbers of women receiving breastfeeding information during prenatal care and between discharge and first follow-up visit.[68]

Methodological quality of included studies

Sample sizes ranged from 230 to 442. One study had four arms[88] and the others had two.[68,87]
One study failed to report inclusion criteria for participants,[88] and none reported the method of allocating participants to treatment groups. All studies reported baseline comparability of treatment groups. One carried out blinded outcome assessment,[68] and in the other two cases this was not stated.[87,88] One study reported numbers of withdrawals,[68] whereas the others did not mention drop-outs.[87,88] One study did not analyse on an intention-to-treat basis,[68] and in the other two cases it was unclear whether this had been performed.[87,88]

Effectiveness of interventions

Primary outcome: initiation of breastfeeding

Results for initiation of breastfeeding are taken from the estimated relative risks, computed on an intention-to-treat basis where possible (see *Figure 5*). One study reported significant between-group differences, in favour of the intervention, for the numbers of women starting to breastfeed.[68] For another study, *Figure 5* shows two comparisons at the two different time points (1982–83 and 1985), and indicates increasing effectiveness of the intervention over time.[88] For the third study, there was no statistically significant difference between those receiving the breastfeeding programme and the control group when relative risks were calculated.[87]

Secondary outcomes: duration and exclusivity of breastfeeding

For the study conducted in Jerusalem, the study authors reported that the difference between intervention and control groups in terms of proportions of women breastfeeding continued to be significant until 26 weeks postpartum.[87]
For the Brazilian study, a statistically significant difference in median duration of breastfeeding was observed in favour of the intervention group.[68]
The use of exclusive breastfeeding increased over time for both intervention and control institutions in the American study, with greater increases reported in the intervention hospital; however, tests of statistical significance were not reported.[88]

Intermediate and/or process outcomes

Rates of rooming-in increased over time for the intervention hospital assessed in the controlled before–after study, but tests of statistical significance were not reported.[88] In a second study, significantly more women in the intervention group received breastfeeding information antenatally and early in the postnatal period compared with controls.[68]

Results from before–after studies

Number of studies

Three evaluations of the effectiveness of HSIs using a before–after design were identified.[89–91]

Characteristics of participants

One study was carried out in the UK, and targeted both mothers and health professionals.[90]
The remaining two studies were carried out in developing countries: one surveyed health professionals in Kenya,[89] and the other surveyed both health professionals and mothers in Honduras.[91]

One study was conducted at a maternity unit of a district general hospital serving an inner-London population.[90] This study focused on all non-medical staff working in the maternity unit and all attendant mothers who could be contacted and interviewed over a period of 2 months before and after the 2-year intervention period. A second study involved a series of nationally representative surveys in Honduras.[91] This involved the recruitment of households, health workers and mothers. Households were systematically selected from a national survey. Health workers from two specified hospitals were recruited for two cross-sectional surveys, and a national study was also carried out at a different time point. For the community surveys, women living in neighbourhoods served by one of the study hospitals were recruited and represented a low-income population.
The third study, conducted in Kenya, assessed the effects of a national campaign.[89]

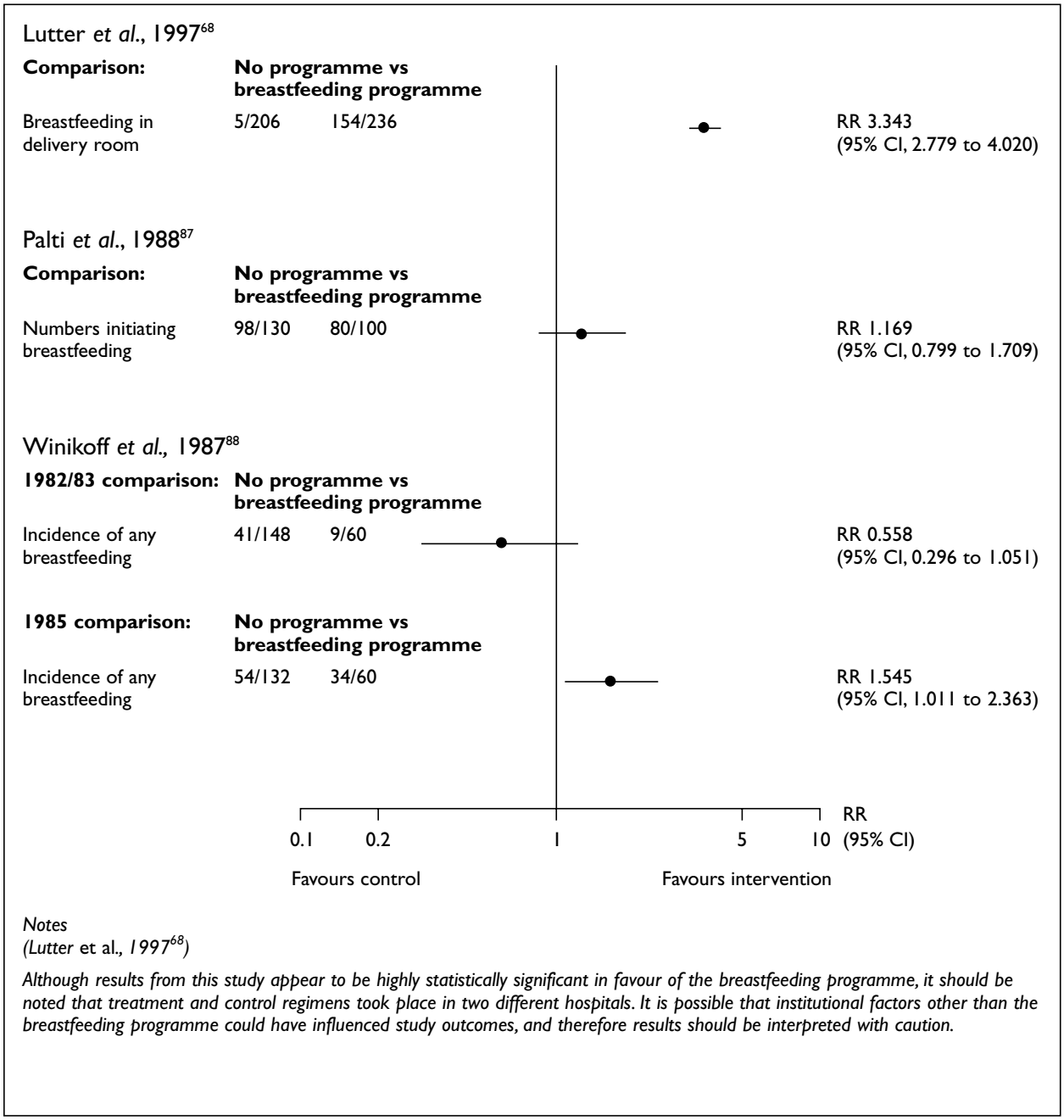


FIGURE 5 *Individual RR estimates for non-RCTs of HSI interventions (general) (outcome: initiation of breastfeeding)*

Characteristics of interventions

The study in Kenya assessed the effects of a central government-driven campaign to promote breastfeeding, and covered the period 1982–89.[89] The campaign consisted of activities to promote early breastfeeding, provide rooming-in, reduce the use of artificial feeds and introduce flexible maternity ward routines conducive to breast-feeding. A national breastfeeding officer was appointed who was responsible for organising the training of health workers on a nationwide scale in connection with breastfeeding promotion and lactation management. A total of 58 hospitals were surveyed in order to assess the effects of the breastfeeding promotion programme. Another study on a national scale assessed the effects of the PROALMA programme in Honduras between 1981 and 1986.[91] This project was designed to promote favourable knowledge and attitudes among health professionals with regard to infant feeding, promote breastfeeding education and support for mothers both prenatally and post-partum, and change hospital policy to enable early breastfeeding, rooming-in and reduced

use of formula feeds. Activity was concentrated in urban areas.

The UK-based study conducted in London evaluated the effects of the appointment of a baby feeding adviser (BFA) and other policy changes at a maternity unit.[90] The BFA worked 5 days a week in the hospital with mothers in the ante- and postnatal periods, and with maternity staff to improve their understanding of baby feeding and advisory skills. Fewer staff from the antenatal clinic and labour ward attended the talks by the BFA than postnatal staff. Other policy changes included revising the unit policy statement on breastfeeding, removing dextrose from postnatal wards and reduction of night-only and night-mainly shifts for maternity staff.[90]

Outcome assessment

Two studies reported both initiation and duration of breastfeeding.[90,91] The UK-based study measured breastfeeding rates at 2 days and 6 weeks.[90] Definitions of initiation were unclear, however, in one study and measures of duration included median duration, and 5, 9 and 11 months postpartum.[91] Two studies reported changes in knowledge and/or attitudes of health professionals.[89,91] One study measured a range of intermediate and process outcomes regarding changes in the effect and quality of breastfeeding support and advice, and use of supplements.[90]

Methodological quality

All studies used a suitable sampling frame and reported inclusion criteria for participants.[89–91] However, none of the studies used randomised sampling methods, or *a priori* sample size calculations. Only one study reported the groups as comparable at baseline.[91] In one study, a change in the price of milk products was identified as a possible confounding factor.[91] None of the other studies described possible confounding factors. One study reported details of response rates.[90] Methods of data analysis appeared to be appropriate in all cases.

Effectiveness of interventions

Primary and secondary outcomes

The appointment of a BFA in a London-based maternity unit was reported to produce a decrease in the proportion of women initiating breastfeeding at 2 days and an increase in the proportion of women breastfeeding at 6 weeks.[90] Neither of these findings were statistically significant. Authors acknowledge that the differences in data collection before and after the intervention may have influenced the validity of the comparison. Women who did not see the BFA were significantly less likely, however, to begin breastfeeding ($p = 0.007$). This effect was not significant for maintaining breastfeeding at 6 weeks however ($p = 0.88$).

The other study that measured primary and secondary outcomes demonstrated that the probability of initiating breastfeeding had increased over time, more so in urban areas, and median duration had lengthened in association with the intervention.[91] However, changes in the price and availability of milk products may also have affected the observed trends in infant feeding.

Intermediate and/or process outcomes

Attitudes towards, and knowledge of, breastfeeding. One study showed improvements in staff knowledge and in maternity ward practices between 1982 and 1989.[89] However, less than half of the health workers participating in the study were aware of the government directives concerning breastfeeding. It is unclear whether the before and after groups were comparable in this study, and no information is given on withdrawals or non-responders. Another study also showed that health workers' knowledge of, and attitudes towards, breastfeeding had improved over time.[91]

Changes in quality of infant feeding advice. Following the appointment of a BFA and policy changes to promote breastfeeding, there was a statistically significant decrease in the proportion of mothers reporting that feeding advice was mainly conflicting ($p < 0.001$) and a statistically significant increase in the proportion of mothers who felt that the hospital supported breastfeeding ($p = 0.034$).[90]

Changes in breastfed babies receiving at least one supplement. Following the removal of the use of dextrose from postnatal wards, one study reported a statistically significant decrease in the proportion of breastfed babies receiving at least one supplement ($p < 0.0001$).[90]

Summary of results of HSI interventions (general)

Results from the single RCT indicated a significant increase in initiation rates in association with rooming-in when compared with both early contact and standard care.[66] A positive effect was not reported for duration of breastfeeding. Findings from non-RCTs suggested favourable outcomes in terms of initiation and duration of breastfeeding.[68,87,88] Findings from one before–

after study conducted in Honduras showed similarly positive results,[91] although this was not the case for the UK study which reported a positive finding for duration rates only.[90] However, this study did report that women who had no contact with the BFA were significantly less likely to begin breastfeeding, although this effect was not maintained at 6 weeks.[90]

Findings from the non-RCTs suggested that institutional indicators also improved in association with the interventions in terms of increased use of rooming-in[88] and increased exposure of women to antenatal education.[68] A before–after study also demonstrated increased consistency of infant feeding advice and a hospital environment which was more supportive of breastfeeding following the implementation of institutional changes in the maternity unit.[90] Favourable changes in staff knowledge were also seen as a result of the HSI in before–after studies.[89,91] Owing to methodological flaws, findings should be considered with caution.

Results of evaluations of HSI interventions – based on the BFHI

Total number of studies

Two studies were identified which evaluated the effectiveness of HSIs based on the BFHI as recommended by WHO/ UNICEF (appendix 3, *Tables 30* and *31*; appendix 4, *Tables 70* and *71*).[27] Of these, one was a RCT,[92] and one was a before–after study.[93]

Results from a RCT

One RCT was identified, conducted in Brazil.[92] Four health institutions employing staff who had been exposed to a lactation management course were compared with four control institutions. The course, which covered all aspects of the 'Ten steps for successful breastfeeding' proposed by WHO/UNICEF, was provided by a hospital considered to be a national centre for the promotion of breastfeeding, which had recently achieved the 'Baby Friendly Hospital' award. Outcomes of the lactation management course were assessed with reference to the 'Ten steps', and included staff knowledge of, and attitudes towards, breastfeeding, and also institutional effects.

The eight health institutions involved were paired and then randomised to treatment groups; however, the method of randomisation was not stated. Some analyses involved comparisons between intervention and control institutions, whilst others involved the intervention institutions only. Domain analysis was conducted across all the institutions in the study.

Institutional effects and institutional scores (the 'Ten-step' score test) were compared between intervention and control institutions, and for both outcomes intervention institutions performed more favourably than controls.

The course process, participants' knowledge and participants' attitudes were assessed in the intervention institutions only. Analysis of the course process showed that all 'Ten steps for successful breastfeeding' were covered: steps five and nine the most, and step ten the least. Participants' knowledge scores increased over time (tests of statistical significance not reported), and analysis of attitudes indicated that participants intended to change routines and practices in their respective institutions. Results were not presented per individual institution for any of these analyses.

Domain analysis revealed a lack of cohesion between policy, management and service domains in all of the health institutions studied.

Results from a before–after study

One before–after study was identified which had used a cross-sectional sampling method.[93] The study was conducted in a single hospital in northern Thailand and collected data from both hospital and community surveys. Hospital data were obtained from two groups of 2000 MIPs from urban areas with a normal delivery (not breech, forceps, vacuum, or Caesarean section). Community data were collected from a total of 370 mothers with children aged up to 2 years residing in the given communities. Participants for the community surveys were randomly selected for interviewing. The intervention consisted of the implementation of a rooming-in facility, as specified by WHO/ UNICEF. Eligible mothers were sent to the postnatal ward with their infant where the correct breastfeeding technique was encouraged and prelacteal feeds were banned. This was compared to routine separation of mothers and babies in the 'before' group where babies were brought to mothers at designated times and prelacteal feeds were given. Initiation of breastfeeding was recorded from both hospital- (at discharge) and community-based data. Duration of breastfeeding was recorded from community surveys as rates of predominant breastfeeding at 0–4 months and current breastfeeding at 24 months postpartum.

Process outcomes of separation time during the hospital stay were also reported.

This study appeared to have used a suitable sampling frame and had recruited participants from the same sampling frame. A systematic method of selecting every tenth child until the predetermined number of children was employed for both groups in the community surveys. Clear inclusion criteria were reported and information was provided about group comparability. Numbers of withdrawals with reasons for drop-out were not reported. Possible factors, other than the intervention that may have influenced the results of the study, were not considered.[93]

Results from this study demonstrated significantly higher rates of breastfeeding after implementation of the rooming-in system ($p < 0.05$) when both hospital- and community-based data were analysed. Community-based data also showed that the intervention produced significantly higher rates of breastfeeding up to 4 months postpartum, although by 24 months the difference was no longer significant. Separation time during the hospital stay also decreased significantly as a result of the intervention.[93]

Results of evaluations of HSI interventions – based on WIC

Definition

WIC is a federally funded nutrition programme in the USA targeted at low-income pregnant and breastfeeding women, and infants and children up to 5 years of age, determined by a health professional to be at 'nutritional risk'. WIC is one of the largest food programmes in the USA, with a budget of nearly US$2 billion in 1990.[98] WIC services include nutrition education and encouragement of breastfeeding as well as distribution of iron-fortified formula for artificially fed infants. Breastfeeding promotion in the WIC Program became federally mandated in the USA in 1991, from which time breast-feeding education and peer counsellor activities became a more integral part of WIC programs.

Evaluations of the WIC Program *per se* or, more commonly, additional breastfeeding promotion interventions conducted within the WIC setting, are classified within the category of HSIs for the purposes of this review. This reflects the institutional changes of WIC health services to promote breastfeeding as routine healthcare among low-income women. The unique nature and setting of WIC programs limit comparison with other welfare programmes and requires consideration as a separate subcategory of HSIs. Many studies evaluating WIC programs have made use of large databases of information routinely collected from all WIC participants.

Total number of studies

Ten evaluations of WIC programs were identified (appendix 3, *Tables 32–41*; appendix 4, *Tables 72–74*), including two RCTs,[94–96] three non-RCTs,[67,97,98] and five before–after studies.[99–103] For one of the RCTs, results were reported in two papers.[95,96]

Results from RCTs

One study was conducted with pregnant women eligible for the WIC program at the Mercy Hospital of Pittsburgh,[94] and one was conducted at WIC clinics in Flagstaff, Arizona.[95,96] Participants of both studies were expecting their first babies.

The hospital-based intervention consisted of breastfeeding education and support throughout the prenatal and postpartum periods and into the first year of infancy.[94] Prenatal education consisted of two to four individual 10–15-minute sessions with a lactation consultant discussing the benefits and practice of breastfeeding. A lactation consultant saw women daily on the postnatal wards and delivered a follow-up telephone call and lactation consultations at clinic visits.

Women and their partners or chosen 'significant other' were offered prizes for participating in a breastfeeding class for expectant couples as well as five sessions about childbirth preparation.[95,96] A further prize was offered to women who contacted their assigned peer counsellor within two days after the baby's birth. The control group received standard breastfeeding education within WIC clinics.

Both studies reported initiation and duration of breastfeeding. Specific measures included breastfeeding at hospital discharge, 2 weeks, 6 weeks and 3 months postpartum,[95,96] and initiation during the hospital stay, median duration of breastfeeding and incidence of breastfeeding at 2 weeks, 2 months and 6 months of age.[94]

The overall sample sizes were 68 women, plus partners,[95,96] to 123 women.[94] Neither study reported *a priori* sample size calculations. Both

studies employed clear inclusion criteria for participants and groups were comparable at baseline in both cases. Participants in the hospital-based study were stratified by age into three groups and randomised into one of two groups by using a blocked randomisation procedure to ensure parity in all age groups.[94] It is not clear, however, if true randomisation was employed in one study.[95,96] Withdrawals were reported by group, with reasons given in both studies.[94–96]

Effectiveness of interventions

Results for initiation of breastfeeding are taken from the estimated relative risks, calculated on an intention-to-treat basis where possible (see *Figure 6*). One study demonstrated significantly better rates of initiation and duration of breastfeeding as a result of the intervention.[94]

The hospital-based education intervention demonstrated significantly increased initiation rates during the hospital stay ($p = 0.005$) when comparing groups of women planning to bottle-feed or undecided on their infant feeding method.[94] Median duration of breastfeeding was reported as 84 days compared to 33 days as a result of the intervention ($p = 0.005$). In terms of duration, rates of breastfeeding significantly increased at both 2 weeks and 2 months, although the difference was no longer significant at 6 months.[94]

The incentive, partner-supported intervention based in WIC clinics reported significantly higher rates of breastfeeding ($p < 0.05$) at hospital discharge, 2 and 6 weeks and 3 months postpartum.[95,96] These results were also reported for exclusive breastfeeding at all time points. It should be noted that the authors' calculations are based on numbers of participants completing the study (26 in the intervention group and 29 in the control group). The estimate relative risk represented in *Figure 6* is based on numbers of participants recruited to the study (34 in each group). When calculations were performed on an intention-to-treat basis, the between-group difference was no longer statistically significant for the outcome of initiation of breastfeeding.

Results from non-RCTs

Characteristics of participants

Three non-RCTs were identified.[67,97,98] One study evaluated WIC-based interventions to promote breastfeeding among African-American women

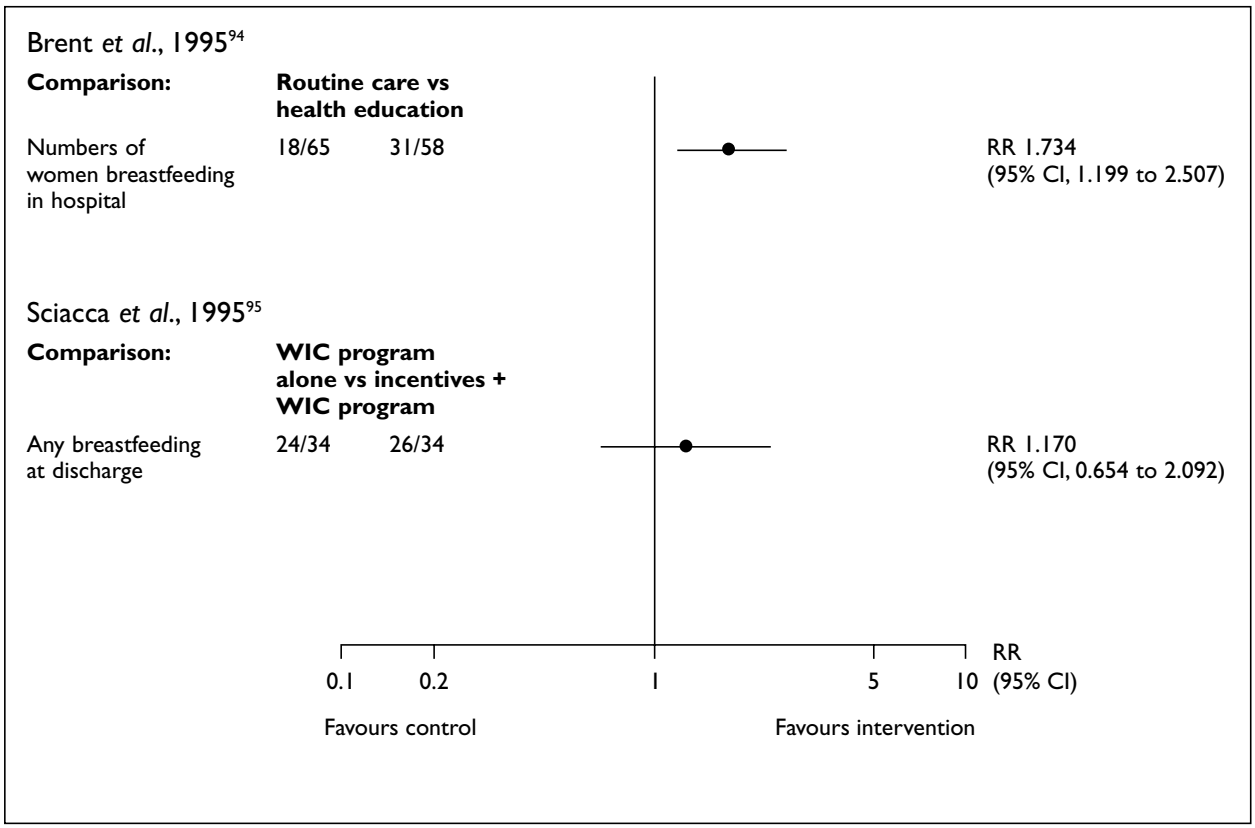


FIGURE 6 *Individual RR estimates for RCTs of HSI interventions (WIC) (outcome: initiation of breastfeeding)*

in the urban location of four WIC clinic sites in Baltimore City.[67] The other two studies examined the effects of WIC-based interventions among rural populations.[97,98] One study examined the effects of prenatal breastfeeding education for women wishing to breastfeed in the health departments of three rural Oklahoma counties where WIC services are provided.[98] Another study assessed the impact of volunteer peer counsellors on breastfeeding practices among pregnant and postpartum women in rural counties of Iowa.[97]

Characteristics of interventions

One study used a 2 × 2 factorial design to evaluate a breastfeeding promotion video with supporting posters and pamphlets, peer counselling, video plus peer counselling and standard WIC service (including ascertaining choice of infant feeding and providing encouragement and support for breastfeeding).[67] Women in the intervention group of one study attended a class covering initiation and maintenance of lactation and advantages of breastfeeding, with the option of a further class on breastfeeding problems.[98] Another study evaluated an intervention where women received individual peer counselling before and after the birth.[97]

Outcome assessment

All studies reported initiation and duration of breastfeeding.[67,97,98] In one study, initiation of breastfeeding was defined as 'ever putting the baby to the breast'[67] whereas no definition was provided in two other studies.[97,98] One study measured breastfeeding rates at 7–10 days post-partum,[67] whilst two others reported breastfeeding up to 4 months[98] and 12 weeks[97] after the birth.

Methodological quality

All three studies reported clear selection criteria for participants.[67,97,98] One study included four arms and had an overall sample size of 242 participants.[67] The other two studies had overall sample sizes of 4798 and 207.[97] All the studies reported comparability of groups at baseline and reported withdrawals. None stated whether outcome assessment was blinded.

Effectiveness of interventions

Primary outcomes: initiation of breastfeeding

Results for initiation of breastfeeding are taken from the estimated relative risks, calculated on an intention-to-treat basis where possible (see *Figures 7* and *8*). All three studies demonstrated a positive trend in initiation of breastfeeding as a result of the intervention,[67,97,98] with two achieving statistical significance.[67,97] One study was conducted in an urban setting,[67] and the other in a rural setting.[97] Both these studies included peer counselling, although the urban-based intervention also included a promotional video and literature.[67]

A prenatal breastfeeding class for women expressing a desire to breastfeed did not lead to statistically significantly increased numbers actually starting to breastfeed.[98] When estimated according to the intention-to-treat principle, initiation rates were 54% for the control group and 57% for the intervention group.

Secondary outcomes: duration of breastfeeding

All three studies demonstrated a significantly improved duration of breastfeeding as a result of the intervention. Measurements varied between studies and included the following: breastfeeding at 7–10 days postpartum,[67] various time points up to and including 12 weeks,[97] and mean duration of breastfeeding.[98]

Results from before–after studies

Characteristics of participants

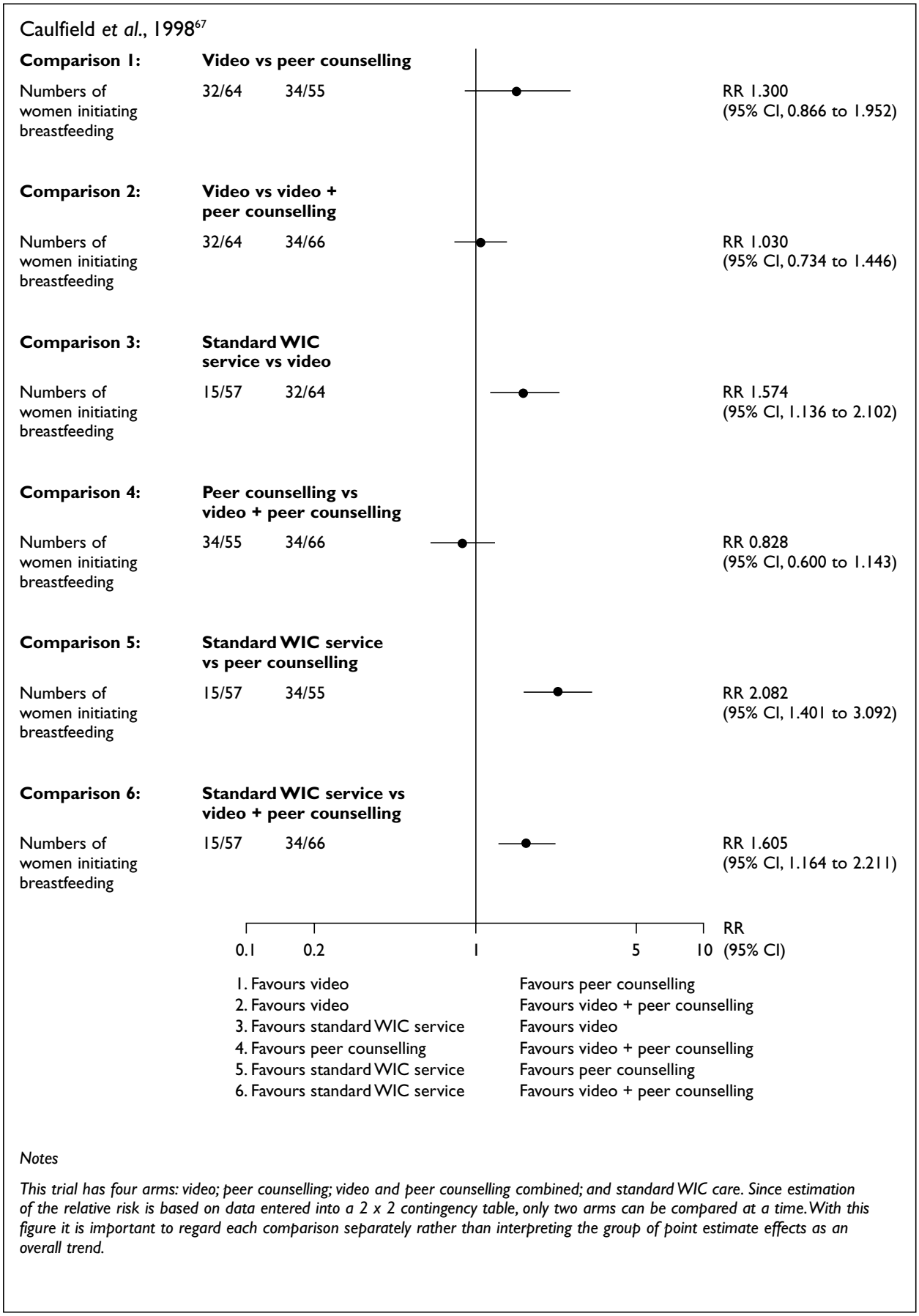
Four studies used WIC data sets to examine the effects of programmes across whole states, as in the case of the Utah study,[103] or parts of states, as in the case of north-eastern New Jersey,[102 120] clinics in Alabama,[99] and 62 clinics in Mississippi.[100] The remaining study focused on the effect of the WIC Program on breastfeeding practices among native American women at Salt Lake City Indian Health Care Center.[101]

Characteristics of interventions

Three studies described multifaceted breastfeeding promotion campaigns that included use of breast-feeding guidelines and coordinated implement-ation through training, educational and media materials, prenatal classes, peer support, hire of breast pumps, and prizes for breastfeeding mothers.[99,102,103] The remaining two studies were evaluations of peer counsellor programmes, in which women had individual contact with a trained peer counsellor both before and after the birth.[100,101]

Outcome assessment

All five studies reported initiation that appears to include infants ever breastfed in all cases.[99–103] One study also reported changes in duration of breastfeeding at various time points from 1 week through to 6 months where breastfeeding was defined as nursing at least once per day,[101] and another reported duration of breastfeeding at 6 months.[103]



Notes

This trial has four arms: video; peer counselling; video and peer counselling combined; and standard WIC care. Since estimation of the relative risk is based on data entered into a 2 x 2 contingency table, only two arms can be compared at a time. With this figure it is important to regard each comparison separately rather than interpreting the group of point estimate effects as an overall trend.

FIGURE 7 *Individual RR estimates for a non-RCT of HSI interventions (WIC) (outcome: initiation of breastfeeding)*

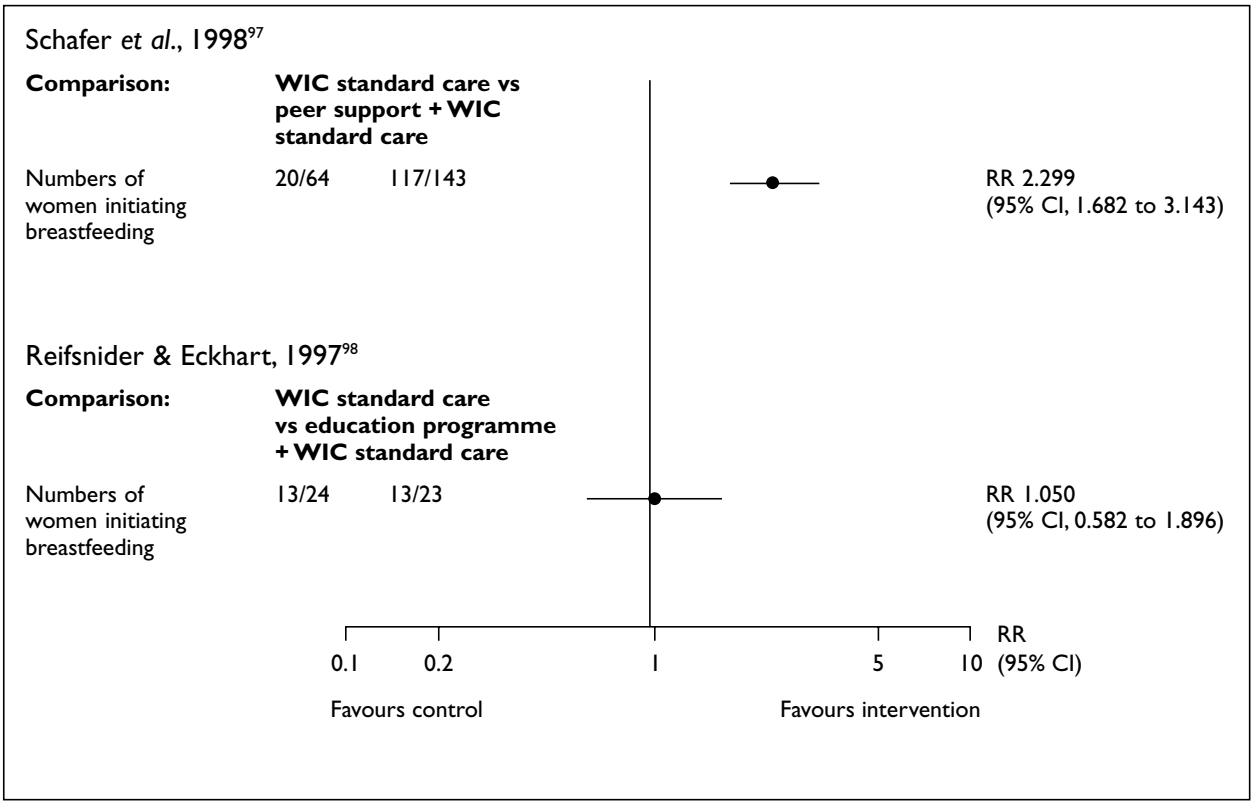


FIGURE 8 *Individual RR estimates for non-RCTs of HSI interventions (WIC) (outcome: initiation of breastfeeding)*

Methodological quality

All five studies used a cross-sectional design, selecting participants from the same geographical setting for the before- and after-intervention comparison groups.[99–103] Only one of the four studies that collected data retrospectively from existing WIC databases reported group comparability at baseline.[100] One study used data for the before-intervention comparison group from existing WIC records.[101] In this study, the before and after groups were reported to be similar with regard to age, socio-economic status and ethnicity. Total sample sizes ranged from 84,[101] to over 13,500.[99] Interpretation of study results in the remaining three studies is extremely limited owing to the lack of information on the numbers of participants in comparison groups.[100,102,103] No studies used an *a priori* sample size calculation, and none considered the effect of factors other than the intervention as possible influences on outcomes.

Effectiveness of interventions

All five studies reported increases in the initiation of breastfeeding following implementation of the WIC intervention, but none was statistically significant.[99–103] The largest study reported an increase in the number of women who were in that WIC program and were breastfeeding (for any period from 1–12 months) from 17% in 1990 to 29% in 1992.[99]

The study that evaluated a peer counsellor programme among low-income native American women reported a statistically significant increase in breastfeeding rates at 3 months ($p = 0.05$) even though the positive change in initiation rates had not achieved significance ($p = 0.07$).[101] However, the baseline rates for initiation of breastfeeding were relatively high at around 84% for the after group and 70% for the before group. The second study did not demonstrate a statistically significant difference between before and after groups.[103]

Summary of results for HSI (WIC)

All ten studies reported findings that were positive as a result of implementing an intervention based on the WIC programs,[67,94–103] although not all were statistically significant. Two RCTs[94–96] and two non-RCTs[67,97] showed statistically significant increases in initiation and duration. All four trials appeared to be of sound methodological quality, although one of the RCTs may not have been based on true randomisation.[95–97] Numbers were small in three studies.[67,94–96] The remaining controlled trial also reported statistically significant increases in

duration of breastfeeding, although the positive effect on initiation did not achieve statistical significance.[98] This may be due to the relatively high baseline rate for initiation of breastfeeding among these WIC participants (intervention group: 13/23, 57%; control group: 13/24, 54%, intention-to-treat estimation).

Results from before–after studies[99–103] supported the findings from the RCTs and non-RCTs. The interventions most commonly evaluated in these studies were breastfeeding education classes, sometimes with incentives to promote increased participation, promotional materials such as videos, posters and pamphlets, and peer counselling. These breastfeeding promotion interventions were found to be effective (statistically significant result) at increasing rates of initiation and duration when more than one intervention was implemented using a combined approach.[67,94–96] The interventions appeared to be effective at increasing both initiation and duration in both urban[67,94] and rural[95,96] settings. The single study evaluating the impact of WIC interventions among low-income native American women also reported a positive effect for both initiation and duration of breastfeeding, with the latter achieving statistical significance.[101] The study design and methodological quality of this study warrants caution in interpretation of these findings however.

In conclusion, overall the studies suggest favourable results for both initiation and duration of breastfeeding following the implementation of WIC programs among women of low-income groups in the USA. Findings appear to be particularly favourable for increased duration of up to 3 months postpartum.

Results of evaluations of HSI interventions – based on training of health professionals

Definition

Interventions to train health professionals are classified within HSIs to reflect their role in helping to reorient health services to promote breastfeeding as distinct from health education interventions which target mothers and other consumer groups.

Results from before–after studies

Number of studies

Five before–after studies of interventions to train health professionals were identified (appendix 3, *Tables 42–46*; appendix 4, *Tables 75* and *76*).[104–108] Three used cross-sectional designs,[104,105,108] one used a cohort design,[106] and one used a part-cohort study design where some of the participants in the baseline group were also included in the after intervention evaluation group.[107]

Characteristics of participants

All five studies were conducted in industrialised nations.[104–108] One was conducted in a community setting, targeting midwives and health visitors in Exeter, UK,[104] another was based in Oxfordshire, UK and involved midwives at a specified hospital,[108] and a study conducted in Northern Ireland attempted to recruit all the relevant healthcare workers in a specified area.[105] For the latter, participants included midwives, health visitors, dieticians, clinical medical officers, general practitioners (GPs) and community pharmacists in the Eastern Health and Social Services Board during the period 1991–93, representing an area where a low incidence of breastfeeding had been identified.[105] An Australian study was conducted among health professionals in the Southern Metropolitan District of Adelaide.[107] The final study was conducted in British Columbia, Canada and recruited all practical and registered nurses at a specified maternity unit.[106]

Characteristics of interventions

In one UK study, training was aimed at midwives and health visitors working in the Exeter district. Practically all staff (numbers not stated) attended one of three seminars during June 1975 where the advantages of breastfeeding and methods of helping mothers to breastfeed were discussed.[104]

Another study was undertaken in Oxfordshire, UK after a baseline audit identified particular breastfeeding difficulties experienced by women.[108] A health education training programme targeted at midwives based its content around the issues emerging from this survey. Evaluation of changes was undertaken by a repeat survey and a comparison of rates of breastfeeding among mothers.

The study in Northern Ireland examined the effects of introducing consensus guidelines on infant feeding.[105] The guidelines were disseminated using a cascade approach via identified teams of health professionals. Staff were provided with relevant training during seminars, other study resources and copies of the guidelines were also made available.

In the Canadian study, an in-service education course was provided to nurses.[106] This consisted of

a series of three classes, a video, and the circulation of journal articles. The group teaching was reinforced by visits to the ward by a clinician who demonstrated good practice and the provision of support to mothers.

The Australian training programme consisted of two workshops given three times each in 1994 and 1995 where participants completed pre- and post-tests.[107] The content of the workshops included the advantages and potential problems of breastfeeding, social and cultural aspects of breastfeeding, weaning, drugs and breastfeeding, and postnatal depression.

Outcome assessment

One UK study reported initiation of breastfeeding at hospital discharge and duration of breastfeeding at 6 weeks postpartum.[104] Initiation data were collected from mothers resident in the Exeter district who had babies within the defined 2-month study periods before and after the training programme. Questionnaires were administered by the midwife at 8–16 days postpartum. Mothers who were breastfeeding at this time received a follow-up postal questionnaire at 6 weeks postpartum to provide duration data. Non-responders were followed up by the health visitor. Data on factors influencing the mothers' choice of infant feeding method were also collected.[104]

A second UK study selected all Oxfordshire mothers giving birth within two specified time periods, and attempted to assess initiation rates arising as a result of the health professional training intervention.[108] As well as initiation, data were reported on intention to breastfeed and actual method of feeding. The percentage of mothers exclusively breastfeeding and the percentage reporting breastfeeding problems at 2 weeks postpartum were also given.

Three studies reported changes in knowledge and/or attitudes of health professionals.[105–107]

Methodological quality

All studies selected groups from suitable sampling frames but none used random sampling methods.[104–108]

Three studies used a cross-sectional design.[104,105,108] Clear selection criteria for participants and group comparability were stated in two cases.[104,105] Withdrawals were reported for all three studies, and methods of analysis were appropriate.[104,105,108] One study considered possible confounding factors (changes in hospital policies, national breastfeeding campaigns, limited supplies of dried milk),[104] and another study also discussed the issue of confounding factors, but in less detail.[105]

Two studies used cohort designs.[106,107] Neither reported clear selection criteria for participants. One study reported withdrawals,[106] and methods of analysis were appropriate in both cases.[106,107] Neither study considered the impact of confounding factors.[106,107]

Effectiveness of interventions

Primary and secondary outcomes

Neither study reported statistically significant changes in initiation rates.[104,108] Rates of breastfeeding did not differ significantly when assessed 6 weeks after the birth,[104] or when exclusive breastfeeding was recorded at the first postnatal visit.[108] Similar rates between study groups were also seen in women initially exclusively breastfeeding but changing to bottle-feeding or partial breastfeeding by the first postnatal visit.[108]

Intermediate outcomes: changes in health professionals' knowledge of, and attitudes towards, breastfeeding

One study reported a statistically significant improvement in knowledge of the breastfeeding topics covered in, and tested before and after, the workshops (overall $p < 0.001$; registered midwives and maternal and child health nurses $p < 0.001$; GPs $p > 0.05$).[107]

Another study demonstrated a statistically significant increase over time for knowledge scores across various professional groups; however, there was no such change for attitude scores.[105] Around 80% of respondents claimed to have read the guidelines on infant feeding.

A Canadian evaluation of in-service training for nurses assessed knowledge of breastfeeding.[106] Post-tests showed disagreement among staff concerning knowledge of breastfeeding and related methods of management.

Summary of results for HSI (training health professionals)

There is a limited amount of evidence to suggest that health professionals' breastfeeding-related knowledge may significantly increase as a result of relevant training;[105,107] however, one study showed inconsistencies in staff knowledge after the intervention.[106] These interventions do not appear to produce statistically significant increases in initiation and duration of breastfeeding.[104,108] In one study, health professionals'

breastfeeding-related attitudes were unchanged relative to baseline.[105] Since all of this evidence comes from before–after studies, it should be interpreted with some caution.

Results of evaluations of HSI interventions – based on social support from health professionals

Definition

Social support interventions refer to support provided by health professionals to pregnant women or mothers in the immediate postpartum period. This intervention is classified within HSIs to reflect the role of health professionals, rather than voluntary peers, in providing advice and support on infant feeding.

Results from a RCT

One RCT evaluating social support interventions from health professionals was identified (appendix 3, *Table 47*; appendix 4, *Table 77*).[113] This study focused on women at above average risk of having a low birthweight baby from four hospitals in the Midlands and the south of the UK.[113] Women who were less than 24 weeks gestation and had given birth to at least one previous normally formed baby weighing less than 2500 g following spontaneous onset of labour were eligible for inclusion in the study. Women were recruited when they booked for delivery at the antenatal clinics of the four study hospitals. Women who were not fluent in English were excluded. Social support consisted of three home visits at 14, 20 and 28 weeks gestation and two telephone contacts or brief home visits between these times from a research midwife. Midwives were on call 24 hours per day to provide support as required and to give advice about topics raised by the women. No details are provided of the advice given or the frequency of additional support utilised. The effect of the intervention on initiation rates at hospital discharge was one of several reported outcomes (others related to the pregnancy, labour, and neonatal and postnatal periods). These data were collected from hospital case notes, and women's views of the intervention were collected from a postal survey. A 94% response rate was reported.

Randomisation was balanced block stratified by centre but not concealed. The authors comment that there was a degree of overflow of support to the control group that may have resulted in a narrowing of the differences found. An *a priori* sample size was calculated and indicated that at least 420 participants were required to give an 80% chance of identifying a difference in the mean birthweight of 150 g, assuming a standard deviation of 550 g. The total sample size was 509 women and analysis was conducted on an intention-to-treat basis. Group comparability at baseline and numbers of withdrawals with reasons were reported for both arms of the trial.

Results from this study indicated that improved rates of initiation of breastfeeding at hospital discharge occurred as a result of the intervention (46% of intervention group compared to 39% of control group). This finding was not reported as statistically significant however (see *Figure 9*). Women's attitudes to the social support

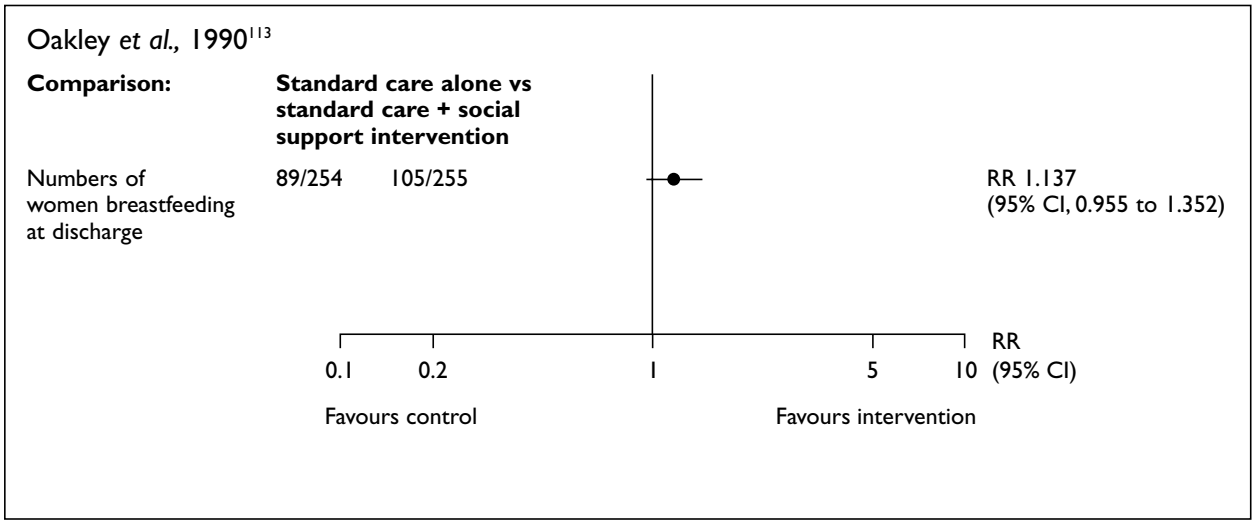


FIGURE 9 *An individual RR estimate for a RCT of HSI interventions (social support from health professionals) (outcome: initiation of breastfeeding)*

intervention were positive. A total of 80% of postnatal respondents stated that they felt that the midwife had listened to them and that they found this important.

Results of peer support programmes

Definition

Peer support interventions refer to studies where support on issues relating to breastfeeding is provided by trained and knowledgeable experts outside of a professional capacity. Typically, the support is provided by peers within the community on a voluntary basis who have breastfed successfully themselves and have undergone some training on breastfeeding.

Results from non-RCTs

Number of studies

Two peer support interventions evaluated in non-RCTs were identified (appendix 3, *Tables 48* and *49*; appendix 4, *Table 78*).[111,112]

Characteristics of participants

Both trials targeted low-income, socially disadvantaged groups. The first study included urban women giving birth at the only public hospital in Chicago, USA,[111] and aimed to assess the impact of a peer support programme on women who intended to breastfeed and had requested peer counselling support during the antenatal period. The second study was based in two socially deprived areas of Glasgow, Scotland and assessed the impact of a peer support programme on women booked in for antenatal care.[112]

Characteristics of interventions

The community-based controlled trial was delivered over a period of 2 years in Glasgow, Scotland.[112] Two similar socially deprived, but geographically separate, communities with poor rates of breastfeeding were identified. One community was offered peer counselling from seven lay breastfeeding counsellors resident in that community and with a recent history of breastfeeding. Counsellors were trained based on the 'BEST breastfeeding course'. Pregnant mothers booked in for antenatal care were approached twice antenatally to assist mothers in making an informed choice on infant feeding. Mothers who chose to breastfeed were seen on a minimum of two occasions following delivery.

The second study evaluated the effectiveness of a breastfeeding peer counsellor programme at Cook County Hospital, Chicago.[111] It compared rates of breastfeeding among two groups of women: those who asked for peer counsellor support and received it, and those who were denied peer support owing to lack of availability. Priority was given to first-time mothers and women with a history of breastfeeding difficulties when assigning peer volunteers. Trained volunteers and participants were matched according to ethnicity and socio-economic background to support women who planned to breastfeed their infant and who had requested a peer counsellor. Counsellors were requested at different points in time, some antenatally and others following delivery. Peer counsellors were instructed to talk with mothers before delivery if possible, and maintain telephone contact for at least 12 weeks and until breastfeeding stopped.

Outcome assessment

Both trials reported the primary outcome of initiation of breastfeeding and examined the number of women 'exclusively' breastfeeding and 'any' breastfeeding.[111,112] In one study, the rates of breastfeeding at delivery, hospital discharge and 6 weeks post-partum were reported, and the intention to breastfeed during antenatal care was assessed.[112] The other study provided data at hospital discharge together with the mean duration in weeks for women who breastfed exclusively or until they ceased feeding at least once a day.[111]

Methodological quality

Both trials included two arms and reported clear inclusion and exclusion criteria for participants. The overall sample sizes were 102[111] and 995.[112] Neither study reported an *a priori* sample size calculation.[111,112] The method of allocation to groups warrants comment. One study identified two similarly socially deprived areas in Glasgow.[112] The most disadvantaged, and with the lowest levels of breastfeeding, was elected for intervention with the other acting as control. Baseline characteristics were not outlined but the author stated that any socio-economic differences tended to favour the control group. The other study lacked clarity on how and whether allocation to groups occurred in the ante- or postnatal period.[111] The demand for peer counselling could not be met and women sometimes were allocated support on the basis of need. The study does not detail the numbers admitted to the trial ante- and postnatally, and the level of difficulty in obtaining peer support allocation during antenatal as opposed to postnatal care. The authors did describe certain baseline characteristics and reported the two groups as comparable.

The use of blinded outcome assessment was unclear in one study.[112] In the other study, data collection differed between intervention and control groups and was not blinded.[111] Information on withdrawals was provided by both studies,[111,112] although one did not report reasons for withdrawal.[111] Analysis was based on an intention-to-treat protocol in one study.[112] The author of this study acknowledged that the intervention did not always ensue according to the protocol because nearly a third of participants did not receive an antenatal visit and over two-thirds of participants did not receive two antenatal visits. This was primarily due to the inconsistency of counsellors to follow-up mothers, often waiting for the mother to initiate contact.

Effectiveness of interventions

Primary outcomes: initiation of breastfeeding

Results for initiation of breastfeeding are taken from the estimated relative risks, calculated on an intention-to-treat basis where possible (*Figure 10*). Peer counsellor support programmes may help to increase initiation of breastfeeding. The difference between treatment and control groups was statistically significant in the USA-based study,[111] but not in the Scotland-based study.[112] It should be noted, however, that for the American study, the intervention only targeted women expressing an interest in breastfeeding and a wish for peer support to achieve their aim.[111] The other trial which included any women in the antenatal period within the target residential area also presented subgroup analyses on women who wished to breastfeed at the time of booking.[112] Results from this analysis indicated that the intervention produced statistically significant increased rates of initiation when compared with controls who stated an intention to breastfeed ($p < 0.01$).[112] Findings from both studies appear to support the view that peer counselling programmes can be effective in supporting women to follow through with their decision to breastfeed.[111,112]

Secondary outcomes: duration and exclusivity of breastfeeding

Peer support achieved statistical significance in duration of breastfeeding at all time periods in one trial.[111] In the other trial, where reported levels of women breastfeeding were very low, the effect of the intervention failed to achieve statistical significance relative to the control programme.[112] If only women expressing an interest to breastfeed at booking were included in the analysis, peer support continued to show a statistically significant benefit at hospital discharge ($p < 0.01$) and at 6 weeks ($p < 0.05$), and exclusive feeding at

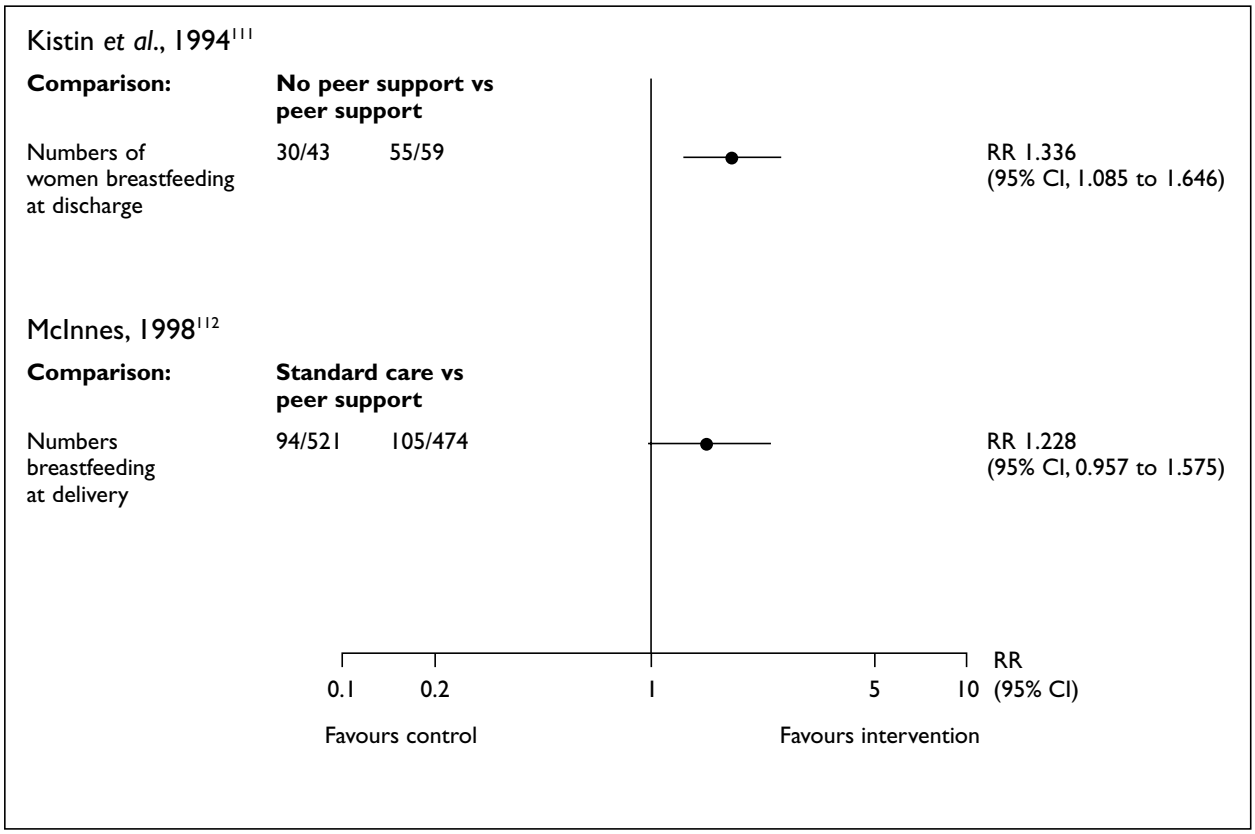


FIGURE 10 *Individual RR estimates for non-RCTs of peer support programmes (outcome: initiation of breastfeeding)*

6 weeks ($p < 0.001$) when compared with controls who stated an intention to breastfeed.

Intermediate outcomes: change in intention to breastfeed

In one study, the intention to breastfeed between the time of booking and the return antenatal visit was assessed.[112] Significantly more intervention mothers stated a change in their feeding intention in favour of breastfeeding between booking and return ($p < 0.05$).

Results of media campaigns

Results from before–after studies

Number of studies

Two media campaigns evaluated with before–after study designs were identified (appendix 3, *Tables 50* and *51*; appendix 4, *Table 79*).[109,110] One used a cross-sectional design,[109] and the other used a part-cohort study design where some of the participants in the baseline data group were also included in the after intervention group.[110]

Characteristics of participants

Both studies were conducted in industrialised nations.[109,110] The UK study was conducted in a hospital setting targeting all primiparous and multiparous mothers who delivered over a 1-month period in both 1975 and 1977 at the study hospital.[109] A subgroup of mothers who were breastfeeding at 1-month were contacted for further follow-up at 3 months.

The Canadian study was conducted in a high school setting and targeted girls through grades 10–12 (aged 15–19 years with a mean age of 16 years) in two study high schools in Newfoundland.[110]

Characteristics of interventions

The UK-based media campaign targeted mothers, doctors, midwives and health visitors although no other details of the intervention are provided.[109] The Canadian media campaign was implemented over an approximate 6-week period in early 1986 and comprised television commercials and newspaper articles and advertisements.[110] The television commercial about breastfeeding was aired on two local stations for 15 seconds five times per week on each station, and the advertisements appeared once as well as an unknown number of articles in three local newspapers.

Outcome assessment

The UK hospital-based study reported initiation rates with results presented separately for first-time mothers and multiparae.[109] Data on duration were also provided at 3 months postpartum by parity. The school-based study in Canada measured the intermediate outcomes of a change in knowledge of, and attitude towards, breastfeeding as a result of the media campaign.[110] Results were presented for four groups reflecting the variables of exposure to the media campaign combined with participation in one, or both, of the pre- and post-intervention tests. Authors also reported the relationship between attitude to breastfeeding and future intention to breastfeed.[110]

Methodological quality

The UK-based study selected all women who gave birth at the study hospital during a 1-month time frames prior to, and following, the intervention.[109] A cross-sectional design was used, with pre- and post-intervention groups recruited from the same sampling frame. Groups were not described separately, nor were data provided relating to the numbers and characteristics of primiparous and multiparous mothers. Authors comment that the overall social class distribution shows a higher than normal proportion of mothers from social classes I and II (40% against a national average of 19%), although the distribution of women by social class is not detailed within each group. An *a priori* sample size was not reported and there was no mention of specific inclusion or exclusion criteria. The duration of the intervention was not described but the interval between data collection periods was approximately 2 years. Response rates for participation were reported. A 100% response rate was achieved at 1 month, and only two women failed to reply at 3 months.

The school-based study in Canada conducted random sampling of participants by class from each of the three eligible school grades for allocation to the pretest baseline group.[110] The method of selection for the post-intervention evaluation was a combination of a cohort and cross-sectional design with 273 participants who completed the post-test having also completed the pretest, compared with the remaining 190 participants of the post-test group not having completed the pretest. Two-way ANOVA was conducted to account for the influence of having completed the pretest combined with exposure to the campaign. The same sampling frame was used for selection of participants. A lack of information on baseline characteristics limited comparison of groups to age only. The intervention and data collection process was completed within a 6-month period. Numbers of withdrawals from study groups with

reasons were reported. A total of 60 participants did not complete the pretest owing to absence from school that day. Participants who completed the post-test but were not clear if they had seen the advertisement ($n = 31$) or the television commercial ($n = 10$) were excluded from the ANOVA.

Effectiveness of interventions

Primary outcomes: initiation of breastfeeding

The UK hospital-based study reported that the media intervention produced significantly higher rates of initiation of breastfeeding when compared with standard care.[109] Results were presented by subgroups according to parity; however, the numbers involved in this analysis were not reported.

Secondary outcomes: duration of breastfeeding

Results on the impact of the UK-based media campaign suggested an improved duration of breastfeeding. This finding was not, however, statistically significant.[109]

Intermediate outcomes: change in knowledge of, and attitude to, breastfeeding

The Canadian study did not report a significant effect of either the television commercial or the newspaper advertisement on increased knowledge about breastfeeding when the influence of completing the pretest was taken into account.[110] Analysis revealed a significant increase in knowledge ($p < 0.05$) for participants who had taken only the pretest or both the pre- and post-test regardless of exposure to media activities. A statistically significant effect on attitudes towards breastfeeding was reported as a result of the television commercial regardless of whether participants had completed the pretest. The newspaper advertisement did not produce a significant effect however.

Results of multifaceted interventions

Definition

Multifaceted interventions refer to studies where more than one type of intervention has been implemented; for example, a health education programme combined with a media programme and HSI.

Results from a non-RCT

Number of studies

One non-RCT of multifaceted interventions was identified (appendix 3, *Table 52*; appendix 4, *Table 80*).[114]

Characteristics of participants

The trial was based in Mexico and targeted multigravidae in four low-income communities.[114]

Characteristics of interventions

The trial allocated interventions to four purposively selected communities in Mexico in an attempt to evaluate the single and combined effects of two different methods of intervention.[114] The control site, which received no intervention, was selected randomly from the four previously selected sites ($n = 155$) and the remaining three communities were allocated to receive an intervention. One group of pregnant multigravidae received group teaching on breastfeeding given by the site supervisor, who was a project employee trained in breastfeeding teaching for mothers and volunteers ($n = 160$). Participants in a second community received individual teaching and counselling from volunteers resident locally ($n = 122$). The volunteers, with previous experience of breastfeeding their own children, received training on breastfeeding teaching from the site supervisor. Women in the third community received both types of intervention ($n = 148$).

Outcome assessment

Initiation of breastfeeding and rates of exclusive breastfeeding at months 1, 5 and 6 were reported.[114]

Methodological quality

The trial had four arms and an overall sample size of 585 participants.[114] Clear inclusion/exclusion criteria were reported. Details relating to socio-economic status were reported, although it is unclear if groups were comparable for this or any other baseline characteristics. It is unclear whether blinded outcome assessment was used, and study withdrawals were not described.

Effectiveness of interventions

Primary outcomes: initiation of breastfeeding

The study set out to examine single and combined effects of both individual education and group counselling for pregnant women but failed to do so, presenting data as the sum of all interventions versus controls.[114] Since outcomes were not reported per treatment arm, the relative risks could not be estimated. The overall effect of all types of intervention to all participants, including single or group health education with or without peer support, indicates a positive finding in favour of the interventions.

Secondary outcomes: duration and exclusivity of breastfeeding

All types of health education and peer support increased the duration of breastfeeding at 1, 5 and 6 months postpartum. However, this result failed to reach statistical significance.[114]

Results from before–after studies

Number of studies

Ten before–after studies evaluating multifaceted interventions were identified (appendix 3, *Tables 53–62*; appendix 4, *Table 81*), all of which used cross-sectional designs.[115–124] Multiple publications were identified for two evaluations: one conducted in the USA,[115,127] and one conducted in Brazil.[120,125,126] For one evaluation, relevant data from separate papers were merged for consideration in the review.[120,125,126]

Characteristics of participants

Five of the ten studies were conducted in industrialised countries in Europe and North America.[115,116,118,121,124] Participants in the three North American studies included both health professionals and traditionally hard to reach target groups such as women of low income and/or ethnic background.[115,118,124] The Scottish study targeted both health professionals and mothers of healthy babies aged between 4 and 12 months born in Edinburgh,[116] whilst the English study targeted health professionals and all mothers discharged from a single maternity ward over a 20-week period in 1972–73.[121]

The remaining five studies were conducted in developing countries.[117,119,120,122,123] Participants of the three studies based in central and southern America were pregnant women at urban-based hospitals.[120,122,123] The study conducted in India was community-based and targeted pregnant women in rural settings.[117] Participants in the nationwide study conducted in Jordan included a range of health professionals, administrators and mothers of young children.[119]

Characteristics of interventions

HSI and health education programmes. Seven studies evaluated a combination of HSIs and health education programmes, with three of those programmes including additional components such as media campaigns, peer support activities and legislation.[115,118,120–124]

Of the four studies evaluating the effectiveness of HSI and health education programmes alone, two were conducted in industrialised countries,[115,121] and two were based in developing nations.[122,123]

The England-based study conducted over a 20-week period evaluated a change in hospital policy that recommended staff to make additional efforts to encourage breastfeeding and to cease offering complementary feeds to breastfed babies.[121] The USA-based programme implemented a 'Wellstart' training course for health professionals and clerical staff of the Women's Health Centre (University Hospitals, Ohio) together with the development of educational and promotional materials and the introduction of peer support counsellors.[115] These interventions provided the foundation for subsequent antenatal health education and postnatal breastfeeding support activities.

A comprehensive programme based in Chile included a Wellstart train-the-trainer course for health professionals and the development and dissemination of training and educational materials and practice guidelines for breastfeeding management.[122] Subsequent activities included one-to-one health education during each antenatal visit and invitations to group sessions between 32 and 40 weeks of pregnancy. Hospital practice was modified to allow early contact, mothers were encouraged to put babies to the breast in the delivery or recovery room, 24-hour rooming-in was reinforced and supplementary feeding was discouraged. Professional breastfeeding support was provided during the postnatal stay and mothers were invited to attend an open breastfeeding clinic after discharge. The Mexico-based study also included a training programme on lactation management from Wellstart International for 110 hospital staff.[123] Antenatal breastfeeding classes were subsequently implemented and attended by 25% of the post-intervention evaluation group. Hospital policy changes included bottle-feeds only on the paediatrician's direction, reduction of the time mothers and newborns were separated, trained lactation personnel were allocated to postnatal areas and infant feeding information previously provided by an infant formula company was replaced by classes on the advantages of correct techniques of breastfeeding. A 1-year programme in Canada included a media campaign in addition to the HSI and health education interventions.[118] Guidelines of recommended procedures for promoting breastfeeding were sent to physicians, nurses and home economists in Manitoba; posters and pamphlets promoting breastfeeding were distributed to health centres and hospitals; and curriculum

supplements encouraging education on infant nutrition were sent to all junior and senior high schools. The media campaign included public newsletters, press releases, radio and television and a post office stamp reading "Breastfeed – the Best Start in Life".

The multifaceted intervention at the Shiprock Indian Health Service Hospital, USA was designed to incorporate cultural understandings about infant feeding and perceived barriers to breastfeeding.[124] The 1-year study period evaluated changes in hospital policy and practice, namely pre- and postnatal breastfeeding education with appropriate educational materials, phasing out of discharge packs containing formula, separating breastfeeding and bottle-feeding mothers, promoting initiation within 30 minutes of delivery, encouraging rooming-in and discouraging supplemental feeds. A complementary community intervention aimed to promote breastfeeding through radio, billboard, T-shirt and slide tape show activities whilst one-to-one and group health education activities were based on newly developed and culturally appropriate education materials and videos. The intervention also included a peer support 'Foster Grandmother' programme, which utilises traditional elders who have breastfed their children to provide counselling and support.

The final study in this category evaluated the impact of the Brazilian National Breastfeeding Program over a 6-year period in two major metropolitan areas: Greater Sao Paulo and Recife.[120] This multifaceted intervention entailed: a national media programme using television and radio, press and other promotions; training and updating knowledge of health professionals on breastfeeding; orientation of non-professional health workers; promoting restructure of health services such as rooming-in; inclusion of breastfeeding in primary school and literacy teacher training curricula; developing a Brazilian Code in accordance with the WHO Code on Marketing of Breast Milk Substitutes;[30] implementing legislation for working mothers; establishing peer support groups; dissemination of breastfeeding information to relevant authorities; and informing mothers about breastfeeding though education and media activities.

HSI and media programmes. Two studies were identified in this subcategory of multifaceted interventions. One study aimed to evaluate the effect of implementing the Department of Health 1974 recommendations on infant feeding practices in Scotland over a 3-year period.[116] In response to these guidelines, the media gave reportedly extensive coverage to the advantages of breastfeeding and the problem of unmodified dried infant milks, and by 1976 the promotion of breastfeeding became policy among the medical and nursing professions in Scotland. The author reported that antenatal clinics offered routine infant feeding advice.

The second study also examined the impact of a national programme, namely a broadcast media intervention for promoting changes in breastfeeding behaviour in Jordan.[119] A 2-day seminar promoting the role of health professionals in promoting timely initiation of breastfeeding was attended by 130 representatives from professional, government, private and community sectors. Recommendations for legislation to support breastfeeding, educational activities and changes in hospital policies and programmes arose from this seminar. The media intervention comprised daily radio and television broadcast spots over a period of 5 months, including dramas, testimonials and advice from a fictitious female doctor.

Health education, peer support and media programmes. The study in India is quite distinct from the other ten studies because it did not include a HSI or institutional component in the intervention.[117] The community-based programme aimed to improve selected mother and child health problems through participation of women in peer support activities in ten villages of a community development area. Pregnant women and mothers of all ages (n = 288) were selected to participate in a 1-week orientation training on mother and child health problems to enable them to work subsequently with community-based women's groups. Educational materials and health messages were disseminated through education, advocacy and promotional activities such as local media to promote breastfeeding and appropriate weaning. Before and after surveys collecting data on a range of health practices were conducted with 300 women in each group at two time points over a 2-year period.

Outcome assessment

Nine studies reported initiation of breastfeeding.[115–121,123,124] In four studies initiation was defined as breastfeeding at hospital discharge.[115,118,120,121] Points of measurement for other studies included on same day as delivery or after delivery,[117] observed at 3 hours after birth,[123] and ever attempted to initiate.[116] Two studies did not report a cut-off point for measurement of initiation rates.[119,124]

The same nine studies also assessed secondary outcomes.[115–121,123,124] The ways in which duration and exclusivity of breastfeeding were assessed varied across the studies and included: rates of breastfeeding at 2 weeks postpartum,[115] at 2 months,[118] at 2 weeks and 4 months,[116] and at 6 months;[117] number of infants receiving supplements and timely initiation of breastfeeding;[119] average number of days of exclusive or any breastfeeding;[120] exclusive breastfeeding at hospital discharge,[121] exclusive breastfeeding at 1 and 4 months,[123] and mean age (in days) of starting formula and mean age (in days) of breastfeeding.[124]

One study reported intermediate outcomes, including knowledge of health professionals, and use of supplementary feeds in hospital.[122] Additionally, a cost-effectiveness analysis was presented, comprising estimated costs per patient day of recovery for rooming-in compared with separate recovery.

Methodological quality

All ten studies used a cross-sectional design.[115–124] Nine studies selected both comparison groups from the same, suitable sampling frame,[115,116,118–124] and in one study this was not stated.[117] Random sampling was used in two studies,[119,120] a further six reported other methods of allocation, such as consecutive assignment to groups,[115,116,121–124] and in two studies sampling methods were not stated.[117,118] Only one study conducted an *a priori* sample size calculation.[115] Seven studies reported clear inclusion and exclusion criteria for selection of participants.[115,116,118,119,121,122,124]

Since all ten studies utilised a before and after design, outcomes may have been affected by factors other than the intervention occurring prior to, or during, the intervention period. Authors of the study conducted in Jordan noted the possibility of an existing trend towards an increased initiation of breastfeeding and changes in hospital practices to support breastfeeding during the 2-year intervention period.[119] Differences in the before- and after-comparison groups may have been present in four studies where the authors had not reported an adjustment for the effects of such variables.[116,117,120,121] The before- and after-intervention groups in the remaining six studies were comparable.[115,118,119,122–124]

Three studies reported withdrawals for each group, including the reason for withdrawal,[115,118,121] and another study reported that there were no withdrawals.[124] Withdrawals were mentioned in another two studies; however, either numbers per group[123] or reason for withdrawal[122] were not reported. The remaining four studies did not report any withdrawals for either comparison group.[116,117,119,120]

Effectiveness of interventions

Primary outcomes: initiation of breastfeeding

As detailed above, the multifaceted programmes varied across studies in terms of methods and content. All studies compared the intervention to routine or standard care before the intervention was implemented although the definition of 'routine' or 'standard care' is also variable.

HSI and health education programmes. Three of the six studies assessing initiation reported that multifaceted interventions produced statistically significantly improved rates of initiation of breastfeeding when compared with standard care.[115,120,124]

The US-based intervention, implemented in both hospital and community settings and including culture-specific health education materials targeting American Indian pregnant women and new mothers, reported a highly significant positive effect on initiation rates with a p-value of < 0.0001.[124] Two interventions included media and peer support activities in addition to the HSI and health education components.[120,124]

It is worth noting the numbers reported for before and after groups in the two Brazilian study sites of Greater Sao Paulo and Recife Metropolitan Area were unclear and a statistically significant positive effect as a result of the intervention was only demonstrated in one of the two study sites (Recife Metropolitan Area).[120]

Another study reported a small but non-significant increase in initiation rates for the groups residing in an urban setting or an Indian Reservation as a result of the intervention.[118] However, the sample size of the Reservation group was very small. Initiation rates had decreased for the rural group following the intervention.

Of the remaining two studies in this category, one based in Mexico reported a negligible positive effect on initiation rates in favour of the intervention.[123] The change in ward policy to promote breastfeeding and cease offering of complementary formula in an English hospital resulted in a decrease in the number of women practising any breastfeeding at hospital discharge.[121] This finding, however, was not statistically significant.

HSI and media programmes. The study that evaluated the effect of a government policy on infant feeding practices in Scotland combined with supporting media activities reported significantly better rates of initiation ($p < 0.005$) when compared with standard care.[116] A statistically significant effect in favour of the intervention was also reported for the Jordanian study, although the authors stated an increase in initiation rates was not the main objective of the campaign and may have been a side effect of the campaign or a result of pre-existing trends or other confounding factors.[119]

Health education, peer support and media programmes. The one study evaluating a combination of health education, peer support and media interventions in India reported significantly better rates of initiation when compared with standard care.[117] It should be noted, however, that in this study, the comparison groups were not selected from the same sampling frame, and no information was provided about the comparability of before and after groups for confounding factors.

Initiation and duration of breastfeeding

HSI and health education programmes. Four of the seven studies in this category measured the effect of the intervention on both changes in initiation and duration of breastfeeding rates.[115,118,120,124]

The culturally led hospital- and community-based intervention targeting hospital staff and mothers giving birth at the USA-based Shiprock Indian Health Service hospital was the only study within this category that reported a significant increase in both initiation and duration rates as a result of the intervention.[124]

The two studies in this category that reported significant increases in initiation of breastfeeding reported a non-statistically significant increase in duration rates as a result of the intervention.[115,120]

The study by the Manitoba Pediatric Society evaluating the effect of a media campaign as well as HSIs and health education interventions reported a significant increase in duration of breastfeeding at 2 months of age for the urban-based group of participants, although this effect had not been significant with respect to initiation rates.[118]

HSI and media programmes. One of the two studies in this category measured both initiation rates and duration of breastfeeding.[116] Significantly improved rates of breastfeeding were reported at both 2 weeks and 4 months as a result of the intervention in addition to the significantly higher rates of initiation.

Health education, peer support and media programmes. The one study in this category conducted in India reported a significant improvement in both initiation and duration rates at 6 months when compared with standard care.[117]

Exclusive breastfeeding

Three studies measured a change in exclusive breastfeeding as a result of a multifaceted intervention,[119,121,123] and two evaluated the effects of changes to hospital policy and practices, including health education activities, on exclusivity of breastfeeding.[121,123] One study conducted in England[121] reported a significant increase in the number of women exclusively breastfeeding as a result of the intervention. The Mexican study, however, reported no statistically significant effect on the exclusivity of breastfeeding at 1 or 4 months as a result of the intervention.[123]

The national media campaign and 2-day seminar on breastfeeding in Jordan specifically aimed to increase the timely initiation of breastfeeding.[119] This outcome, measured by the number of mothers reporting initiation within 6 hours, was reported as significantly better as a result of the intervention whereas the increase in numbers of infants exclusively breastfed did not achieve statistical significance.

Intermediate and process outcomes

Knowledge of health professionals. The HSI and health education multifaceted programme reported a significant improvement ($p < 0.0001$) in knowledge about breastfeeding by health professionals following a 1-day Wellstart training workshop for train-the-trainers.[122]

Provision of infant feeding advice. The Scotland-based study evaluated the effect of a change in government policy on promoting breastfeeding combined with supporting media activities on the proportion of mothers receiving infant feeding advice from health professionals, lay groups or individuals and the media.[116] The findings from this study are mainly positive although not statistically significant.

Use of formula milk. Three of the studies evaluating a combination of HSI and health education interventions also reported changes in the use of formula milk.[121,122,124]

The US-based intervention designed to incorporate cultural understandings about infant feeding and perceived barriers to breastfeeding reported a significant increase in the mean age (days) of infants starting formula feeds from 11.7 days before the intervention to 48.5 days post-intervention ($p < 0.001$).[124]

The UK study reported a significant change in the introduction of bottle-feeds among babies exclusively breastfed at discharge from hospital of 2–4 weeks later than the pre-intervention group (no data provided for this outcome measure).[121]A HSI and health education programme in Chile reported a significant decrease in the percentage of infants receiving postnatal supplementary feeds in hospital ($p < 0.001$).[122]

Costs

The evaluation of the HSI and health education programme in Chile included a cost-effectiveness analysis to estimate cost savings per patient day of recovery for rooming-in when comparing separate recovery to recovery in rooming-in facilities.[122] The cost of rooming-in per patient day of recovery was estimated as US$2.35 compared to US$3.57 for separate facilities with 14% cost savings and 34% personnel savings in favour of the rooming-in intervention.

Chapter 5

Discussion and conclusion

Key gaps in the evidence

The five action areas of health promotion identified in the Ottawa Charter[68] (*Table 3*) provided a comprehensive framework for this review to identify and evaluate a broad range of health promotion interventions which relate to infant feeding and promotion of the uptake of breastfeeding. On examination of the 59 studies included in this review (see *Table 2*), an additional type of health promotion intervention was included, namely multifaceted interventions, to reflect those studies where more than one health promotion intervention had been implemented.

Table 3 summarises how the studies identified were reclassified in relation to the five health promotion action areas of the Ottawa Charter. This table highlights the key gaps in evidence for the effectiveness of health promotion interventions in increasing the uptake of breastfeeding. Public policy initiatives such as legislation and taxation have been implemented in a variety of settings. For example, maternity leave has gradually increased in Norway and currently lasts for 1 year with 80% of pay or for 46 weeks with full pay.[128] Whilst some research has been conducted to evaluate the impact of maternity leave on the duration of breastfeeding, no evidence is available to examine the impact of changes in policy on the intention to breastfeed. Similarly, despite the implementation of the WHO Code on Marketing of Breast Milk Substitutes[30] in several countries, no evaluations meeting the criteria for this review were identified. One related study was identified which provided a descriptive analysis of the impact of the WHO Code in European countries.[129] The study examined reported changes in maternity ward practices in relation to changes in the **duration** of breastfeeding. Whilst the main focus of this study falls outside the scope of this review, aspects of interventions contributing to the success of breastfeeding in Scandinavia are discussed in 'Interventions contributing to the success of breastfeeding in Scandinavia', page 53).

Evaluations of interventions to provide supportive environments for breastfeeding, for example facilities for women to breastfeed in public areas, is another gap identified by this review. No evaluations of such interventions were identified, although a small number of descriptions in non-peer-reviewed journals and organisational newsletters were found. These included the introduction of a breastfeeding policy and facilities for women to breastfeed in a major supermarket chain.

Very few studies were identified which evaluated the effect of breastfeeding promotion interventions conducted with women of different ethnic groups, particularly in the UK setting. Another gap in the evidence is consideration of women's perceptions of the intervention as part of the overall evaluation of effectiveness. One notable exception to this was seen in one study included in this review, in which women's views were considered as one part of the evaluation of social support services to pregnant women at risk of having a low-birthweight baby.[113]

The review protocol included the possibility for examining economic considerations and impli-

TABLE 3 *Classification of review studies within the Ottawa Charter framework for health promotion activities*[64]

Areas of health promotion action (Ottawa Charter)	Types of intervention to promote the uptake of breastfeeding
Public policy	No studies identified
Supportive environments	No studies identified
Community action	Peer support activities
Development of personal skills	Health education and media programmes
Reorientation of health services	HSI
	Multifaceted interventions

cations of the studies in this area. This included the option for including studies that were solely concerned with economic evaluations, taking costs into account when evaluating effectiveness (and/or benefits), as well as studies that were mainly concerned with effectiveness/efficacy but for which some economic data were available. In practice, however, no full economic evaluations were found, and no details of the cost implications of the interventions carried out were reported in the papers, with one exception.[122] Accordingly, the absence of any discussion of the economic ramifications reflects the absence of reported information, and not of a failure of the review to take account of these issues.

Effectiveness of health promotion interventions to promote the uptake of breastfeeding

Of the 59 studies included in this review, 48 reported the primary outcome of initiation of breastfeeding. These studies included 25 trials with concurrent controls (12 RCTs and 13 non-RCTs) and 23 before–after studies. The methodological quality varied considerably across the 48 studies (see chapter 4 and appendices 3 and 4).

In summary, results from most of the studies (41/48) suggested increased rates of initiation of breastfeeding as a result of the health promotion intervention compared with no intervention or routine care. In just under half of the studies (20/48), the between-group difference in initiation rates was statistically significant. No studies reported statistically significant negative effects in terms of the number of women starting to breastfeed, or any other adverse effect.

The findings reported suggest that health promotion interventions aiming to increase initiation rates may be effective. However, some caution is needed in interpreting these findings owing to methodological weaknesses in many of the studies. In addition, the possibility of publication bias should be considered, whereby studies reporting a positive outcome are more likely to be published than those reporting a null or negative effect. The balance of evidence appears to suggest that policymakers, public health practitioners and managers may be more confident in delivering certain interventions which aim to promote an increase in the numbers of women breastfeeding.

It was not possible to provide information about the relative effectiveness of different types of intervention. None of the studies included in the review had made direct comparisons between different types of interventions. Comparisons of effectiveness taken from different studies can be misleading owing to the loss of initial group allocation (e.g. randomisation).[130] In addition, the non-comparability of settings, participants and outcome assessment makes interpretation difficult. Specific features of an intervention that may have contributed to its effectiveness within a particular type of intervention group are discussed in 'Health education programmes' (below) and 'Multifaceted interventions (page 51), providing a basis for relevant implications for practice and/or research in the UK.

Health education programmes

Effectiveness of health education programmes

Studies evaluating stand-alone health education interventions represent the second largest category of breastfeeding promotion interventions examined in this review (19/59). Of the 14 studies that measured the effect of the intervention on initiation rates, nearly all (11/14) were either RCTs (eight) or non-RCTs (three). The findings of one RCT warrant particular caution in interpretation because of regrouping of participants by the authors for the purposes of analysis (see 'Results from RCTs', page 12).[72] For the remaining trials, clear inclusion and exclusion criteria and group comparability at baseline were reported in all cases except one.[79] Sample sizes were variable and ranged from 38 to 2000 participants, including four trials that had treatment arms of between 19 and 25 participants.[70,76,78,82] Caution is required in interpreting some results, mainly due to the small numbers recruited. Findings from two before–after studies that measured initiation rates should also be viewed conservatively owing to the less reliable nature of the study design.[84,86]

Several evaluations of health education programmes showed statistically significantly increased initiation rates. However, it should be noted that studies were dissimilar with respect to participant characteristics, intervention characteristics and outcome measurement. Therefore, it is difficult to interpret a pattern of effectiveness across these evaluations. A lack of effectiveness could be partly attributable to the selection criteria of participants in some studies. In one case, where post-intervention initiation rates were high for both groups, all participants had expressed a wish to breastfeed prior to the intervention.[78] Conversely, other findings indicated resistance to change in women who had expressed a wish to artificially feed their infants prior to the

intervention.[82] Overall, these findings challenge the assumption that information alone will lead to behaviour change and highlight the importance of identifying best practice characteristics that have been shown to be effective before implementation in other settings.

Effectiveness of breastfeeding literature

The available evidence from four studies,[70,71,78,79] one conducted in the USA,[70] two in the Republic of Ireland[71,79] and one in the UK,[78] suggested that breastfeeding literature when used alone was not effective in increasing initiation rates among women of different income and ethnic groups. The two RCTs were of reasonable quality, although neither study reported using true randomisation,[70,71] and one had a small sample size.[70] One non-RCT also had a small sample size (n = 38).[78] The remaining controlled trial was larger (n = 111) but did not use clear inclusion criteria and did not report groups to be comparable at baseline.[79]

With respect to low-income women in the USA, the combination of education literature with a more didactic style of health education, such as a group lecture[69] or individual health education from a paediatrician,[75] were also not found to be effective when evaluated by RCTs. Again, findings need to be interpreted with caution owing to methodological problems of individual trials. In one study, a calculation for statistical power was reported but the researchers were unable to recruit the estimated numbers.[75] This study is known, therefore, to be under-powered. For the other trial, the sample size is small (n = 64), and no information is provided about withdrawals.[69]

Effectiveness of a coordinated approach to health education

An evaluation of the effect of a coordinated three-step health education programme in the antenatal period in Sweden reported a significant increase in the initiation rates of breastfeeding.[80] Women received advice and short pamphlets about breastfeeding at a maternity clinic in addition to the usual routes at antenatal and child welfare clinics providing the same health education. An intensive information programme had also been provided for staff at the maternity, antenatal and child welfare clinics. Lectures lasting 2 hours and discussions were held with all clinic staff, at which point a booklet of facts about breastfeeding and direct instructions on how to educate mothers about breastfeeding at the **different** clinic settings was distributed. This controlled trial had a large sample size of 2000 participants.

It is not clear, however, whether the effect of the intervention can be attributed to the delivery of health education at the maternity clinic and/or the training of all clinic staff which may have improved the quality of the health education provided. Whilst it is likely to be a combination of both factors, the differences in organisation of antenatal, maternity and child welfare organisations between countries limit its scope for direct generalisation to the UK setting.

Effectiveness of group and one-to-one health education programmes

A RCT that evaluated both group and repeated one-to-one health education from the same professional reported both methods of health education to be effective at increasing the initiation and duration of breastfeeding among low-income American black women.[65] The study further reports differences in infant feeding practices between intervention groups, for example group health education was more effective at increasing initiation amongst women who planned to breastfeed, whereas individual health education was more effective at increasing initiation among women who planned to bottle-feed. The findings of these subgroup analyses are based on small numbers, however, and should be treated with some caution. As detailed in 'Results from RCTs' (page 12), this study met many of the quality appraisal criteria and was one of the few studies reporting the use of true randomisation (use of random number tables to allocate women from one clinic to one of two intervention groups or another clinic to the control group). Elements of this intervention that may have contributed to the effectiveness of the group health education sessions were the discursive nature of the sessions, discussion on the choice of infant feeding method and myths about breastfeeding as well as the more commonly discussed information on the benefits and potential problems of breastfeeding, together with demonstrations of breastfeeding by previous class members.[65]

A relatively well-designed and larger RCT (intervention group: n = 108; control group: n = 86) reported the intervention of a videotape followed by three small group discussion sessions to Vietnamese women in Australia to be effective at increasing initiation rates of breastfeeding.[74] This intervention was also effective at increasing the duration of breastfeeding, knowledge of breastfeeding, attitudes towards breastfeeding and women's intention to breastfeed. One of the factors that may have contributed to the effectiveness of this intervention among a minority ethnic group

was its use of Leininger's theory of transcultural nursing and design with specific social, cultural and language considerations.[131,132] For example, the programme was conducted in the first language of the participants (in this case, Vietnamese) with the assistance of a health interpreter.

Group health education was also reported to be effective amongst American primiparous women regardless of income level[76] and pregnant women in the UK when adjusted for parity and social class.[86] In both cases, group health education was shown to produce a significant increase in the initiation of breastfeeding and an increase, although not statistically significant, for duration of breastfeeding. However, the findings from the American study are based on a small sample size of 20 participants per treatment arm.[76] The UK-based study[86] found the interactive, informal, group education in the primary care setting to be effective when authors had adjusted for social class and parity. A total of 356 participants were included in this study but the inclusion and exclusion criteria were not clear and the less reliable nature of a before–after study design warrants caution in interpretation.

Overall, the findings from these studies suggest that various types of group health education, with or without supportive written or visual materials, can be effective among women from different ethnic groups and on various levels of income in developed countries such as the USA,[65,76] UK[86] and Australia.[74] Given the relatively small sample sizes in two of the studies[65,76] and the less reliable form of evidence in one study,[86] it would be useful to replicate such research with larger, well-designed studies among different target groups in the UK in order to determine the patterns of effectiveness more conclusively.

Conclusions

The findings in this review suggest that breastfeeding literature alone, or combined with a more formal, non-interactive method of delivering health education, appears to have limited effectiveness in terms of initiation rates when implemented among women of different income or ethnic groups in the UK, the Republic of Ireland and the USA. The research requires replication in different populations and settings, within large, well-designed evaluations to provide more conclusive evidence of effectiveness for this type of health education programme in the UK.

Small, informal group health education classes appear to increase initiation and duration rates of breastfeeding in developed countries. This form of intervention can be effective when implemented among women of all income groups and from minority ethnic groups. Leininger's theory of transcultural nursing[131,132] may provide a useful approach for potential replication of group education programmes among women from a minority ethnic group who do not speak English as their first language.[74]

The evidence suggests the need for policy-makers, managers and health educators to review their existing breastfeeding education programmes and where necessary develop a health education strategy that incorporates some or all of the elements demonstrated to be effective in similar settings. Coordinated efforts with research bodies to conduct larger, good quality trials to evaluate the implementation of health education programmes in UK settings would further assist in effective targeting of existing resources in this key area of health promotion.

Health sector initiatives

Effectiveness of HSI

Evaluations of interventions that aim to change the institutional nature of the health sector in favour of promoting breastfeeding are the largest category of interventions in this review, representing 42% of all included studies (25/59). Nearly half of the HSI interventions were evaluated with controlled trial designs (11/25), including five RCTs and six non-RCTs. The remaining studies were evaluated using a before–after study design (14/25). Interventions implemented within the category of HSI include training of health professionals, appointment of infant feeding advisers, rooming-in, reduced use of artificial milk and health education activities. In several cases, a combined package of several interventions was implemented.

With one exception,[90] all 20 studies that measured a change in initiation of breastfeeding as a result of a HSI reported increases in the number of women starting to breastfeed, and in most cases increases in the length of time women continued to breastfeed. A total of 7 of 20 studies showed a statistically significant difference in favour of the HSI.[66–68,88,93,94,97] Six out of the seven evaluations that reported the HSI to be effective were RCT or non-RCTs.[66–68,88,94,97] All the trials had recruited at least 55 participants per treatment arm with several trials including at least 100 participants or, in one case, over 200 participants per trial arm.[68] All the trials were well designed in terms of clear inclusion criteria and group comparability at

baseline. Both RCTs had used true randomisation methods,[66,94] although in one case this applied to only one of the two intervention groups.[66] One of the four controlled trials had conducted blinded outcome assessment,[68] and another had used intention-to-treat analysis.[67]

Effectiveness of rooming-in interventions

Two evaluations of rooming-in delivered as a single intervention demonstrated consistent findings in favour of the intervention. Studies conducted in Thailand[93] and Nicaragua[66] reported significant increases in initiation of breastfeeding as a result of rooming-in and one study also reported a significant increase in duration of breastfeeding.[93] Some caution is needed, however, in interpretation of these findings. One of the studies that used a before–after design did not control for any confounding factors which might have influenced rates of initiation during the 3-year study period.[93] In another study that used a before–after method to evaluate the rooming-in component of the two-pronged intervention, the intervention occurred only 1 month after data were collected from the comparison group and group comparability was reported at baseline.[66] In summary, whilst the available evidence suggests rooming-in as a stand-alone intervention can be effective at increasing the initiation of breastfeeding, the quality of the evidence needs to be considered.

Effectiveness of a combination of HSIs

The two studies that evaluated combinations of general HSIs were implemented in very different settings.[68,88] One study that evaluated the effect of early contact, rooming-in, breastfeeding education and support in a Brazilian hospital reported effectiveness for both increased initiation and duration rates.[68] Rooming-in and prohibition of free gifts of formula were standard practice in the hospital for both the control and intervention groups. The methodological quality of this trial was good and the findings suggest that widespread changes in hospital practices in similar settings are likely to be effective.

The second intervention of combined HSIs was implemented among low-income women in the USA and included training of staff, employment of a breastfeeding counsellor, written information on breastfeeding for patients and staff and rooming-in.[88] This study reported a significant increase in initiation and duration rates over the 2-year period of the intervention. Although this trial had a relatively large sample size of 400 participants across four arms, with the exception of group comparability at baseline, the study failed to meet the remaining quality criteria. Further good quality research is required therefore to provide more conclusive evidence of the effectiveness of this package of HSIs among low-income American women.

Effectiveness of training of health professionals

Interventions involving the training of health professionals in issues relating to the promotion of breastfeeding did not produce statistically significant increases in initiation or duration rates.[104,108] One of these studies, conducted in the UK, described the possible impact of other concurrent breastfeeding promotion activities.[104] These included a change in policy on postnatal length of stay at the study hospital, national and local media breastfeeding campaigns, and limited supplies of National Dried Milk for a 4-month period at the study hospital. All, or any, of these factors may have influenced the outcome of the study.

There is only a limited amount of evidence to suggest that training, delivered as a stand-alone intervention, positively influences health professionals' breastfeeding-related knowledge,[105,107] and one study showed inconsistencies in knowledge after the intervention.[106] Consensus guidelines on infant feeding in Northern Ireland did not change the attitudes of health professionals towards breastfeeding, despite increasing their knowledge of breastfeeding.[105] All of the evidence in this intervention category – HSI (training health professionals) – was derived from before–after studies, and therefore should be interpreted with caution.

A study that measured the effects of a 5-year breastfeeding programme (included a training component for health professionals) on breastfeeding rates in predominantly urban areas of Honduras reported small increases in the number of women starting and maintaining breastfeeding.[91] Tests of statistical significance were not reported. Statistically significant improvements were reported, however, between 1982 and 1986 for the knowledge and attitudes of health workers towards breastfeeding. The study used clear inclusion and exclusion criteria to select participants from a suitable and similar sampling frame. Groups were comparable at baseline and follow-up, and the authors adjusted for possible confounding factors.

Further studies that have evaluated a package of interventions, including training health professionals as one component, have demonstrated improvements in staff knowledge of breastfeeding as a result of training[89,92] and a change in attitudes

of health professionals.[92] One study also reported significant changes in breastfeeding promotion practices by hospital staff following their participation in the lactation management course based on the BFHI.[92]

This evidence comes from all three types of study design. Several studies appeared to have at least one methodological weakness; for example, groups were not comparable at baseline or the inclusion criteria for participants were not clear.[89,92,106–108] Based on this limited evidence, it appears that infant feeding guidelines may not be effective in changing attitudes of health professionals towards breastfeeding, whereas a package of in-service training, media activities and institutional changes in hospital practice may change attitudes.

No evidence was identified that had examined the potential effects of a lack of knowledge of, or negative attitudes towards, breastfeeding on initiation rates. Positive attitudes towards breastfeeding from health professionals, combined with the clinical skills to assist and support women who choose to breastfeed, have been reported to be important factors in promoting the duration of breastfeeding.[40,133] Improved access to consistent breastfeeding information, advice and support services has been highlighted as central to good practice within the NHS.[33]

In summary, the evidence indicates that intensive lactation training courses and in-service lactation training programmes as a stand-alone intervention can be effective in increasing knowledge of health professionals. A package of interventions including a training component appears to be more likely to influence attitudes of health professionals towards breastfeeding and have a positive effect on hospital breastfeeding promotion practice. However, further good quality research is required to evaluate both the effectiveness of lactation training programmes in changing knowledge and attitudes of hospital- and community-based health professionals in the UK, and the impact of any changes in knowledge and attitudes upon hospital practices and infant feeding outcomes.

Effectiveness of the US Department of Agriculture's Special Supplemental Nutrition Program for Women, Infants, and Children (WIC)

All ten studies evaluating WIC interventions among low-income American women reported increases for initiation and duration rates of breastfeeding. Three of the five trials demonstrated statistically significant between-group differences (for the estimated relative risk calculated on an intention-to-treat basis) in initiation rates as a result of the WIC intervention. These results are from one RCT,[94] and two non-RCTs.[67,97] One intervention comprised one-to-one education[94] and one comprised peer counselling.[97] The remaining study compared peer counselling, an educational video, or the combination of both interventions, and found all three approaches to be effective.[67]

All of the three trials of WIC interventions demonstrated to be effective appear to be of good quality, although one trial had a relatively small sample size.[94] All three trials used clear inclusion and exclusion criteria, had comparable groups at baseline, and had reported withdrawals per group. Intention-to-treat analysis was conducted in the two controlled trials.[67,97]

Another RCT reported statistically significant higher rates of breastfeeding for initiation, duration and exclusivity at several time points. However, the between-group difference in initiation rates was not found to be statistically significant when the relative risk was estimated on an intention-to-treat basis.[95,96]

Despite several national promotion initiatives over the last two decades, low rates of initiation of breastfeeding among women of low-income groups in both the USA and UK have remained. Given the evidence for the effectiveness of the WIC Program in the USA, implementation of similar interventions, delivered at a local level and targeting women in low-income groups, may be justified in the UK. Specifically, interventions comprising group or individual health education sessions and/or peer support programmes delivered in both the antenatal and postnatal periods appear to be effective in either hospital or clinic settings among this target group. Well-conducted evaluations of such interventions in the UK would guide managers and practitioners on what, if any, adaptations were necessary to best meet the needs of women among low-income groups living in the UK.

Effectiveness of hospital practice to reduce the use of infant formula

Evidence which directly measures the impact of availability of artificial milk on the decision and ability to initiate breastfeeding is limited. A national breastfeeding programme in Kenya included a ban on the free supply of artificial milk to hospitals and a ban on routine supplemental feeding together with training of health workers and implementing rooming-in practices.[89] This study reported improved maternity practices, but

specific measures of the effect of the programme on initiation or duration rates of breastfeeding were not reported.

Further research is required on the direct effect of the availability and appropriate use of artificial milk in hospitals in both developed and developing country settings.

Conclusion

There is some evidence to show that institutional changes in hospital practices to promote breastfeeding can be effective at increasing both the initiation and duration of breastfeeding, particularly in developing countries. These may include stand-alone interventions such as rooming-in or a package of interventions, such as rooming-in, early contact and health education. Peer support programmes and/or group or individual health education sessions, delivered at the local level, but as part of a national programme, have also been demonstrated to be effective among women on low incomes in the USA.

Replication of these interventions would be justified based on this evidence, together with good quality evaluations of their effectiveness in UK settings. A lack of evidence has been identified in two particular areas: lactation training programmes to change the knowledge and attitudes of health professionals, and the impact of any changes in knowledge and attitudes upon hospital practices and infant feeding outcomes. In addition, there is very little evidence on the effect of reduced use of artificial milk as standard hospital practice on initiation rates of breastfeeding.

Peer support programmes

Two studies evaluating a peer support programme as a stand-alone intervention were included in this review. Both controlled trials targeted low-income women in the UK and USA, and provided breastfeeding advice and support from trained counsellors in both the antenatal and postnatal periods.[111,112] One study[112] was much larger and of better methodological quality than the other,[111] but both had clear inclusion and exclusion criteria and reported groups as comparable at baseline.

Both studies demonstrated the effectiveness of peer support programmes for women who expressed a wish to breastfeed.[111,112] The numbers of such women starting to breastfeed and maintaining exclusive breastfeeding for at least 6 weeks were significantly increased. Peer support was not effective for women who had decided to bottle-feed. The main contribution of peer support programmes was in supporting women in implementing their decision to breastfeed and to help them to do so effectively.

Media campaigns

There is a lack of good quality evidence concerning the impact of media activities on the uptake of breastfeeding. Both of the two studies included measured attitudes towards breastfeeding. The results suggest that media campaigns, particularly television commercials, may have an impact on improving attitudes towards breastfeeding, which in turn could increase initiation and duration rates.[109,110] One of these studies also measured the primary outcome of initiation and reported a significant increase in initiation of breastfeeding as a result of the intervention.[109]

The effectiveness of both campaigns was evaluated using before and after study designs. A lack of information about the particular medium used to target mothers in the UK-based hospital media campaign limits its potential for replication in similar settings.[109] This limitation is exacerbated by both the age and the methodological quality of the study.

Evaluation of the impact of a community-based media campaign in Canada on the attitudes of high school girls compared two different types of media intervention.[110] In this study, only television commercials resulted in a significant effect on school girls' attitudes towards breastfeeding, whereas the newspaper advertisement did not produce such an effect. Random sampling was employed for all comparison groups and results include analysis for influence of the pretest. This more recent study appears to be of relatively good quality and was implemented in a much shorter time frame than the study conducted in the UK.[109] It does provide some evidence, therefore, for the effectiveness of television commercials in changing the attitudes of teenage girls to favour breastfeeding.

On the basis of the limited evidence provided by these two studies, further good quality research to explore the extent to which local media campaigns can shift cultural values towards breastfeeding as a recognised norm and the subsequent effects on breastfeeding practices may be justified.

Multifaceted interventions

Effectiveness of multifaceted interventions

Multifaceted interventions were the third largest category of intervention types within this review comprising 11 of the 59 included studies.

Before–after study designs were the most common method of evaluation (10/11 studies).[115–124] Only one controlled trial was identified.[114]

Overall conclusions about the effectiveness of multifaceted interventions are limited by the heterogeneity of interventions, settings, target groups and definitions of 'routine' care employed across the different studies. In addition, as no study evaluated the effect of the specific components of the interventions, it is not possible to directly attribute any change in initiation of breastfeeding to a particular component, or combination of components. More detailed evaluations are required to provide a better understanding of the incremental benefits of adding different components to the interventions in UK settings.

The existing evidence base provides some general insights into the effectiveness of 'packages' of breastfeeding promotion activities that have been conducted in the last two decades. In all, six of 11 evaluations of multifaceted interventions that measured the effect of the intervention on changes in initiation rates showed the interventions to be effective.[115–117,119,120,124] Three of the seven studies that measured a change in both the incidence and prevalence of breastfeeding as a result of the intervention reported a significant increase in the rates of both initiation and duration.[116,117,124]

Effectiveness of multifaceted interventions including a media campaign

Five multifaceted interventions incorporating a media campaign were reported to be effective.[116,117,119,120,124] Other components included government recommendations on infant feeding and introduction of routine infant feeding advice,[116] a health education programme,[117] training of health professionals and recommendations for changes in hospital policies.[119] Two studies included a wide variety of interventions: health education, media, and legislative and structural changes to the healthcare sector.[120,124] These five studies were evaluated using a before–after study design and the authors did not adjust for the effects of possible confounding factors in most cases. Although media campaigns may not directly influence breastfeeding practice they may help to promote a cultural environment that is more supportive of breastfeeding, and can change attitudes towards breastfeeding.

Identification of a 'model' media campaign for potential replication is not possible owing to the diversity of both campaigns and the settings in which they were implemented. Two effective campaigns were implemented in developed countries: Scotland[116] and the USA;[124] and three in developing countries: Brazil,[120] Jordan[119] and India.[117] The media campaigns implemented in Scotland,[116] Jordan[119] and Brazil[120] were national campaigns compared with the local media activities implemented in India[117] and the USA.[124] Specific media activities ranged from radio, billboards, T-shirts and slide shows targeting the American-Indian Navaho,[124] to national television, radio, press and other promotions in Brazil.[120] Lack of detailed description of the media interventions further limits the ability to comment on specific elements of an effective campaign.

Effectiveness of government guidelines, health education and media activities

The Scotland-based study provides useful insight into some of the possible intended and unintended effects that an intervention can produce.[116] This study is also a rare example of an evaluation of the impact of infant feeding information and advice on breastfeeding practices generated by a national government initiative. Following the 1974 UK DHSS recommendations on infant feeding practices, the media was reported to have given extensive coverage to the advantages of breastfeeding and the problems associated with the use of unmodified dried infant milks. The author states that the DHSS report stimulated renewed interest in infant nutrition leading to the promotion of breastfeeding as an official policy in early 1976. Medical, nursing and midwifery health professionals in Scotland began to encourage breastfeeding routinely at antenatal clinics. Statistically significant increases in initiation, and breastfeeding rates at 2 weeks and 4 months, were reported as a result of this intervention.[116]

Both surveys conducted before and after the interventions found that middle-class mothers received more advice from health professionals and referred more often to books than working-class mothers. Working-class mothers received more advice from lay sources than professional or media sources and, perhaps surprisingly, this trend was more marked after the intervention. A higher incidence of breastfeeding was found for middle-class mothers compared with working-class mothers, both before and after the interventions. Of particular interest, however, is the fact that the difference in breastfeeding practices between the two socio-economic groups achieved a greater level of statistical significance after the interventions. This was the case for both initiation

and duration of breastfeeding at 2 weeks and 4 months. Furthermore, significantly more primiparous mothers initiated and maintained breastfeeding at 2 weeks and 4 months compared with multiparous mothers.

These findings suggest that breastfeeding advice from media and professional sources needs to be adapted and targeted more effectively in order to achieve a greater impact on breastfeeding practices for women in lower-income groups. Interventions aimed at improving the knowledge and attitudes of women's mothers, partners, peers and other lay sources of infant feeding advice may increase the number of women among low-income groups who choose to breastfeed. Evaluations of the role of government guidelines on infant feeding as a method of generating such activities to promote breastfeeding could be replicated in other parts of the UK.

There is, however, a need for caution when interpreting the results of this study owing to the more unreliable nature of data collected retrospectively, in this case from recall of mothers of healthy babies between 4 and 12 months of age who had delivered in Edinburgh during the previous 1-year period.

Effectiveness of multifaceted interventions including a peer support programme

Peer support may be an important component underlying the effectiveness of multifaceted interventions. Of the six studies that reported a significant positive effect on initiation rates as a result of the intervention, four studies included a peer support programme with either health education classes,[115] health education and media programmes,[117] or a wide variety of interventions including health education, media, and legislative and structural changes to the healthcare sector.[120,124] Two of these studies targeted American women among low-income groups.[115,124] All four studies used a before–after study design whereby other external factors occurring during the intervention period may have influenced the reported outcomes.

Three of the six multifaceted interventions reported to be effective at increasing initiation rates included both media campaigns and peer support programmes.[117,120,124] One controlled trial that evaluated peer support programmes as a single intervention reported the intervention as effective at increasing initiation and duration rates of breastfeeding in women who had expressed a wish to breastfeed.[111] In addition, three of the five trials evaluating WIC programs among low-income women that were reported as effective in increasing initiation and/or duration rates included a peer support programme. In these cases, peer support programmes were implemented as either stand-alone interventions,[97] or as a package of peer support and health education interventions.[67,95,96]

Taken together, these findings provide a relatively strong evidence base for the effectiveness of peer support programmes to increase initiation and duration rates, particularly among women of low income. The evidence is based mainly on findings from trials that met most of the quality criteria used in this review. Although there are more studies reporting the effectiveness of peer support programmes when implemented as a package of interventions than for stand-alone peer support programmes, the quality of the evidence is more reliable for the stand-alone peer support programmes.

A recent, well-conducted qualitative study, examining why some women among low-income groups do not want to breastfeed, reported that breastfeeding is seldom seen and many women lack the body confidence required to perform it in front of others.[55] This study showed that women who had regularly seen successful breast-feeding were more confident and committed to breastfeeding antenatally and more likely to succeed. All women knew that breastfeeding was theoretically better for their baby, but for women with close exposure to breastfeeding this knowledge became appreciated in a personalised and practical way by the women. The author concludes that, in the case of this small group of low-income women, breastfeeding is a practical skill, best learnt through apprenticeship to a trusted individual. Confidence, commitment and success are best achieved by exposure to breast-feeding rather than theoretical knowledge gained by talking or reading about it.[55]

Conclusion

Based on the evidence in this review, support for more widespread implementation of peer support programmes targeting low-income women in the ante- and postnatal periods seems to be justified in the UK.

Interventions contributing to the success of breastfeeding in Scandinavia

Experience from Scandinavian countries in promoting breastfeeding over the last 30 years may provide a useful insight into strategies that may prove successful in the UK context. With the

exception of consistently high initiation rates in Norway, most Scandinavian countries experienced a decline in breastfeeding rates similar to that of other developed countries during the early 1970s.[41,80,128,134] Following the widespread implementation of a range of breastfeeding promotion interventions, initiation rates remain consistently high at around 98% of all women in Norway (1995),[41] Finland (1983)[135] and Sweden (1991).[135]

Four types of intervention that have contributed to the increase in breastfeeding in Scandinavia from the late 1960s and early 1970s onwards have been described:[129]

- An increase in problem-based informational material about breastfeeding, written mostly for and often by mothers, but read also by health workers. Consequently, more health workers also succeeded in their own breastfeeding.
- Increased availability of mother-to-mother support through mother support groups; health workers with better management skills and sometimes positive personal experience; and the collective breastfeeding experience shared among women as more mothers had successfully breastfed.
- Increase in paid maternity leave with guaranteed return to previous employment.
- Maternity ward practices changed substantially towards mother–infant contact and autonomy.

All of these interventions have been implemented to some degree in the UK and other developed countries. It is possible that the success of the Scandinavian experience lies in the commitment to achieve widespread and coordinated implementation of all these interventions in a systematic way. As described by Dr Elizabet Helsing: "it is the cumulative effect of activities from several disciplines that finally shows up in the statistics as an increase in breastfeeding".[129] Another factor that may have contributed to the success of breastfeeding promotion in Scandinavia may be the quality of the intervention. The lack of information, however, regarding the quality of the interventions implemented in Scandinavia and those interventions examined in this review does not allow more conclusive analysis of this potentially important aspect.

Trajectory of knowledge base

The 59 studies included in this review were published between January 1975 and November 1998 – a total of nearly 24 years (see appendix 7). In terms of the number of studies published over four blocks of 6-year periods, seven studies were published in the first two periods (1975–80 and 1981–86) followed by 16 studies between 1987 and 1992 and 29 studies between 1993 and 1998. These figures suggest a doubling of published evidence every 6 years over the last 18-year period. On this basis, it is projected that there may be as many as 58 studies published in the field over the next 6 years (1999–2004) or an average of approximately ten new studies per year.

Another feature of more recent evaluation studies is their focus on interventions implemented among women of different income or ethnic groups. The relatively large number of studies evaluating WIC programs in the USA represents a large proportion of these studies however.

The extent to which the recommendations for research in this review are implemented may further affect the trajectory of the knowledge base.

Chapter 6

Implications for practice and recommendations for future research

Implications for practice

Evidence of effectiveness for some interventions evaluated and reported in this review suggests that practitioners, managers and policy-makers can promote the implementation of particular interventions aimed at increasing the number of women initiating breastfeeding. Furthermore, information about the effectiveness of some interventions when implemented among groups of women on different incomes can assist managers in the UK when targeting resources to promote breastfeeding among women of low-income groups as part of a broader strategy to reduce existing health inequalities.

Whilst a number of the studies included in this review were conducted in the UK, many studies were evaluations of interventions implemented in the USA. Although there are difficulties in generalising from one setting to another, some broad implications can be made from the evaluations of those interventions found to be effective in increasing initiation rates. On the basis of the existing evidence from Europe, North America and Australasia, combined with the available evidence available from UK settings, three implications for practice in the UK are made.

The first two implications for practice are particularly relevant to managers and practitioners at the local level for improved planning and targeting of resources to promote the initiation and duration of breastfeeding among women in different income and ethnic groups.

1. Managers and practitioners could consider conducting an internal review of existing breastfeeding education programmes, and, where appropriate, develop a revised breastfeeding education strategy aimed at promoting the initiation, and to a lesser extent, the duration, of breastfeeding among women of all income and ethnic groups.

In the authors' opinion, good practice components include:

- audit of existing health education programmes for women of all income and ethnic groups which deliver breastfeeding literature as either a stand-alone intervention or in combination with a more formal, non-interactive method of health education during the antenatal period; this recognises the current lack of evidence that shows these interventions to be effective
- increased availability of informal, small group, interactive and discursive breastfeeding education sessions (with or without the use of supporting breastfeeding literature) during the antenatal period; this intervention has been demonstrated to be an effective form of health education for increasing both initiation and duration rates among women of all income groups and women from minority ethnic groups
- inclusion of an evaluation component as part of the implementation of any newly developed health education programme in UK settings.

2. Managers, practitioners and non-government organisations could consider increasing the implementation of peer support programmes, particularly targeting women of low-income groups, to promote both the initiation and increased duration of breastfeeding. In the case of limited additional resources for more extensive breastfeeding promotion programmes, this implication reflects the strength of evidence to increase both the initiation and duration of breastfeeding, particularly among the priority target group of women on low incomes.

In the authors' opinion, good practice components include:

- delivery of peer support programmes in both ante- and postnatal periods; this intervention has been demonstrated – particularly in the USA – to be effective at increasing initiation and duration rates among women of low-income groups
- targeting of women on low incomes who have expressed a wish to breastfeed; peer support programmes have been demonstrated to be effective in UK settings in increasing initiation rates of breastfeeding among this group

- inclusion of groups of women among middle-income groups where feasible; this intervention has also been demonstrated to be effective at increasing initiation and duration rates among women of all income groups
- delivery of complementary good practice breastfeeding education programmes (as detailed above); peer support programmes have also been demonstrated to be effective when combined with good practice breastfeeding education programmes
- inclusion of an evaluation component as part of the implementation of any peer support programme in a UK setting.

3. Consideration could be given to implementing a 'package' of complementary interventions at both a national and local level that aims to promote sustainable increases in the initiation and duration of breastfeeding practices among all women:
   - good practice peer support programmes (as detailed in the second point above)
   - good practice breastfeeding education programmes (as detailed in the first point above)
   - changes in maternity ward practices to promote mother–infant contact and autonomy, as summarised in WHO/UNICEF's 1989 Joint Statement.[27] Rooming-in has been demonstrated to be an effective intervention for increasing both the initiation and duration of breastfeeding
   - inclusion of an evaluation component to assess the effect of both single and combined interventions in UK settings.

Recommendations for future research

Scope of research for evidence-based practice

- Increased coordination between research and breastfeeding promotion organisations is required to encourage high quality evaluations of future breastfeeding promotion programmes as standard practice.
- Qualitative methods used to explore women's views of any intervention should be included as an integral component of studies of effectiveness.
- Assessment of the cost-effectiveness of interventions to promote the initiation and/or duration of breastfeeding should be included as a component of effectiveness studies.

Priority research areas

- Evaluation of the impact of intensive breastfeeding training courses and in-service lactation training programmes for health professionals. Measures should include evaluation of:
  - knowledge and attitudes of health professionals towards breastfeeding
  - subsequent changes in initiation and duration of breastfeeding.
- Further research to explore the extent to which media campaigns can shift cultural values towards breastfeeding as a recognised norm. Their effect on breastfeeding practices at the local level could also be investigated. Priority research areas include:
  - comparison of the effects of different types of locally delivered media interventions on breastfeeding practices among women of different income groups
  - the effects of media campaigns in changing attitudes of women, families and society at large towards breastfeeding.
- Evaluation of innovative health education approaches to increase initiation rates among women on low incomes that also target those women's partners, mothers or peers as part of the intervention.
- Evaluation of the impact of breastfeeding promotion programmes on breastfeeding practices and factors influencing infant feeding decisions among women of different ethnic groups.
- Evaluations of the use, or removal of the use, of artificial milk in routine hospital practices on rates of initiation and duration of breastfeeding.

Methodological issues

- Improvement of the following methodological aspects of future evaluation studies would improve the evidence base:
  - provision of detailed information about the intervention and its implementation methods, and details of the setting in which the intervention took place and of the person delivering the intervention (where appropriate)
  - comprehensive baseline data for all groups
  - sample sizes that are adequate to detect significant effects if they exist
  - details of the method of allocation
  - analysis on an intention-to-treat basis
  - analysis at the correct level; for example, if communities are the unit of allocation they should also be the unit of analysis, or adequate adjustment should be made if

individual level data are used
  - use of fully factorial designs to determine which programme components are effective.
- The RCT remains the preferred study design for evaluation of the effectiveness of an intervention. Where it is difficult to conduct a RCT or a non-RCT, before–after studies could be considered (e.g. for the evaluation of policies or organisational changes within the health sector). In such cases, particular attention should be applied to sampling methods, group comparability and the impact of confounding factors on the observed effect of the intervention.
- Publication requirements may partly explain the lack of detailed reporting in published studies. One possible strategy to overcome this would be the creation of a parallel website providing more detailed information of the study to those individuals and organisations with access to the Internet. Organisations that may be best placed to create such websites are funding agencies and journals themselves. The National Research Register may also be able to assist with dissemination of the methods and with contact details for research that has not been published or peer reviewed.
- The absence of a standard and internationally recognised definition of initiation of breastfeeding is one of the limiting factors for comparison of evaluations of breastfeeding promotion interventions. The definition of initiation as 'ever breastfed', referring to all babies who were put to the breast at all, even if this was on one occasion only, would be consistent with the definition used in national infant feeding surveys in the UK.[39] Similarly, duration of breastfeeding was defined as the length of time for which breastfeeding continued at all, regardless of when non-human milk and other drinks or foods were introduced. This has been measured at 1 and 2 week/s and 4, 6 and 9 months.[39] The need for, and development of, appropriate and standardised definitions of breastfeeding has been highlighted in a literature review,[136] and attempts have been made to provide recommendations relating to a set of agreed definitions by the Interagency Group for Action on Breastfeeding.[137] The Department of Health may be the institution that is best placed to promote standardised use of agreed definitions of the initiation and duration of breastfeeding based on a series of agreed time points.

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Appendix 1

MEDLINE search strategy

The following strategy was used to search the MEDLINE database. It was adapted as appropriate to search the other databases used in this review.

001 breast feeding/
002 lactation/
003 milk, human/
004 (breastfeed$ or breastfed).tw.
005 (breast-feed$ or breast-fed).tw.
006 (breastmilk or babymilk).tw.
007 (breast-milk or baby-milk).tw.
008 (breast adj4 (fed or milk or feed$)).tw.
009 (baby adj2 milk).tw.
010 (lactation or lactating).tw.
011 (nursing adj2 (mother or mothers)).tw.
012 (nursing adj2 (baby or babies)).tw.
013 infant food/
014 infant feeding.tw.
015 infant formula.tw.
016 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11 or 12 or 13 or 14 or 15
017 limit 16 to human
018 health promotion/
019 exp health education/
020 public health/
021 parental leave/
022 legislation/
023 attitude of health personnel/
024 self-help groups/
025 world health organization/
026 united nations/
027 persuasive communication/
028 (health adj4 promot$).tw.
029 (health adj4 educat$).tw.
030 (campaign$ or policy or policies).tw.
031 (promoting or promotion or promote$).tw.
032 (program$ or programme$).tw.
033 (intervention$ or scheme$).tw.
034 process evaluation$.tw.
035 "process assessment (health care)"/
036 "outcome and process assessment (health care)"/
037 (public adj2 health).tw.
038 (public adj2 education).tw.
039 maternity leave.tw.
040 (encourag$ or motivat$ or support).tw.
041 (legislation or legal).tw.
042 baby friendly.tw.
043 la leche league.tw.
044 unicef.tw.
045 donor milk.tw.
046 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45
047 17 and 46
048 world health organization/
049 world health organisation.tw.
050 world health organization.tw.
051 48 or 49 or 50
052 breast milk substitute$.tw.
053 breast-milk substitute$.tw.
054 breastmilk substitute$.tw.
055 52 or 53 or 54
056 51 and 55
057 47 or 56

Appendix 2

Prescreen form

Reviewer:

Paper (author and year):

1. Is the paper concerned with activity intended to increase initiation rates? YES/NO
2. Does the paper discuss a specific intervention? YES/NO
3. Do(es) the intervention(s) take place before the first breastfeed? YES/NO
4. Is the paper an evaluation of an intervention? YES/NO

If 1–4 = 'yes', possible DATA EXTRACT
If 'no' to 1, 2, 3 or 4, go to 13

5. Are initiation rates reported? YES/NO

If 'yes', Primary Outcomes

6. Are rates of women breastfeeding exclusively and/or increased duration of breastfeeding reported? YES/NO

If 'yes', (Primary and) Secondary Outcome(s)

7. Are other beneficial or adverse effects reported? YES/NO

If 'yes', (Primary and/or) Secondary Outcome(s) (other effects)

8. Are intermediate/process outcomes reported? YES/NO

If 'yes', Intermediate Outcomes

If 'yes' to 5, 6, 7 or 8, DATA EXTRACT
If 'no', go to 13

9. Please indicate the study design used to evaluate the intervention:

Randomised controlled trial	*DATA EXTRACT*
Controlled trial	*DATA EXTRACT*
Non-experimental before/after, e.g. audit	*DATA EXTRACT*
Other, e.g. Developmental action research	*CONSIDER FOR DATA EXTRACTION*

10. What is the type of intervention?

Health education	Media campaign	Public facilities	Self-help groups/ Peer support	Legislation/ Taxation	Health sector initiatives, e.g. BFHI

11. In which country has the intervention been conducted?
12. Is the paper in English? YES/NO If 'no', please state which language.

If 'yes', DATA EXTRACT
If 'no', CONSIDER FOR DATA EXTRACTION

13. Does the paper examine factors influencing choices/obstacles to breastfeeding? YES/NO

If 'yes', CONSIDER FOR INFORMATION ON FACTORS

14. Does the paper contain other useful background information? (e.g. description of intervention) YES/NO Please detail

If 'yes', CONSIDER FOR BACKGROUND
If 'no' to 13 and 14, REJECT

15. Additional references checked and logged? YES/NO

16. Details of additional reference(s):

Appendix 3

Data extraction tables of included studies

TABLE 4 *Health education: RCT*[69]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Hill, 1987[69] USA Research aim To determine the effects of a bf education programme among low-income pregnant women in Chicago Study design RCT Method of group allocation Groups separated regarding parity: either primipara or multipara; random allocation to treatment or control group Unit of allocation Individual Unit of analysis Individual Sample size calculation Not stated Outcome measures Mean bf knowledge scores; number of women not bf at all; number of women bf for less than 6 weeks; number of women bf for 6 weeks or longer; number of women reporting successful bf	Selection Women attending an antenatal clinic serving low-income women in Chicago (all medical expenses incurred by the clinic). The women were remunerated US$5.00 for their participation. A total of 64 women completed initial questionnaires and were contacted 6 weeks after delivery Inclusion criteria Intend to keep baby; deliver at the given university hospital; deliver healthy infant; have a telephone or agree to return the Telephone Interview Survey by post Exclusion criteria Not stated	64 women Married: 69% White: 95% Mean education level: 11.8 years College education: 0 < US$12,999 annual income: 84% Primiparae: 42% Multiparae: 58% Breastfed: 53% Bottle-fed: 47% Group comparability Not significantly different with respect to age, marital status, years of schooling and income	I: *n* = 31 'Bf Knowledge Questionnaire' (A or B) distributed and completed as pretest (coin flip to decide) Women: attended a 40-min lecture and discussion using slide projector; attended a 5–10-min question-and-answer period after the slide presentation; received a pamphlet with information that reinforced the lecture and its contents Post-test administration: if A was pretest then B given; if B was pretest then A given. Immediate feedback of correct responses given C: *n* = 33 'Bf Knowledge Questionnaire' (A or B) distributed and completed as pretest (coin flip to decide) No lecture, discussion, pamphlet or post-test Routine bf classes offered to all women at attending antenatal clinic Postnatal support offered to all mothers wishing to breastfeed	Mean bf knowledge score among I Pretest: 22.35 ± 4.93 Post-test: 28.19 ± 2.70 1-tailed *t* test; $p < 0.001$ Number of women not bf at all I: 12/31 (39%) C: 18/33 (55%) Number of women bf for less than 6 weeks I: 7/31 (22%) C: 5/33 (15%) Number of women bf for 6 weeks or longer I: 12/31 (39%) C: 10/33 (30%) Chi-squared test: not significant Number of women and their perception of bf success (*n* = 34) *Successful* I: 17/19 (89.5%) C: 9/15 (60%) *Unsuccessful* I: 2/19 (10.5%) C: 6/15 (40%) Chi-squared test: not significant	Not stated	Not bf at all *n* = 30 4 wished they had tried bf; 26 did not wish to breastfeed (reasons cited: embarrassment/ discomfort = 53.8%) Stopping bf insufficient milk = 58.3%; return to work; frustration with baby pulling at the nipple; embarrassment when feeding at boyfriend's house; separation from baby Statistically significant relationship between years of schooling and the decision to breastfeed

bf, breastfeeding; I, intervention group; C, control group

TABLE 5 *Health education: RCT*[70]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Kaplowitz & Olson, 1983[70] USA Research aim To determine the effects of a bf education programme on knowledge, attitudes and infant feeding practices in low-income women Study design RCT Method of group allocation Women were stratified into 3 categories according to their intended infant feeding method (breastfeed, bottle-feed or undecided), then allocated to I and C randomly Unit of allocation Individuals Unit of analysis Individuals Sample size calculation Not stated Outcome measures Bf rates on discharge from hospital, and at 2 months postpartum; women's knowledge about nursing and their attitudes towards bf were measured; the distinction between mother-centred attitude and baby-centred attitude was examined	Selection Pregnant women in the WIC program in New York Inclusion criteria Maternal age = 18 years; of 4–6 months gestation; primigravida or a woman who had bottle-fed previous children or who had had an unsuccessful bf experience (an unsuccessful bf experience was defined as either one that was unpleasant for the mother or one that was terminated before the mother wished to stop nursing) Exclusion criteria Not stated	Mean (range) age 22 (18–22) years Gravidity/parity Primigravidae: 20 Para 1: 15 Para > 2: 9 Ethnicity White: 41 Black: 3 Education Beyond high school: 3 High school graduates: 20 High school non-graduates: 21 Employment 3 women were employed outside the home Group comparability Groups were reported to be comparable for socio-demographic characteristics, although data per group are not presented. I and C were comparable for pretest attitude scores; data presented per group in paper	I: n = 21 Received a series of 5 pamphlets providing information on the benefits of bf, basic physiology of lactation and nursing techniques. Information was also given on the positive aspects of bottle-feeding for mother and baby. A two-sided approach, described by Bettinghaus*, was used. Pamphlets were designed to have high readability to maximise comprehension and retention of the information. They were posted to participants' homes one at a time over 5 consecutive weeks C: n = 23 Details of control regime are not given, except to say that these women did not receive the above information Data collection Obtained by individual interviews and administration of questionnaires on enrolment: at 4–6 months gestation and at 2 months postpartum. The reliability of the knowledge questionnaire was tested by a series of Cronbach alpha reliability analyses	Statistical techniques • 2-way ANOVA to assess impact of treatment/intended feeding method on knowledge/attitudes, and to assess interaction of treatment and intended feeding method • 1-way ANOVA to compare same categories of planned feeding methods between groups • Chi-squared test for intervention effect on infant feeding method and duration Bf at discharge Overall 18/40 (45%), with no significant differences between I and C Bf at 2 months postpartum 10/18 (56%): I = 5; C = 5 Post-test knowledge scores (mean ± SD of score) I (n = 21): 6.3 ± 1.7 C (n = 18): 4.3 ± 2.3 p < 0.001 (in favour of I) Comparison between different categories of planned method of feeding showing mean ± SD of score Breastfeed (n = 14): 6.5 ± 2.1 Bottle-feed (n = 15): 4.4 ± 2.0 Undecided (n = 11): 4.6 ± 2.3 p < 0.01 (breastfeed vs bottle-feed)	4 withdrawals overall Reasons 2 moved away 1 premature delivery 1 researcher unable to contact prenatally Per treatment group I: 3 C: 1 Intention-to-treat analysis not performed	The planned method of infant feeding influenced pretest attitude scores. Both those planning to breastfeed and those who were undecided scored significantly higher than women planning to bottle-feed. For baby-centred attitude scores, women planning to breastfeed scored higher than those planning to bottle-feed, and the mean score of the undecided group did not differ significantly from the other 2 groups. Larger attitude scores represented a more positive attitude towards bf

I, intervention group; C, control group; ANOVA, analysis of variance

* *Bettinghaus EP. Persuasive communication. New York: Holt, Rinehart & Winston; 1973. p. 155–6*

continued

TABLE 5 contd *Health education: RCT*[70]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
continued Kaplowitz & Olson, 1983[70] USA				Influence of the planned infant feeding method on knowledge, showing mean score Breastfeed: I = 6.7; C = 6.2; n.s. Bottle-feed: I = 5.6; C = 3.3; $p < 0.05$ Undecided: I = 6.6; C = 2.8; $p < 0.001$ Figures estimated from a bar chart Post-test attitude scores No significant differences between I and C, or between 3 categories of planned infant feeding. Planned feeding method significantly influenced only mother-centred attitude scores. Planned infant feeding at 4–6 months gestation related significantly to actual infant feeding ($p < 0.001$)		

I, intervention group; C, control group; n.s., not significant

TABLE 6 *Health education: RCT*[65]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
Kistin *et al.*, 1990[65] USA Research aim To determine whether prenatal bf education would increase the rate of bf among black women, and whether different education settings (group classes or individual teaching sessions) have different effects on women's choices of infant feeding Study design RCT, but only 2/3 groups randomly allocated Method of group allocation Women in the Monday clinic were randomly assigned to 1 of 2 intervention groups using random number tables, and women in the Friday clinic were assigned to the control group Unit of allocation Individuals Unit of analysis Individuals Sample size calculation None reported Outcome measures Bf rates in hospital, then at 2 weeks, 6 weeks and 12 weeks postpartum. Bf rates per treatment group were also analysed by intention to breastfeed or bottle-feed. Bf is defined as at least 1 breastfeed per day	Selection Black women, of low income, born in the USA, attending the Monday and Friday Cook County Hospital Midwife Prenatal Clinics before 24 weeks gestation Inclusion criteria Women who registered at clinic for an 8-week period Exclusion criteria Not stated	Data given only for women completing the trial Mean age (years) I1: 22 I2: 22 C: 21 Education (≤ 12 years) I1: 74% I2: 69% C: 65% Primigravidae I1: 76% I2: 69% C: 64% Multigravidae who previously breastfed I1: 8% I2: 22% C: 21% Planning to work after birth I1: 82% I2: 81% C: 86% Father or grandmother supports bf I1: 62% I2: 35% C: 42% Planned bf I1: 37% I2: 33% C: 30% Group comparability Groups were reported to be comparable for all above variables except for 'father/grandmother supports bf', $p = 0.053$	Overall initially $n = 159$, but data given in paper relate to those completing the study ($n = 130$) I1: $n = 38$ (completers) Received bf classes consisting of 50–80-min group sessions, led by 1 or more of the authors. Topics covered included reasons for choice of breast or bottle-feeding, myths about bf, basic principles of lactation, benefits of bf, common problems with bf and how to overcome them, how to work/study and still breastfeed. Discussion among participants was encouraged, and former class members demonstrated bf. Women attended at least 1 class, and more if they wished I2: $n = 36$ (completers) Received one-to-one sessions with 1 of the authors for 15–30 min before 30 weeks gestation. Topics discussed were similar to those initiated by leaders of the bf classes C: $n = 56$ (completers) Standard clinic care, with no extra educational intervention Women from all 3 groups were assisted at the time of the postpartum interview if they had questions or problems initiating lactation Data collection Women were interviewed within 4 days after delivery, before discharge. Thereafter, women planning to breastfeed were followed-up by telephone or pre-addressed cards until bf stopped	Statistical techniques Chi-squared test; multivariate analysis Bf rates in hospital I1: 17/38 (45%)† I2: 18/36 (50%)† C: 13/56 (22%) Bf rates at ≤ 2 weeks I1: 12/38 (32%) I2: 13/36 (36%)† C: 10/56 (18%) Bf rates at ≤ 6 weeks I1: 8/38 (21%) I2: 8/36 (22%) C: 8/56 (14%) No significant differences Bf rates at ≤ 12 weeks I1: 6/38 (15%)† I2: 2/36 (6%) C: 2/56 (4%) Women who planned to breastfeed and actually breastfed I1: 12/14 (86%)† I2: 8/12 (67%) C: 10/17 (56%) Women who planned to bottle-feed and actually breastfed I1: 5/24 (21%) I2: 9/24 (38%)‡ C: 3/39 (8%)	Overall 29 withdrawals: 7 withdrew for medical reasons (miscarriage or problems requiring transfer to high-risk obstetric unit); 22 withdrew for non-medical reasons (I1 = 4; I2 = 6; C = 12) Those withdrawing from the study for non-medical reasons were comparable to women completing the study for all baseline characteristics except age (withdrawals mean age = 25 years; completers = 22 years, $p < 0.05$). Among withdrawals, 55% reported plans to breastfeed, compared with 33% of women completing the study; non-significant difference. Withdrawals from C were slightly older but reported less bf support and fewer bf plans than withdrawals from I1 or I2	Multivariate analysis controlling for age, prenatal plans to breastfeed, prior bf, perceived support, education, gravidity and employment plans I1 + I2 vs C OR = 4.26; 95% CI, 2.59 to 7.03; $p = 0.004$ I1 vs C OR = 5.16; 95% CI, 2.86 to 9.30; $p = 0.006$ I2 vs C OR = 2.73; 95% CI, 1.37 to 5.45; $p = 0.147$ Women who chose bf were similar to women who chose bottle-feeding in terms of level of education, gravidity and employment plans, but differed significantly in age (mean 23 vs 21 years respectively, $p < 0.05$), prenatal plans to breastfeed (60% vs 16%, $p < 0.001$), prior bf experience (40% vs 18%), and perceived support from baby's father or grandmother (64% vs 35%, $p < 0.05$) Comparisons were between each intervention group and the control

I1, first intervention group; I2, second intervention group; C, control group; OR, odds ratio; CI, confidence interval

* *Figures shown are as reported in the original paper;* † $p < 0.05$; ‡ $p < 0.001$

TABLE 7 *Health education: RCT*[71]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments*
Loh *et al.*, 1997[71] Ireland Research aim To determine if a short intervention in late pregnancy can affect mothers' choice of infant feeding method Study design RCT Method of group allocation Women presenting at the clinic during weeks 1, 3, 5 and 7 of the recruitment phase of the study were assigned to I, and those presenting during weeks 2, 4, 6 and 8 were allocated to C. Study presumed to be non-blinded because first author delivered the intervention Unit of allocation Women Unit of analysis Women Sample size calculation Not stated Outcome measures Bf rates at discharge and at 4 weeks postpartum; bf rates in medical card holders were compared with rates in non-medical card holders; analysed by treatment group	Selection Pregnant women were recruited from the antenatal outpatient department at University College Hospital, Galway, over an 8-week period during 1994 Inclusion criteria Women of > 36 weeks gestation Exclusion criteria Not stated	Medical card holders I: 48/98 (49%) C: 54/95 (57%) Married I: 74/98 (76%) C: 74/95 (78%) Baby admitted to special care unit I: 6/98 (6%) C: 5/95 (5%) Primiparae I: 34/98 (35%) C: 35/95 (37%) Group comparability I and C were comparable for all the above variables	I: *n* = 98 Received a simple factsheet covering 8 positive aspects of bf, followed by a questionnaire designed to reinforce this information. This intervention took about 3 min and was conducted in individual clinic rooms by a medical student, also 1 of the authors C: *n* = 95 Received routine antenatal care and were not made aware of the study until delivery Data collection All women were interviewed within 48 h of delivery and asked about feeding methods; this information was confirmed with nursing notes. During this interview mothers were asked about sources of information on bf, and reasons for not choosing to breastfeed for those not choosing to do so. For mothers bf at discharge, a 4-week postdischarge survey was conducted by telephone or mail	Statistical techniques Chi-squared test Bf on discharge from hospital I: 43/98 (44%) C: 30/95 (32%) *p* = 0.07 Bf at 4 weeks I: 29/38 (76%) C: 17/27 (63%) Medical card breastfeeders I: 21/48 (44%) C: 16/54 (30%) Non-medical card breastfeeders I: 22/50 (44%) C: 14/41 (34%)	Not contactable at 4 weeks I: 5/43 (12%) C: 3/30 (10%)	The following are data collected at delivery interview Sources of bf information *Doctors* I: 14/98 (14%) C: 12/95 (13%) *Nurses/midwives* I: 29/98 (30%) C: 33/95 (35%) *No-one gave information* I: 55/98 (56%) C: 50/95 (53%) Main reasons that discourage bf *Belief that there is no difference between breast- and bottle-feeding* I: 9/55 (16%) C: 18/65 (28%) *Social embarrassment* I: 9/55 (16%) C: 12/65 (19%) *Convenience* I: 23/55 (42%) C: 25/65 (36%) *Other reasons* I: 14/55 (26%) C: 10/65 (15%)

I, intervention group; C, control group

* *Figures shown are as reported in the original paper*

TABLE 8 *Health education: RCT*[72]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
McEnery & Rao, 1986[72] UK Research aim To assess the effects of a special antenatal education programme on infant health Study design RCT Method of group allocation Method of randomisation not stated Unit of allocation Individuals (mothers) Unit of analysis Individuals (mothers) Sample size calculation Not stated Outcome measures Perinatal data (included any and exclusive bf during the perinatal period)	Selection Asian women of any parity living in East London, UK, seeking antenatal care Inclusion criteria Born in the Indian subcontinent or Asians from East Africa; pregnant for less than 16 weeks on entry to the trial; patients of a specified 2-doctor general practice in outer London; intended to be delivered at Whipps Cross Hospital Exclusion criteria Not stated	Data provided for overall sample only, but not per group Mean (range) age: 25.6 (18–40) years 60% of patients came from the Mirpur and Lahore area of Northern Pakistan 22% of patients were primiparae All participants spoke Urdu, 46% spoke little or no English 51% had husbands belonging to social classes IV and V, or were unemployed 30% of the women had spent less than 2 years in England No details given about group comparability at baseline	I: *n* = 35 Received course of 12 weekly lectures, each lasting 1 1/2 h, covering fertility, pregnancy, childbirth and child rearing. Sessions were led by a health visitor, midwife or nutritionist, and were relayed in Urdu by an interpreter and held in a health clinic near the doctor's surgery. The lectures were accompanied by literature, and discussion was encouraged C: *n* = 34 Routine antenatal care, including mothercraft classes in English Data collection Perinatal details recorded	The patients were regrouped for analysis: 16 women from I who had attended more than 3 lectures were designated as E. All other women in the trial, whether allocated to I or C, were designated as NE (*n* = 53) Any bf during perinatal period E: 7/16 (48%) NE: 16/51 (31%) Exclusive bf during perinatal period E: 4/16 (25%) NE: 16/51 (31%)	13 participants withdrew from the study due to miscarriage, moving away from the area, change of maternity hospital, or lost to later follow-up. Data not presented per group 19 patients from I attended 3 or less of the lectures, therefore participants were regrouped (see results)	The fact that the authors regrouped the participants according to how many lectures had been attended by women in I means that the benefits of randomisation have been lost, in terms of minimisation of bias. This, in effect, non-random selection of participants, means that results should be treated with caution

I, intervention group; C, control group; E, 'educated'; NE, 'non-educated'

TABLE 9 *Health education: RCT*[73]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Ross *et al.*, 1983[73] South Africa Research aim To evaluate the efficacy of an antenatal health education programme in improving bf practice Study design RCT Method of group allocation Not stated Unit of allocation Women Unit of analysis Women Sample size calculation None reported Outcome measures Changes in knowledge The researcher conducting the interviews after delivery was blind to treatment allocation	Selection Women were selected from a clinic in a black urban area where all patients were Zulu-speaking Inclusion criteria Not stated Exclusion criteria Not stated	No data for I1 and C1 Groups I2 and C2 Reported to be comparable for age, marital status, parity, level of education and previous success with bf	I: n = 59 Received a health education programme led by an experienced midwife, fluent in the vernacular, employed solely to conduct this programme. The programme consisted of 2 half-hour sessions: the first devoted to the advantages of bf and the second to technique. Photographs were used to illustrate orally presented material. Simple motivational literature in the vernacular was provided. Patients were seen in groups of 3–6 primigravidae together with multigravidae, and free discussion was encouraged I2: n = 74 Received same health education intervention as I1 C1: n = 66 Received usual care C2: n = 48 Received usual care Data collection A research worker (not the course leader) interviewed mothers from I1 and C1 after delivery and obtained data on age, parity, level of education and knowledge of bf and breastmilk substitutes. Mothers from I2 and C2 were interviewed at home within 24 weeks of delivery	Statistical techniques Not stated Changes in knowledge: I1 and C1 Analysis of data from a 13-item questionnaire showed statistically significant differences between I1 and C1 for 7 items, with I1 showing higher rates of positive responses compared with C1 (range of p-values 0.001–0.05). Age, parity and level of education did not affect changes in knowledge Mean ± SD period between delivery and home interview: I2 and C2 I2: 9.50 ± 5.50 weeks C2: 10.48 ± 6.15 weeks Changes in knowledge: I2 and C2 I2 had statistically significant higher rates of positive responses for 2 questionnaire items compared with C2 ($p < 0.001$, $p < 0.05$) Those providing formula feeds at time of home interviews I2: 66% C2: 56% Mean ± SD infant age for introduction of formula I2: 4.71 ± 3.40 weeks C2: 5.22 ± 4.90 weeks Mean ± SD infant age for introduction of non-milk supplements I2: 8.32 ± 4.71 weeks C2: 10.29 ± 4.44 weeks	Not stated	This is a rather confusing paper, with 4 groups who appear, in some respects, to be concurrent; however, the numbers discussed do not match up

I1, first intervention group; C1, first control group; I2, second intervention group; C2, second control group

TABLE 10 *Health education: RCT*[74]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Rossiter, 1994[74] Australia Research aim To develop a language- and culture-specific education programme to promote bf among immigrant Vietnamese women, and to assess the effectiveness of this programme Study design RCT Method of group allocation Not stated Unit of allocation Women Unit of analysis Women Sample size calculation None reported Outcome measures Changes in knowledge of bf; changes in attitudes towards bf; planned infant feeding method; initiation rates of bf; rates at 4 weeks and 6 months postpartum. Bf is defined as the provision of mother's breastmilk as the main source of infant nutrition	Selection Prenatal clinics of 3 hospitals in west and south-west Sydney, New South Wales, where a large number of Vietnamese immigrants have settled Inclusion criteria Ethnic Vietnamese women or other women who were born and reared in Vietnam; Vietnamese-speaking; at least 12 weeks gestation Exclusion criteria Not stated	For most variables baseline data are given as a value for the overall sample and not per treatment group 62% were aged between 26 and 35 years; mean age = 28.5 years 93% born in Vietnam 93% married 84% had lived in Australia for more than 2 years; mean stay = 3.6 years 59% attended secondary education 70% were unemployed in both Vietnam and Australia 53% had employed spouse 57% had spouse with income < A$20,000 per annum 57% had spouse who had achieved only secondary education 42% had household assistance from close relatives Mean number of children = 2.04 Women who had given birth in Vietnam: I = 23%; C = 13% 93% had breastfed infant born in Vietnam Group comparability Groups were reported to be comparable for all baseline variables except for number of women who had given birth in Vietnam	I: n = 108 Received bf education programme consisting of a 25-min video followed by a series of 3 2-h small group discussion sessions. The education programme was based on Leininger's theory of transcultural nursing,[131,132] and was designed with specific social, cultural and language considerations. The programme was conducted in Vietnamese by the parenthood educators of the hospitals, with the assistance of a Vietnamese health interpreter. Appointments for education sessions were made to coincide with prenatal clinic visits C: n = 86 Received bf and childbirth pamphlets produced by the Department of Health, New South Wales Data collection The author developed a bf questionnaire consisting of 63 items for the pretest and 38 items for the post-test covering the following dimensions: knowledge of bf, attitudes towards bf, planned feeding behaviour, actual feeding behaviour. Data were collected within 1 week of delivery and at 4 weeks and 6 months postpartum. Pre- and post-test questionnaires were translated into Vietnamese and were subjected to content validity verification and reliability testing	Statistical techniques MANOVA used to assess differences in knowledge, attitudes and planned behaviour between groups. Chi-squared test used to determine differences in feeding methods Change in knowledge about bf There was a statistically significant between-group difference in knowledge ($p < 0.0001$), between the pre- and post-test ($p < 0.0001$), and a group by time interaction effect ($p < 0.0001$). Both groups showed increased knowledge of bf, but greater improvement in C Change in attitudes towards bf There was a statistically significance between-group difference in attitudes ($p < 0.0001$), between the pre- and post-test ($p < 0.0001$), and a group by time interaction effect ($p < 0.05$). Both groups showed increased positive attitudes towards bf, but the improvement was greater in I vs C Planned feeding behaviour There was a statistically significant between-group difference in attitudes towards bf between I and C ($p < 0.001$), between the pre- and post-test ($p < 0.001$), and a group by time interaction effect ($p < 0.05$). Both groups showed increased intention to breastfeed after the intervention, but the increase was greater in I vs C Initiation of bf at birth I: 73/104 (70%); C: 28/73 (38%) $p < 0.001$ Bf at 4 weeks postpartum I: 52/104 (50%); C: 19/73 (26%) $p < 0.001$ Bf at 6 months postpartum I: 26/104 (25%); C: 12/73 (16%) n.s.	12 participants withdrew due to unforeseen circumstances (miscarriage, stillbirth, change of address) 182 participants completed the post-test questionnaire 4 more withdrawals at birth interview and at 4 weeks Another 3 withdrawals by 6 months	

I, intervention group; C, control group; MANOVA, multivariate analysis of variance

TABLE 11 *Health education: RCT*[75]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Serwint *et al.*, 1996[75] USA Research aim To assess the impact of prenatal paediatrician visits on bf decisions of low-income mothers Study design RCT Method of group allocation Random number table with blocks of 10 to assign participants Unit of allocation Women Unit of analysis Women Sample size calculation Calculated, but lower number recruited Outcome measures Prenatal intent to breastfeed; feeding decision changes during pregnancy subsequent to enrolment; initiation of bf; bf at 30 and 60 days postpartum; perception of relationship between mother and paediatrician by both parties	Selection Women were recruited from the prenatal obstetrics clinic Inclusion criteria Nulliparous women, > 18 years, between 8 and 28 weeks gestation, who had not yet selected a paediatrician or wanted their infant to receive paediatric care at the hospital-based paediatric clinic Exclusion criteria Prenatal drug use; recognised psychiatric illness; HIV infection Paediatricians 40 postgraduate year 2 paediatric residents participated in the study. The mean number of patients assigned to each resident was 3.9. Patients per resident were equally distributed between I and C; however, allocation was not random, but was done according to mother's due date	Age (mean ± SD) I: 20.2 ± 2.1 years C: 20.7 ± 2.5 years Maternal education (mean ± SD) I: 12.1 ± 1.0 years C: 11.8 ± 1.9 years Week at which prenatal care initiated (mean ± SD) I: 10.8 ± 4.4 C: 10.5 ± 4.7 Infant gestational age at birth (mean ± SD) I: 38.6 ± 1.8 weeks C: 37.5 ± 5.2 weeks Maternal ethnicity (African-American) I: 91% C: 91% Vaginal delivery I: 78% C: 68% Medical assistance I: 98% C: 95% Group comparability I and C were reported to be comparable for all the above variables	I: *n* = 81 Received a scheduled prenatal visit between 32 and 36 weeks gestation at a hospital-based clinic with the infant's future paediatrician. The clinic was in an urban academic medical centre where mothers received their obstetric care. Prior to the visits, paediatricians received training in counselling parents of newborn infants and bf techniques/promotion. During visits, paediatricians recorded data on timing of pregnancy, preparation for the baby, involvement of father, social support and maternal medical history. Parents-to-be were counselled on feeding options, advantages of bf, infant car safety, circumcision and access to paediatric healthcare and appropriate utilisation C: *n* = 75 Similar management, except no prenatal paediatrician visits Data collection Data on perceptions of relationship between mothers and paediatricians collected by questionnaire Outcomes were measured by maternal interview prenatally and at 2 months postpartum, and nursery records were reviewed	Statistical techniques Chi-squared test; Fisher's exact test; Student's *t* test Attendance I: 46/81 (57%) attended the prenatal paediatric visit. Of those not attending, 13/35 (37%) were known to be unable to keep the appointment due to transfer of care, premature delivery, or miscarriage. Of the remaining mothers, 46/68 (68%) attended the prenatal visit Bf intent before prenatal visit I: 27/74 (36%); C: 32/70 (46%); n.s. Bf initiation at birth I: 31/74 (42%); C: 22/70 (31%); n.s. Bf at 30 days postpartum I: 14/74 (19%); C: 10/70 (14%); n.s. Bf at 60 days postpartum I: 8/74 (11%); C: 6/70 (9%); n.s. Mothers who changed their mind in favour of bf after enrolment I: 14/31 (45%); C: 3/22 (14%) *p* = 0.03 Emergency room use until 7 months postpartum in bf versus non-bf dyads Bf: 0.86 visits Non-bf: 0.89 visits Parent–physician relationship Paediatricians were more likely to think they knew mothers well in I (54%) compared with mothers in C (29%); *p* = 0.02. However, 67% of mothers in both groups agreed that their paediatrician knew them moderately or very well	Withdrawals between enrolment and delivery *Miscarriage* I: 1 C: 1 *Transferred obstetric care out of state* I: 6 C: 4 Withdrawals between delivery and 2 weeks postpartum *Transferred obstetric care out of state* I: 6 C: 9 *Remained hospitalised* I: 0 C: 1 Withdrawals between 2 weeks and 2 months postpartum *Transferred obstetric care out of state* I: 12 C: 5 *Not interviewed* I: 2 C: 4	Data were analysed using an intention-to-treat model

I, intervention group; C, control group

TABLE 12 *Health education: RCT*[76]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Wiles, 1984[76] USA Research aim To determine the effect of prenatal bf education on maternal reports of success in bf and maternal perception of the infant Study design RCT Method of group allocation Women allocated according to the childbirth class in which they were enrolled Unit of allocation Women Unit of analysis Women Sample size calculation None reported Outcome measures Maternal report of success in bf; maternal perception of the infant	Selection Convenience sample selected from a list of all possible participants enrolled in childbirth education classes at a 1000-bed hospital Inclusion criteria Primigravidae; planning to breastfeed; of at least 32 weeks gestation; registered to attend childbirth education classes. In order for the data obtained from a participant to be used in this study, the mother had to deliver vaginally, deliver a full-term healthy infant, defined as a neonate of 36–43 weeks gestation with a 5-min Apgar Score of 7 or more, and exhibiting no evidence of congenital illness or malformation, and not having diabetes, hypertension, toxaemia, heart disease or infection Exclusion criteria Not stated	Mean (range) age I: 26.7 (20–35) years C: 25.1 (18–37) years Married/single (never married) I: 90% /10% C: 90% /10% Education The majority of participants in both I and C had college education Group comparability I and C reported to be comparable for the above variables	I: n = 20 Received group health education programme, developed by the author, which covered the anatomy and physiology of the lactating breast, advantages of bf for mother and infant, prenatal breast care, the mechanics of bf, self-care for the bf mother, possible setbacks in early bf and their treatment, and resources for the bf mother C: n = 20 No education programme Data collection Data were collected by interview, the schedule for which was developed by the author. Data were collected at 1–2 days postpartum (the delivery, any complications, length of time that mother planned to breastfeed, mother's source of instruction) and at 1 month postpartum (mother's degree of success with bf, factors contributing to success). A panel of postpartum nurses checked the instrument for content validity. The Neonatal Perception Inventory (construct validity and predictive validity established) was administered at 1–2 days postpartum	Statistical techniques Chi-squared test for analysis of bf success; Mann–Whitney U test used for analysis of maternal perception of infant Bf intention The majority of participants in both I and C planned to breastfeed for 4–6 months Mothers' report of primary source of bf information I: all reported that this was the prenatal bf education class C: 11 = hospital nurse; 5 = educated selves; 4 = no bf information Exclusive bf rates at 1 month postpartum I: 18/20 (90%); C: 6/20 (30%) Discontinued bf by 1 month I: 1/20; C: 12/20 For C, 10/12 participants had discontinued bf at 1 week postpartum, and range of time for bf was 3 days to 2 weeks Bf success I reported a significantly higher frequency of success compared with C; p = 0.01 Neonatal Perception Inventory scores at 1–2 days postpartum There were fewer positive and more neutral scores of participants in I compared with C; p = 0.05 Neonatal Perception Inventory scores at 1 month postpartum Scores in I became significantly more positive and scores in C became significantly more negative; p = 0.0001 Effect of intervention on maternal infant perception Women in I reported significantly more positive Neonatal Perception Inventory scores compared with C; p = 0.001	Not stated	Data on factors/determinants Maternal report of primary factors contributing to bf success *Prenatal bf education class* I: 16/19 C: 0/6 *Support from significant other* I: 3/19 C: 1/6 *Baby is a good nurser* I: 0/19 C: 5/6 Maternal report of primary factor preventing bf success *Lack of support from significant other* I: 1/1 C: 2/14 *Uncooperative baby* I: 0/1 C: 9/14 *Lack of information* I: 0/1 C: 3/14

I, intervention group; C, control group

TABLE 13 *Health education: non-RCT*[77]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Agboatwalla & Akram, 1997[77] Pakistan Research aim To evaluate the effects of health education on mothers' knowledge of infant/child health Study design Non-randomised, comparative study with concurrent study groups; prospective design, with pre- and post-intervention scores Method of group allocation Not stated Unit of allocation Communities Unit of analysis Individuals (mothers) Sample size calculation A sample size of 150 was chosen in each group based on 95% confidence level with a power of 80 Outcome measures Mothers' knowledge of: nutrition (with special reference to bf); use of oral rehydration supplements; vaccination	Selection Women were recruited from a slum area of Karachi (population 10,000, comprising mainly labourers and transporters). Women were sampled randomly from 150 households in the intervention group and 150 in the non-intervention group. The 2 groups were located in geographically distant areas Inclusion/exclusion criteria Not stated	Maternal age in years (% mean ± SEM) *20–30 years* I: 15.0 ± 2.1; C: 18.0 ± 3.2 *30–40 years* I: 59.0 ± 3.1; C: 54.0 ± 3.1 *> 40 years* I: 26.0 ± 2.1; C: 28.0 ± 1.6 Maternal literacy (% mean ± SEM) *Illiterate* I: 47.3 ± 2.1; C: 49.1 ± 6.4 *Literate* I: 30.3 ± 3.1; C: 34.6 ± 2.1 *Primary schooling* I: 22.4 ± 2.1; C: 16.3 ± 3.1 Size of family (% mean ± SEM) *< 5* I: 21.6 ± 3.1; C: 25.8 ± 3.8 *5–10* I: 45.8 ± 2.3; C: 51.2 ± 2.8 *> 10* I: 32.6 ± 1.9; C: 23.0 ± 2.1 Income (% mean ± SEM) I: Rs 3000 ± 3.5 (US$100) C: Rs 2890 ± 6.5 (US$98) Period of stay in Karachi (% mean ± SEM) *< 5 years* I: 23.0 ± 2.1; C: 24.6 ± 2.1 *> 5 years* I: 77.0 ± 3.2; C: 75.4 ± 3.1 Means of communication *Radio* I: 29.7 ± 3.1; C: 32.8 ± 6.9 *TV* I: 35.2 ± 6.1; C: 36.8 ± 3.2 *Newspaper* I: 60.2 ± 3.1; C: 58.2 ± 2.1 Pre-intervention knowledge score (mean) I: 10.2; C: 11.5 Group comparability Groups reported to be comparable for the above variables	I: *n* = 150 households Health education by trained CHWs (girls from the area who had studied up to middle or higher secondary school). The CHWs (trained by a team of doctors in nutrition, oral rehydration, salts, sanitation and hygiene) gave weekly group lectures to mothers (lane meetings) for approx. 2 h, using flip charts, slides and videos. They also provided immunisation services, dispensed oral rehydration packets for diarrhoea and weighed children, giving nutrition advice (done in the CHW's home). No formal training was given to the mothers but sustained repetitive messages were passed on. Health education in this form continued for a minimum period of 6 months C: *n* = 150 households No intervention Data collection Pre-intervention survey done in 1992 for both groups (face-to-face questioning). A score was given according to the number of correct responses given (minimum 0, maximum 40). A post-intervention survey was carried out in 1993, with mothers who were earlier interviewed in the pre-intervention survey. One-to-one interviews were carried out in the mothers' homes. In addition to questions, observations for hygienic health practices were also made	Statistical techniques 2 x 2 cross-tabulations with chi-squared test Mothers' post-intervention scores showed a statistically significantly better knowledge of the advantages of bf in I compared with C ($p < 0.0001$) Overall post-intervention score knowledge scores (mean) – covers knowledge of topics other than bf I: 32.2 C: 16.1 Between-group statistical significance not reported	Not reported	

SEM, standard error of the mean; I, intervention group; C, control group; Rs, rupees; CHW, community health worker

TABLE 14 *Health education: non-RCT*[78]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Barwick *et al.*, 1997[78] UK Research aim To determine whether an Urdu-speaking home video on bf, watched by Urdu-speaking mothers, affects bf rates Study design Non-randomised, prospective, controlled trial Method of group allocation Not stated Unit of allocation Communities Unit of analysis Individual mothers Sample size calculation None reported Outcome measures Bf rates after delivery and at 6 weeks postpartum	Selection Pregnant women were selected from 2 GP practices in 2 Urdu-speaking communities in east Berkshire. The communities were a considerable distance away from one another in order to eliminate contamination Inclusion criteria Urdu-speaking pregnant women who had expressed a desire to breastfeed Exclusion criteria Not stated	Data for overall sample Age: average 24 years (range 15–40 years) Occupation: 98% housewives First language: 76% were fluent in Punjabi or Urdu Time of entry to study: 37% were in first trimester, 63% were between 5 and 7 months pregnant First baby/more than 1 baby I: 7/19 (37%) / 12/19 (63%) C: 6/19 (32%) / 13/19 (68%) Women with previous children who had/had not breastfed I: 10/12 (83%) / 2/12 (17%) C: 12/13 (92%) / 1/13 (8%) Women with previous child who breastfed less/more than 6 weeks I: 4/12 (34%) / 8/12 (66%) C: 4/13 (31%) / 9/13 (69%) Group comparability Groups appear to be comparable for variables where data are given per group; however, numbers recruited are small	I: *n* = 19 At first antenatal GP visit, mothers received a copy of Urdu-speaking home video on bf, on loan for 1 month. Mothers were asked to record the number of times that the video was viewed, and who was with them during each viewing. The video covered information on establishing bf and discussed common problems C: *n* = 19 Did not receive video Data collection A pretest questionnaire was administered to mothers at the first antenatal GP visit by the HV or GP with help available from an Urdu-speaking interpreter. This covered socio-economic data; previous and present knowledge of bf with past and present pregnancies; previous and past influences from significant others; existence of other bf mothers within the family; intentions for infant feeding. Post-test questionnaire was given 6 weeks postnatally, administered as above, or by HV in participant's home	Statistical techniques Mostly descriptive Bf rates after delivery I: 18/19 (95%) C: 19/19 (100%) Bf rates at 6 weeks postpartum I: 10/19 (53%) C: 6/19 (32%) Bf rates for more/less than 6 weeks I: 10/19 (53%) / 9/19 (47%) C: 6/19 (32%) / 13/19 (68%) Chi-squared test: n.s. For women with previous children, length of time of bf of new baby less/more than 6 weeks I: 6/12 (50%) / 6/12 (50%) C: 9/13 (69%) / 4/13 (31%) First-time mothers bf/not bf at 6 weeks postpartum I: 4/7 (57%) / 3/7 (43%) C: 2/6 (33%) / 4/6 (67%)	Appear to be no withdrawals	Other data Of 19 subjects who watched the video, 10 watched it with their husbands, 4 watched alone, and 5 with a family member or friend. Six of these participants had breastfed a previous child. Of those who watched it with their husbands, 8 were aged 21–30 years, and 6 were Punjabi-speaking. There was little difference in bf rates for more/less than 6 weeks in women who watched the video alone or with a relative; however, a greater percentage of women who breastfed for longer than 6 weeks watched with their husbands Relating to overall sample 42% of mothers reported that they received most of their information on bf from professionals, whereas 39% claimed to have received it from family or friends 10% of mothers had seen leaflets, whilst the remainder had no written information In the postnatal period, only 1 mother claimed to have been shown how to position her baby for bf, with the remaining 37 mothers claiming that they had not been shown

GP, general practitioner; I, intervention group; C, control group; HV, health visitor

TABLE 15 *Health education: non-RCT*[79]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Gilmore *et al.*, 1979[79] Ireland Research aim To determine whether an educational leaflet promoting bf influences infant feeding method Study design Non-RCT with concurrent study groups Method of group allocation Mothers were allocated to I or C according to which 1 of 2 days they attended antenatal clinics Unit of allocation Individuals (mothers) Unit of analysis Individuals (mothers) Sample size calculation None reported Outcome measures Method of infant feeding prior to discharge	Selection Mothers were from a semirural population in Wexford, Republic of Ireland, and attended 2 antenatal clinics in the obstetrics and gynaecology unit, County Hospital, Wexford over a 3-month period. All mothers were under the care of the same medical and nursing team Inclusion/exclusion criteria Not stated	Data reported for overall sample (n = 111) Mean age: primigravidae 23 years; multigravidae 30 years. Almost all belonged to social classes III, IV and V 8 worked outside the home, of which 6 intended to continue working after the birth and gave this a reason for not bf 16 primigravidae and 7 multigravidae were living with relatives, and none of these intended to breastfeed 13 had successfully breastfed a previous baby, but only 4 of these intended to breastfeed again. The main influences in favour of bf were husbands/own mother for primigravidae, and reading matter for multigravidae. The local branch of La Leche League was contacted by 3 mothers. Peer group relatives and friends influenced 1 mother to breastfeed Primiparae/multiparae I: 16 (25%)/47 (75%) C: 20 (42%)/28 (58%) Group comparability This is difficult to assess because most of the baseline variables are reported as overall values for the whole sample, and not per group. The relative proportions of primiparae and multiparae per group may not be comparable	I: n = 63 Received leaflet promoting bf in addition to the usual verbal encouragement to breastfeed. The leaflet answered common questions about bf, and covered the following: breastmilk as perfectly balanced food for the baby; decreased risk of infection associated with bf; fears of underfeeding baby/overfeeding self; advice on suitable clothing and overcoming shyness; breast preparation; bonding between mother and baby; encouragement to involve husbands in the decision to breastfeed C: n = 48 Received usual verbal encouragement to breastfeed, but no leaflet as above Data collection Baseline information was collected via questionnaire given to mothers at least 8 weeks prior to delivery. Methods of data collection for outcomes are not reported	Statistical techniques Descriptive Change in feeding method from antenatal decision *Antenatal decision to use artificial feeding (total/consistent/changed)* I: 37/37/0 C: 34/33/1 *Antenatal decision to breastfeed (total/consistent/changed)* I: 23/16/7 C: 11/8/3 Previous and current feeding methods *Previous artificial feeding (present method artificial/bf)* I: 33/3 C: 19/2 *Previous bf (present method artificial/bf)* I: 3/8 C: 1/6	None reported	

I, intervention group; C, control group

TABLE 16 *Health education: non-RCT*[80]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Kjellmer *et al.*, 1978[80] Sweden Research aim To evaluate an educational programme for bf Study design Non-RCT Unit of allocation Mothers Unit of analysis Mothers Sample size calculation Not reported Outcome measures Initiation; duration; attitudes of mothers towards bf	Selection Mothers attending 2 maternity hospitals in Gothenberg Inclusion/exclusion criteria All mothers within the relevant communities were targeted	The maternity hospital at which the intervention groups were based had approximately 5% higher rates of initiation vs the control institution at baseline. The authors attribute this to the fact that the maternity hospital relating to I had an established lactation instructor in post	I: *n* = 1000 mothers A bf manual, plus 2 h of lectures/discussion, was provided to nursing staff in antenatal clinics, maternity hospitals and child welfare clinics. The manual contained facts about bf and instructions for educating mothers Mothers received oral instructions from midwives, and also a set of short pamphlets containing key information in text and pictures C: *n* = 1000 mothers Controls received the same information at antenatal clinics and in child welfare centres but not at the maternity hospital Gothenberg mothers' attitudes towards bf was compared with a group of mothers from Stockholm who had no specific bf promotion programme	Initiation rates were significantly higher in I compared with C, but *p*-value not stated Duration rates were higher in I compared with C at 2, 4 and 6 months, but unclear if difference was statistically significant When Gothenberg and Stockholm mothers were compared, more mothers initiated in Gothenberg (true for primiparae, multiparae and overall); again, unclear if differences were statistically significant. Similar results for duration rates at 4 1/2 months. More mothers in Gothenberg showed positive attitudes towards bf	Around 100 mothers remained per group when duration data were analysed	Authors' retrospective comments state that bf rates were at their lowest point at the time of the intervention. A range of national policy initiatives in the health, welfare and education sectors (e.g. increases in maternity leave, implementation of other programmes such as those provided by La Leche League and a general trend towards bf) were also taking place at this time

I, intervention group; C, control group

TABLE 17 *Health education: non-RCT*[81]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants*	Intervention details	Results	Withdrawals	Additional comments
Roman, 1992[81] USA Research aim To evaluate individual and group health education on first-time bf mothers Study design Non-RCT Method of group allocation Self-selection to type of instruction: individual or group education Unit of allocation Group Unit of analysis Group Sample size calculation Not stated Outcome measures Bf plans at 6 weeks postpartum; mean pre- and post-test knowledge scores	Selection Pregnant women at 6 months gestation attending antenatal care were invited to participate Inclusion criteria ≥ 18 years; minimum of a high school education; women who would be bf for the first time; fluent in English; client of an obstetrician or midwife in private practice Exclusion criteria Not stated	Age (years): I1/I2 < 20: 1/0 21–25: 6/6 26–30: 24/21 31–35: 17/11 > 36 years: 0/3 Marital status: I1/I2 Married: 45/40 Single: 2/1 Divorced: 1/0 Level of education: I1/I2 High school: 6/1 Vocational: 2/3 Some college: 8/7 Associates: 6/9 Bachelors: 16/14 Masters: 8/4 Doctorate: 1/1 Other: 1/2 Level of income (US$): I1/I2 < 20,000: 2/0 20,000–39,999: 9/11 40,000–59,999: 10/8 60,000–79,999: 20/11 80,000–99,999: 4/6 > 100,000: 2/5 No data: 1/0 Employment: I1/I2 Not employed: 15/16 Employed: 33/25 Ethnicity: I1/I2 African-American: 2/3 White: 43/38 Hispanic: 1/0 Asian: 2/0 Breastfed by mother: I1/I2 Yes: 21/14; No: 25/27 No data: 2/0 First baby: I1/I2 44/37 Intention to breastfeed: I1/I2 Limited time: 16/16 Until weaning: 8/10 Undecided: 22/15 No data: 1/0 Mean bf knowledge pretest scores: I1/I2 17.73 ± 3.56/18.63 ± 4.29; n.s.	I1: *n* = 48; individual teaching A 2-h session using audio-visual equipment. Topics covered: the decision to breastfeed; preparation for bf; getting off to a good start; essentials of bf management; learning about your baby; concerns related to the baby; concerns related to the mother Each mother was given 4 handouts and a La Leche League book on bf I2: *n* = 41; group teaching Same content in groups of 6–10 women No control group of 'no intervention' Data collection Data collected by self-completed questionnaire at time of intervention and 6 weeks postpartum; pretest/post-test scores using 'Mother Breastfeeding Knowledge Survey'; group education participants completed a 'Post-Group Intervention Survey' regarding group dynamics and level of satisfaction	Statistical techniques Chi-squared test Bf plans at 6 weeks postpartum I1 *n* = 45; I2 *n* = 40 Limited time 15; 19 Until weaning 10; 7 Undecided 12; 6 Already stopped 8; 8 Chi-squared test: n.s. Mean pre- and post-test knowledge scores Pre: 18.15 ± 3.92 Post: 23.43 ± 7.78 No significant differences between intervention groups Significant pre- and post-test scores regardless of membership	90 consented; 89 completed questionnaires	Factors Relationship between plans for bf and demographic variables One significant predictor using multiple regression analysis, education

I1, first intervention group; I2, second intervention group; * *Figures shown are as reported in the original paper*

TABLE 18 *Health education: non-RCT*[82]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Vega-Franco *et al.*, 1985[82] Mexico Research aim To determine whether a programme of antenatal education increases bf among women who state their intention to proceed with af Study design Non-RCT Method of group allocation 25 mothers who intended to proceed with af were recruited from 2 antenatal clinics to the intervention group; a further 25 from the same clinics were recruited to the control group Unit of allocation Group Unit of analysis Group Sample size calculation Not reported Outcome measures Mothers' opinions of the best way to feed newborns; feeding method used during hospital stay; feeding method used 4 weeks after the birth	Selection Women attending either of 2 hospitals for antenatal care Inclusion criteria ≤ 35 years old or less; 6–8 months pregnant; gave verbal consent to take part in a study Exclusion criteria No anatomical or physiological contraindications to bf; not classified by obstetrician as high-risk pregnancy; no previous Caesarean section	Age ≤ 35 years old Socio-economic status 78% married, 16% cohabiting, 6% single; 82% housewives, 18% working outside the home; 28% educated to primary 1–3 grade, 58% to primary 4–6 grade, 14% some education beyond this; 55% of partners working as labourers or in jobs that did not require qualifications Ethnicity Not stated Group comparability No statistical differences between the groups in terms of number of previous children or pregnancies, civil state, education or partners' occupation	I: *n* = 25 Recruited at clinic and consented; interviewed to fill in a baseline questionnaire; received the first of 4 30-min talks about bf with written information; received appointments for 3 further talks at 2–3-week intervals. Themes for the talks were: breasts and bf; advantages of breastmilk for the baby; how to breastfeed and mother's diet during bf. Each talk began and ended with test questions and mothers received written information after each talk Not clear whether the talks were individual or group, nor how many mothers attended how many of the talks C: *n* = 25 Recruited, consented and interviewed for baseline questionnaire; did not receive the talks or written information; standard care not described Data collection Birth and postnatal hospital stay details of all the mothers were recorded, and all were visited at home 4 weeks after the birth Not stated who delivered the intervention, collected the data or did the home visits	Statistical techniques Analysis 'according to the usual procedures of non-parametric statistics' Change in initiation rates At recruitment: All said they wanted to use af 14 I and 14 C said bf best; 9 I and 6 C said mf best; 2 I and 5 C said af best for newborns 7 I and 9 C said giving colostrum is best; 8 I and 9 C said no need to give colostrum; 10 I and 7 C said they didn't know None of these differences was significant In the hospital: 11 I and 13 C babies were breastfed; 14 I and 12 C received bottles Not clear if any/how many received both Change in duration rates At 4 weeks, 15 I and 4 C were exclusively bf, 3 I mf, and 7 I and 21 C af Of the 9 multiparae in I, 6 had never previously tried bf; all 9 breastfed or mixed fed this baby ($p = 0.0001$) Of the 13 multiparae in C, 9 had never previously tried bf; 11 did not breastfeed this baby and 2 breastfed or mix fed	How many All those recruited are accounted for. None appear to have been lost at delivery or postnatal visit. Researchers account for the latter by pointing out the high proportion of participants who were housewives and that the 4-week visit was timed within statutory maternity leave. Details of the hospital's catchment area are not given, but it would appear they are different from the other Mexican study we have reviewed (Vandale-Toney and colleagues 1992[123])	

af, artificial feeding; I, intervention group; C, control group; mf, mixed feeding

TABLE 19 *Health education: non-RCT*[83]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Verma *et al.*, 1995[83] Punjab, India Research aim To evaluate the impact of an antenatal educational programme on the knowledge regarding maternal and child care Study design Non-randomised, comparative study; controls recruited just prior to experimental participants; prospective design Method of group allocation The first 100 cases served as controls, thereafter women were recruited to the experimental group Unit of allocation Individuals (women) Unit of analysis Individuals (women) Sample size calculation Not reported Outcome measures Maternal knowledge of infant feeding practices	Selection Pregnant women attending the antenatal clinic of the Christian Medical College, Ludhiana, Punjab, during a 1-year study period Inclusion/exclusion criteria Not stated	Group comparability No data are shown, but the authors report that I and C were well matched for age, education, income and number of antenatal visits	I: n = 201 Received antenatal education from paediatricians on various aspects of maternal and child care, either in small groups or on a one-to-one basis C: n = 100 Received routine antenatal advice only Data collection Mothers were interviewed twice with a questionnaire: the first interview (pretest) was taken during the first antenatal visit; the second one (post-test) after delivery. Evaluation was carried out by a single person	Statistical techniques Descriptive; test of significance used not stated Knowledge that breastmilk should be baby's first feed *Pretest* I: 45.8%; C: 50.0% *Post-test* I: 99.5%; C: 98.0% $p < 0.001$ for both I and C (post) Opinion that honey should be baby's first feed *Pretest* I: 32.8%; C: 25.0% *Post-test* I: 0.5%; C: 1.0% Test of significance not reported Knowledge that first feed should be given within 2–3 h of birth *Pretest* I: 27.4%; C: 29.0% *Post-test* I: 93.0%; C: 78.0% $p < 0.001$ for both I and C (post) Knowledge that bf should be given for 6–12 months *Pretest* I: 59.2%; C: 63.0% *Post-test* I: 84.1%; C: 85.0% $p < 0.001$ for both I and C (post) Knowledge of advantages of bf over bottle-feeding A 6-item questionnaire was used and mothers in both I and C obtained high scores at pretest. For mothers in I, knowledge increased significantly at post-test ($p < 0.05$)	Appear to have been no withdrawals	Discrepancies between text and tables make some of the results a little unclear Authors' comment: although C mothers had started the antenatal care earlier than those in I, knowledge in I at post-test was better, showing that the intervention was the important factor

I, intervention group; C, control group

TABLE 20 *Health education: before–after study*[84]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
Hart *et al.*, 1980[84] England Research aim To evaluate community services promoting bf Study design Before–after (cross-sectional) Unit of allocation Group Unit of analysis Group Sample size calculation None Outcome measures Percentage of mothers bf at birth, and at 3 and 6 weeks postpartum; percentage mothers in antenatal contact with HV; time of first home visit with HV; frequency of visit; number of contacts	Selection Before (1974–75) All mothers of children aged 6 weeks to 4 1/2 years attending the newly opened health centres. Mothers with more than 1 child contributed information on the most recent birth only After (1976–77) Babies attending the child health clinics in Camden and Paddington, born between the middle of 1976 and the end of 1977 Comparison area (1977) All babies born in 1977 in a London area where no intervention occurred Exclusion Premature babies; maternal illness requiring a hospital stay	Social class *Before* Camden NM: *n* = 78 ML: *n* = 76 Paddington NM: *n* = 11 ML: *n* = 54 *After* Camden NM: *n* = 33 ML: *n* = 33 Paddington NM: *n* = 27 ML: *n* = 32 *Comparison area* ML: *n* = 22 NM: *n* = 65 Ethnicity Camden UK/Eire: 66% Paddington and Comparison area UK/Eire: 50% Parity Before: not stated After: 50% primiparae in each area Group comparability A higher proportion of women from outside the UK tended to breastfeed; not tested for significance Comparison area contained a higher proportion of non-manual mothers; not tested for significance	Before *n* = 219 Intervention *n* = 125 All families with children under 5 years old were identified in house-to-house visits. Community child health doctors serving Paddington and Camden developed guidelines in conjunction with HVs on antenatal advice to mothers and the management of problems within the first few weeks of birth Home visits by HVs increased. Approach and support to mothers expressing wish/interest in bf. Antenatal contact was made if possible. First postnatal home visit was arranged as soon as HV notified of discharge In Camden (*n* = 66), HV made weekly home visits in addition to any clinic attendances In Paddington (*n* = 59), the HV used discretion about the amount and type of contact Telephone advice was offered in both areas All intervention babies had a developmental check at 6 weeks. Mothers were interviewed using a feeding questionnaire at 6 weeks and 6 months Comparison area (*n* = 87) elected to support findings of a before–after intervention and not a general shift in attitudes and behaviour of parents and health professionals	*Before* Baseline bf rates at week 0 Camden/Paddington NM: 39 (50%)/6 (55%) ML: 21 (28%)/21 (39%) Total: 60 (39%)/27 (42%) Baseline bf rates at week 3 Camden/Paddington NM: 27 (35%)/6 (55%) ML: 10 (13%)/7 (13%) Total: 37 (24%)/13 (20%) *After* Bf rates at week 0 Camden/Paddington/Comp area NM: 28 (85%)/24 (89%)/15 (68%) ML: 19 (58%)/22 (69%)/36 (55%) Total: 47 (71%)/46 (78%)/51 (59%) Bf rates at week 3 Camden/Paddington/Comp area NM: 25 (76%)/19 (70%)/11 (50%) ML: 13 (39%)/15 (47%)/25 (39%) Total: 38 (58%)/33 (56%)/36 (41%) Bf rates at week 6 Camden/Paddington/Comp area NM: 25 (76%)/17 (63%)/8 (36%) ML: 11 (33%)/15 (47%)/21 (32%) Total: 36 (55%)/32 (54%)/29 (33%) % of mothers in antenatal contact with HV Camden/Paddington/Comp area 40% / 23% / 16% Time of first home visit with HV < 10 days Camden: 46%; Paddington: 43% Comp area: 27% 10–14 days Camden: 93%; Paddington: 88% Comp area: 79% Frequency of visit > 2 home visits Camden: 96%; Paddington: 35% Comp area: 38% Number of contacts > 4 home/clinic Camden: 96%; Paddington: 71% Comp: 47%	Not stated	

*NM, non-manual; ML, manual; I, intervention group; Comp, comparison; * Figures shown are as reported in the original paper*

TABLE 21 *Health education: before–after study*[85]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals*	Additional comments
Redman *et al.*, 1991[85] Australia Research question To evaluate an antenatal education programme in New South Wales, Australia Study design Before–after (cohort); retrospective survey Unit of allocation Cohort Unit of analysis Individual Sample size calculation Not stated Outcome measures Characteristics of attenders at antenatal education; feeding choice and attendance at antenatal education; changes in knowledge following antenatal classes	Selection Mothers giving birth in a given large teaching hospital during a 4-month period, and their partners Inclusion criteria Primiparae Exclusion criteria Not stated	Characteristics of attenders at antenatal education (n = 325) *Marital status* Single 27 33 Married/living as married 294 87 $p < 0.01$ *Age* < 26 144 76 26 + 171 86 $p < 0.029$ *Education* Primary and some secondary 129 79 HSC 93 77 Trade certificate 29 83 Degree 73 95 $p < 0.025$ *Country of birth* Australia 293 82 Other 27 82 n.s. *Health provider* Obstetrician 214 88 GP 36 78 Antenatal clinic 61 61 Other 12 92 $p < 0.001$ *Insurance* Private 242 90 Public 83 59 $p < 0.000$ (n / % attending)	Routine antenatal classes	Statistical techniques Chi-squared test; logistic regression Feeding choice and attendance at antenatal education (n = 294) Bf: 274; 83% Bottle/to decide: 20; 70% n.s. Regression analysis showed that antenatal education did not alter outcome of bf when demographic differences were controlled for Changes in knowledge following antenatal classes (n = 142) Pre Post % Women correct 68 87 % Partners correct 66 86	360 approached: 349 consented; 97% response 55 left hospital without completing questionnaire; 31 were chased and completed demographic and attendance details Details of attendance: n = 325 (91%) Feeding behaviour: n = 294 (82%) 142 women and partners approached for pre and post knowledge scores: 12 excluded for lateness to class; 13 excluded for missing final class 117 women and 82 partners Details of attendance: n = 325 (91%) Feeding behaviour: n = 294 (82%)	Details of baseline characteristics were not available for all characteristics of all participants. The influence of baseline characteristics, such as age or education, is not clearly known therefore

HSC, high school certificate; * *Figures shown are as reported in the original paper*

TABLE 22 *Health education: before–after study*[86]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Thorley *et al.*, 1997[86] England Research aim To study the effectiveness of a new system of antenatal care from a general practice Study design Before–after (cross-sectional) Method of allocation Pregnant women attending antenatal care prior to, and following, the implementation of a new approach to the antenatal care process Unit of allocation Group Unit of analysis Group Sample size calculation None Outcome measures Numbers bf at 1 week postpartum; percentage bf at 3 months	Selection All pregnant women registered with the study general practice in Staffordshire, England for 4 years before, to 4 years after the introduction of the new method of antenatal care Inclusion criteria Not stated Exclusion criteria Not stated	Age in years (SD) Before: 28.2 (3.31) After: 28.6 (0.75) Comparability on baseline characteristics No significant differences on parity or social class	B: *n* = 146 Intervention A new method of antenatal care was implemented with 6 aims: to be sensitive to the needs of pregnant women; to maintain a high standard of clinical care while reducing clinical measurement; to provide a comfortable setting for a group of mothers where education takes place through discussion; to promote flexibility of timing and availability of care; to provide availability of a wide range of therapies; to audit these changes to ensure safety for mother and baby The starting point for the clinic was an interactive group approach to antenatal care. Women would meet the midwife, doctor and guest speaker in an informal manner and this would provide the forum for antenatal education and the development of a cohesive support group. This was followed by individual consultation with midwife and doctor. Five attendances were set as standard and women were able to attend at any other time they wished, or if they were advised to do so A: *n* = 210 No description of data collection method	Bf at 1 week postpartum B: 84/146 (58%) A: 142/210 (68%) $p = 0.07$ Bf at 3 months B: 26% A: 47% Adjusting for social class and parity using Cochran's test; $p < 0.05$ Other outcomes: Mean visual analogue scores for anxiety about the pregnancy Decrease by 4.6% in the new clinic Mean visual analogue score for enjoyment of the clinic Increase of 10.5%	None stated Intention-to-treat analysis Apparently so	

B, group studied before the intervention; A, group studied after the intervention

TABLE 23 *HSIs (general): RCT*[66]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Lindenberg *et al.*, 1990[66] Nicaragua Research aim To examine the effects of various amounts of early postpartum mother–infant contact on the incidence and continuation of bf Study design RCT Method of group allocation First 3 months: randomised (using a table of random numbers) to 1 of 2 groups Fourth month: allocated consecutively to a separate intervention Unit of allocation MIP Unit of analysis MIP Sample size calculation Not stated Outcome measures Bf incidence and continuation data collected at home visits 1 week and 4 months after the birth, not stated by whom; demographic details collected in hospital, not stated by whom	Selection Mothers giving birth to their first babies in Velez Pais Hospital, Managua, during a 4-month period in 1982–83 There were > 15,000 births per year at this capital city hospital, approximately 30% of all hospital deliveries in the country Inclusion criteria Normal vaginal delivery with no complications; living in poor urban areas of Managua Exclusion criteria Not stated	Age 15–32 years; mean 20 years Socio-economic status Living in poor urban areas of Managua Ethnicity Not stated Other 82% lived with extended families where average population density was 8 per household; 55% had access to indoor piped water, almost all had electricity; 38% of homes had at least 1 dirt floor Group comparability No statistically significant differences among groups with regard to family size, marital status, housing, education, age, employment or antenatal care There were differences in infant birthweights and lengths, and in rates of episiotomy, anaesthesia and premature rupture of the membranes between the groups, but chi-square analysis demonstrated no significant differences in these characteristics and the initial and 4-month infant feeding patterns	I1: n = 136 First 3 months of study 45 min of mother–infant contact immediately after birth with standardised, uniform bf promotion followed by complete separation until discharge I2: n = 116 Fourth month of study Rooming-in (continuous postpartum contact until discharge) with standardised bf promotion C: n = 123 First 3 months of study Received standard care; complete separation of MIPs throughout hospitalisation (12–24 h) with *ad hoc* bf promotion Data collection The authors summarise 8 previous studies and identify gaps in knowledge, including knowledge of bf promotion in countries where most mothers initiate bf; their study was designed with this in mind	Statistical techniques Descriptive statistics, chi-squared analysis Change in initiation rates, measured at 1 week C: 32% initiated exclusive bf; 50% initiated mixed feeding; 18% never tried bf I1: 53% initiated exclusive bf; 33% initiated mixed feeding; 14% never tried bf I2: 63% initiated exclusive bf; 30% initiated mixed feeding; 7% never tried bf I1 and I2 combined gave greater initiation rates for any bf than C ($p > 0.001$) Change in duration rates, measured at 4 months C: 10% were bf exclusively; 41% were mf; 49% were not bf I1: 12% were bf exclusively; 38% were mf; 50% were not bf I2: 7% were bf exclusively; 54% were mf; 39% were not bf 39% I2 MIPs were fully weaned at 4 months compared with 50% of I1 and C MIPs combined ($p > 0.05$) The authors conclude that in this population, the interventions may have influenced bf initiation rates, but not continuation rates	512 MIPs were originally assigned to 3 approximately equal groups. Of these, 27% (groups not specified) were lost to follow-up and thus excluded from analysis because of postpartum maternal or infant complications or failure to locate homes for follow-up visits. The final study sample was 375 MIPs	No information about how standardised bf promotion was delivered

I1, first intervention group; I2, second intervention group; C, control group

TABLE 24 *HSIs (general): non-RCT*[68]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
Lutter *et al.*, 1997[68] Brazil Research aim To examine the effectiveness of a comprehensive hospital-based bf promotion programme in promoting exclusive bf among low-income women in the city of Santos, Brazil Study design Non-RCT with concurrent control groups; prospective design Method of group allocation Not stated Unit of allocation Hospitals Unit of analysis Individuals (mothers) Sample size calculation None reported Outcome measures Rates of bf in delivery room, and rates of observation of 15 other indicators of exposure to bf promotion programme; exclusive bf at 30 and 90 days postpartum (exclusive bf defined as infant's intake consisting of nothing but breastmilk)	Selection The 2 hospitals were situated in Santos, Brazil. The control hospital was selected from 7 possible control hospitals because its maternity population is similar to that of the programme hospital. The women were selected from a low-income population Inclusion criteria All women delivering healthy singleton infants with birthweights of 2000 g or more between June 1992 and March 1993 were enrolled	Maternal age (mean ± SD) in years I: 25.3 ± 6.5; C: 24.6 ± 5.4 Maternal education (mean ± SD) in years I: 7.3 ± 3.4; C: 7.2 ± 3.5 Employed (%) I: 29.2; C: 29.1 Socio-economic score (composite indicator of specified household possessions) (mean ± SD) I: 3.6 ± 0.9; C: 3.7 ± 0.7 Living with baby's father (%) I: 81.3; C: 82.4 Parity (mean ± SD) I: 2.2 ± 1.6; C: 2.0 ± 1.3 Primipara (%) I: 43.2; C: 43.2 Received prenatal care (%) I: 93.6; C: 95.6 Male infant (%) I: 53.0; C: 45.6 Child's birthweight (mean ± SD) I: 3227 ± 467; C: 3386 ± 499 $p < 0.001$ Caesarean section (%) I: 23.4; C: 49.0; $p < 0.001$ Duration of bf of previous child (mean ± SD) in months I: 10.9 ± 11.8; C: 13.0 ± 5.7 Planned duration of exclusive bf (mean ± SD) in months I: 4.5 ± 2.3; C: 2.8 ± 2.3; $p < 0.05$ Group comparability Authors reported that groups were comparable for all observed baseline variables except infant birthweight and incidence of Caesarean section, both of which were higher in C	I: $n = 236$ Women delivered at a hospital that had had a comprehensive bf promotion programme for 20 years. This included rooming-in, early initiation of bf, bf assistance, and talks during hospitalisation covering the importance of exclusive bf for the first 6 months of life, how to solve common bf problems, and where to find postpartum bf help C: $n = 206$ Women delivered at a nearby hospital without a programme as above. However, several reforms mandated by Brazilian law had been instituted. These included rooming-in and prohibition of free gifts of infant formula Data collection Data were collected from hospital records and by interviewing the women just prior to discharge and at home at 30 and 90 days postpartum. Two physicians, not associated with either hospital, administered the predischarge questionnaire and abstracted information from medical records. Three social workers, blind to study objectives and group allocation, conducted the household interviews	Statistical techniques The Cox model was used to generate survival curves for the multivariate analysis Received bf information during prenatal care I: 88/236 (37.1%) C: 54/206 (26.4%) $p < 0.05$ Received bf information between discharge and first follow-up visit I: 228/236 (96.8%) C: 144/206 (70.1%) $p < 0.001$ Received bf information between first and second follow-up visits I: 124/236 (52.6%) C: 98/206 (47.4%) n.s. Bf in delivery room I: 154/236 (65.3%) C: 5/206 (2.2%) $p < 0.001$ Other indicators of programme exposure Statistically significant differences were found between I and C for 14/15 other indicators of programme exposure ($p < 0.001$ for all items) Median duration of exclusive bf I: 75 days; C: 22 days; $p < 0.0001$ Controlling for potential confounding variables (birthweight, Caesarean section, pre- and postnatal bf information did not alter the results)	Complete follow-up data were unavailable for approximately 20% of the original sample, with no observed difference in attrition between hospitals. There were no differences between women completing the study and those lost to follow-up except that women completing the study at the intervention hospital were older than those lost to follow-up	

I, intervention group; C, control group; * *Figures shown are as reported in the original paper*

TABLE 25 *HSIs (general): non-RCT*[87]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Palti *et al.*, 1988[87] Jerusalem Research aim To evaluate the effectiveness of a structured bf promotion programme integrated into a maternal and child health service in Jerusalem Study design Non-randomised, comparative study; concurrent controls; prospective design Method of group allocation Not stated Unit of allocation Neighbourhoods Unit of analysis Individuals (mothers) Sample size calculation None reported Outcome measures Initiation and duration of total (with or without supplement) and full (without supplement) bf. Initiation of bf is defined as bf at birth. Multiple regression analysis was used to assess the effects of the following variables on infant feeding practice: number of years of mother's schooling; mother's work; social class; previous experience with bf; infant feeding practice of mother's mother; age of baby when mother started work; birthweight; study group	Selection Participants in I were recruited from a Jewish neighbourhood of Jerusalem served by the Research and Teaching Health Centre of the Department of Social Medicine of the Hadassah Medical Organisation and School of Public Health Control participants were recruited from a Maternal and Child Health Service of an adjacent neighbourhood Recruitment took place during 1985 Inclusion criteria Women and children aged up to 5 years living in specified neighbourhoods as above Exclusion criteria Mothers giving birth to twins; those who adopted children; those with very low-birthweight infants; those without a telephone	Country of origin of mothers *Israeli* I: 69%; C: 68% *Asian/African* I: 15%; C: 14% *European/American* I: 16%; C: 18% Mean years of schooling of mothers I: 13.3 ± 2.8; C: 12.9 ± 2.7 Group comparability I and C were comparable for: relative frequency of country of origin; mean number of years of schooling of mothers (both shown above); hospital attended during delivery; age of mother; birth order; birthweight; age of infant when mother returned to work	I: *n* = 100 births Mothers were exposed to the PROD programme, which included the following to be implemented by nurses during routine contact with mothers: (i) provision of information on the advantages of bf, breast preparation; (ii) provision of anticipatory guidance on early common bf problems; (iii) early detection and treatment of problems, such as problems with bf technique; (iv) provision of encouragement and support for bf, reassurance when mother decides to discontinue bf 75% of women attended the service during the prenatal period and all attended during the postnatal period with their infant from birth to at least 6 months C: *n* = 130 births Mothers received care at a Maternal and Child Health Service of an adjacent neighbourhood, where similar prenatal and postnatal care were provided, but with no structured bf promotion programme as above. However, nurses had received in-service training on bf promotion Data collection Data were obtained from the personal files of mothers and infants, and all mothers were interviewed by telephone when their infant reached 1 year of age	Statistical techniques Mann–Whitney *U* test for differences in % bf at various ages; multiple regression analysis to assess the effect of intervention and other factors on bf duration Initiation of bf I: 80/100 (80%) C: 98/130 (75%) *p* = 0.004 Bf at 26 weeks postpartum I: 29/100 (29%) C: 16/130 (12%) *p* = 0.004 Full bf at 13 weeks postpartum I: 29/100 (29%) C: 23/130 (18%) *p* = 0.02 Full bf at 26 weeks postpartum I: 5/100 (5%) C: 3/130 (2%) *p* = 0.02	None reported	Factors/determinants: effect of mothers' schooling Of C mothers with < 13 years of schooling, 65% initiated bf, 20% were bf at 13 weeks, and 3% at 26 weeks. Of mothers with ≥ 13 years of education, the respective figures were 85%, 50% and 25% (*p* = 0.002). No differences in bf were noted by education in I. No differences were noted in % of mothers bf at birth and at 13 weeks between the mothers with < 13 years of education between I and C. However, at 26 weeks, 30% of mothers from I and 22% from C were still bf Effect of mothers' work Of non-working mothers, a higher % of mothers in I practised bf at each age compared with C. The greatest difference was seen at 26 weeks, with 33% of I and 15% of C still bf (*p* = 0.006). The bf pattern among mothers returning to work before the baby was 13 weeks old was similar in I and C Correlation between the duration of total bf and previous bf was 0.25 (*p* = 0.01) in C. The correlation between the number of postnatal visits and total bf duration was high and significant for I (*r* = 0.24, *p* = 0.01) and almost zero for C (*r* = 0.06). Multiple regression analysis showed that 4 independent variables had a significant effect on duration of total/full bf: education; prior experience; maternal age; study group. Mothers with longer education, those bf previously, younger mothers and those in I breastfed for longer

I, intervention group; C, control group; PROD, promotion of growth and development of children from 0 to 5 years

TABLE 26 *HSIs (general): non-RCT*[88]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Winikoff *et al.*, 1987[88] USA Research aim To evaluate the effectiveness of a project designed to overcome institutional constraints to bf Study design Non-randomised, controlled, before–after study Method of group allocation According to hospital where obstetric care took place Unit of allocation Hospital Unit of analysis Individuals (mothers) Sample size calculation None reported Outcome measures Incidence of bf (defined as the baby having at least 1 feeding that contained any breastmilk); rates of exclusive bf for 75% of all feeds; rates of use of supplements to bf; intended and actual bf practice; rates of rooming-in	Selection The project was carried out in a 597-bed municipal hospital, with approximately 2000 deliveries per year. The hospital is located in a low-income community and serves as a teaching facility for a local medical school. A nearby municipal hospital served as the control site Inclusion/exclusion criteria Not stated	Maternal age (years) < 18/18–20/21–29/≥ 30 I1: 15/18/52/15 I2: 3/22/58/17 C1: 9/16/57/17 C2: 9/23/48/21 Maternal education (years) ≤ 8/9–10/HSG/college I1: 25/48/8/18 I2: 20/28/22/30 C1: 3/40/39/17 C2: 10/27/39/23 Caesarean section I1: 17/60 I2: 17/60 C1: 16/148 C2: 18/132 Primipara I1: 38/60 I2: 50/60 C1: 40/148 C2: 48/132 Group comparability Authors state that study groups were similar across time and across sites	I1: *n* = 60 mothers I2: *n* = 60 mothers C1: *n* = 148 mothers C2: *n* = 132 mothers Intervention Over a 2-year period, staff training in lactation management, and employment of a bf counsellor. A simple text was developed for patients which conveyed basic motivational/ informational messages. An accompanying guide for nurses was developed, expanding upon the information contained in the mothers' booklet. An educational programme was developed to introduce the booklets for mothers and nurses to all members of the perinatal nursing staff. Small workshops were used to present the material and to demonstrate how it might be incorporated into the care provided to mothers by various staff. Demonstration and teaching aids were provided to staff to assist with group teaching and a telephone hotline was established so that mothers could speak directly with a trained professional. Rooming-in facilities were established Data collection Direct observation over 3 months, by interviewing mothers, staff surveys and review of feeding records on infants' charts	Statistical techniques Descriptive Incidence of (any) bf I1: 15%; I2: 56% C1: 28%; C2: 41% Bf exclusively for at least 75% of all feedings I1: 0%; I2: 15% C1: 5%; C2: 7% Bf supplemented with infant formula I1: 24%; I2: 8% C1: 18%; C2: 18% Maternal recall of discussing infant feeding in prenatal clinic I1: 53%; I2: 97% Intended and actual bf I1: Of 60 mothers interviewed at least 24 h postpartum, 52% intended to breastfeed, yet only 32% had already begun I2: 77% women breastfed, although only 65% had so intended Rates of rooming-in I1: 43%; I2: 70%	Not reported	

HSG, high school graduate; I1, experimental hospital in 1983, prior to the implementation of the intervention described above; I2, experimental hospital in 1985, after the intervention was established; C1, control hospital in 1982, with no bf promotion programme; C2, the control hospital in 1985, prior to bf promotion programme

TABLE 27 *HSIs (general): before–after study*[89]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Bradley & Meme, 1992[89] Kenya Research aim To evaluate the impact of a bf campaign on changes in health worker knowledge, attitudes and practices Study design Before–after Unit of allocation Hospitals (all those in Kenya) Unit of analysis Individuals (data analysed from questionnaire responses) Sample size calculation None Outcome measures Changes in health worker knowledge, attitudes and practices between 1982 and 1989, covering the following aspects: acceptance of responsibility to promote bf; encouragement of early initiation, rooming-in, demand feeding, prelacteal feeds; use of infant formula, use of bottles, introduction of complementary foods; knowledge of relevant government directives	B: Selection for 1982 survey The only information given is that a total of 300 people were interviewed A: Selection for 1989 survey Hospitals: in total, 58 hospitals in Kenya were surveyed. Of these, 35 were government, district or provincial hospitals (6 such hospitals could not be reached), 6 were Nairobi City Commission health centres having maternity facilities (selected at random from a total of 10), 17 were privately owned facilities or were under the Catholic Secretariat or the Christian Health Association of Kenya, and were selected at random from Nairobi (6 hospitals) and from 6 other provinces in Kenya (11 hospitals) Interviewees: Hospital policy-makers (n = 109) Those interviewed included the district medical officer, medical officer in charge, and the hospital matron. In their absence (17 cases) the hospital obstetrician or paediatrician was interviewed Maternity ward staff (n = 175) The maternity ward sister on duty was selected and 2 ward nurses at random in each hospital. In the majority of cases, 3 nurses constituted the total number of nurses on duty at the time of the survey and so all were interviewed	Comparability of hospitals surveyed in 1982 and 1989 No details are given of the hospitals surveyed in the 1982 survey. However, the authors state that the sample recruited in 1989 was not significantly different to that used in 1982 (unclear whether this refers to hospitals or individuals)	B: In 1982, a study of health worker knowledge, attitudes and practices with respect to bf was undertaken in Kenya Intervention In 1983, the Kenyan government launched a programme to promote bf consisting of: ban of free supply of infant formula to hospitals; directive to promote early bf; full rooming-in; ban of routine prelacteal/supplemental feeding; flexible hospital routines to suit mothers/babies rather than staff. In addition, the ministry of health appointed a national bf officer who organised training of over 800 health workers nationwide in bf promotion and lactation management. Other health workers were trained at specialist lactation management courses overseas. Also, non-government organisations undertook training and counselling of individual mothers with respect to bf A: In 1989, survey conducted to assess changes in health worker knowledge, attitudes and practices Data collection Data were collected via questionnaires administered during interviews conducted by trained interviewers in 58 hospitals nationwide (1989). Two types of questionnaires were used, 1 for hospital policy-makers (n = 109), and 1 for maternity ward sisters and nurses (n = 175). The questionnaires were not identical for the 2 time points	Statistical techniques Results are presented as percentages of responses for each questionnaire item. No statistical tests of significance reported Changes in knowledge For all aspects of knowledge, both policy-makers and maternity ward staff scored higher in 1989 compared with 1982. Larger hospitals (usually private sector) tended to have the least knowledgeable staff. Policy-makers and maternity ward staff were equally knowledgeable Changes in practice Maternity practices had improved in 1989 compared with 1982 Government directives Less than half of the health workers interviewed knew about the government directives on infant feeding, despite all directives being sent to district medical officers and to the private hospital umbrella organisations. Awareness of the directives was not correlated with higher levels of knowledge, nor with better hospital practices Note: percentage responses to each questionnaire item are reported in the paper	No details reported	As well as interviewing specified personnel within the hospitals, the authors also appear to have taken data from patients which conflict with reported practices by the health professionals. Since the numbers and methodology involved are not reported, it is assumed that these data were obtained opportunistically, and are therefore likely to have limited validity and reliability The authors report that duration of bf increased between 1977 and 1989, but these data did not appear to have been collected in a standardised way at each survey point, so interpretation is difficult

B, group studied before the intervention took place; A, group studied after the intervention took place

TABLE 28 *HSIs (general): before–after study*[90]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Bruce & Griffioen, 1995[90] UK Research aim To evaluate the appointment of a BFA and other policy changes for infant feeding at a DGH Study design Before–after study; a cohort design was used for the staff surveys and a cross-sectional design for mothers' surveys Unit of allocation Individuals (staff members and mothers) Unit of analysis Individuals (staff members and mothers) Sample size calculation Not reported Outcome measures Bf at 2 days and 6 weeks postpartum; effect of BFA support on bf; use of supplements in breastfed babies; mothers' views on policy; staff views on policy	Selection *Staff* All non-medical maternity unit staff were surveyed *Mothers* All those attending the maternity unit of a DGH serving an inner London population and adjacent districts, who could be contacted and interviewed over a period of 2 months, excluding some weekends. About 80% of the total delivering were interviewed Inclusion/exclusion criteria All, as described above	Not reported	B: 1988 (staff, *n* = 60; mothers, *n* = 250) Survey carried out prior to appointment of BFA and other policy changes A: 1990 (staff, *n* = 75; mothers, *n* = 403) Second survey following appointment of BFA, and implementation of other policy changes. The BFA worked directly with mothers in the ante- and postnatal periods in hospital, and also with maternity staff to improve their understanding of baby feeding and advisory skills. The BFA was available to, and visited all mothers in hospital (Monday to Friday), irrespective of whether they wished to breast- or bottle-feed. The BFA gave talks to almost all staff on postnatal wards and SCBU, but fewer staff attended from the antenatal clinic and labour ward. Other policy changes included revising the unit policy statement on bf, removing dextrose from postnatal wards (sterile water and formula still available), reduction of night-only and night-mainly shifts for maternity staff. During national bf week, there was a display in the hospital concourse, with input from the BFA, other maternity staff, health visitors, NCT, La Leche League and a local twin club Staff surveys Data were collected via self-administered questionnaires, identical for the 2 time points except that the 'A' version included questions on the role of the BFA. Remaining questions covered time available for talking to mothers, attitudes to policy on the unit, advice on feeding methods and use of supplements	Statistical techniques Chi-squared tests used for comparisons between frequencies Bf at 2 days B: 81.7% (95% CI, 76.4 to 87.0) A: 76.7% (95% CI, 72.1 to 81.3) n.s. Bf at 6 weeks B: 57.4% (95% CI, 50.6 to 64.2) A: 64.0% (95% CI, 58.8 to 69.2) n.s. Those who stopped bf at 6 weeks among women who had initiated B: 49/165, 29.7% (95% CI, 22.7 to 36.7) A: 55/247, 22.3% (95% CI, 17.1 to 27.5) n.s. Effect of BFA support on bf Women who did not see the BFA were significantly less likely to begin bf (OR = 0.39; $p = 0.007$). However, seeing the BFA had no advantage for maintaining bf at 6 weeks (OR = 0.93; $p = 0.88$) Breastfed babies receiving at least 1 supplement B: 93% A: 60% $p < 0.0001$ Mothers reporting that feeding advice was mainly conflicting B: 24% A: 14% $p < 0.001$	Response rates to staff surveys B: 48/60 (80%) A: 65/75 (87%) Response rates to mothers' surveys B: 202/250 (81%) A: 322/403 (80%)	The authors acknowledge that the differences in data collection before and after the intervention may have influenced the validity of the comparison The most important factors independently associated with not starting to breastfeed were lower social class, younger maternal age and not seeing the BFA For the 6-week outcome, the multivariate analysis showed that lower social class, younger maternal age, birthweight, use of supplements, advice reported as mainly conflicting and mode of delivery were the most important factors associated with not continuing to breastfeed. Seeing the BFA was not associated with the 6-week outcome

BFA, baby feeding advisor; DGH, district general hospital; B, before intervention; A, after intervention; SCBU, special care baby unit; NCT, National Childbirth Trust

continued

TABLE 28 contd *HSIs (general): before–after study*[90]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
continued Bruce & Griffioen, 1995[90] UK			Mothers' surveys B – interview covering feeding method and social/demographic data, was conducted within the first few days postpartum, then a self-administered questionnaire mailed at 6 weeks postpartum, covering feeding methods and views on support. One written reminder was sent. A – 6-week questionnaire only, including questions on the immediate postnatal period	Mothers feeling that hospital supported bf B: 48.5% A: 55.9% $p = 0.034$ Staff agreeing that unit should have policy on bf B: 52% A: 75% $p = 0.02$ Staff recommending bf to mothers of full-term, normally delivered baby B: 50% A: 69% $p = 0.01$		

BFA, baby feeding advisor; DGH, district general hospital; B, before intervention; A, after intervention; SCBU, special care baby unit; NCT, National Childbirth Trust

TABLE 29 *HSIs (general): before–after study*[91]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Popkin *et al.*, 1991[91] Honduras Research aim To examine the effects of the first 5 years of the PROALMA project on patients' bf behaviour and health workers' knowledge, attitudes and practice with regard to bf Study design Before–after (using survey data) Units of selection National surveys – households; health worker surveys – individual health workers; community surveys – individual mothers Units of analysis National surveys – infants; health worker surveys – individual health workers; community surveys – individual mothers Sample size calculation None Outcome measures National surveys – national bf patterns. Health worker surveys – knowledge, attitudes and practices of health professionals, covering the following topics: recommend bf at birth/bf on demand; consider separation during first hours of life bad for bonding/colostrum important for baby; consider that baby with diarrhoea should continue bf; knowledge of contraindications for bf. Community surveys – urban bf patterns for up to 9 months postpartum	Selection *Nationally representative surveys*: For all 3 surveys, multistage cluster sampling was used, with census sectors (the smallest census units) as the primary sampling units, from which the secondary sampling units (households) were systematically selected. For each household, the last child born during the 24 months preceding each survey was selected for analysis. Infants who had died were excluded *Health worker surveys*: Health professionals from the 3 major hospitals in Tegucigalpa and San Pedro Sula (1982 and 1985) and nationally (1986) were studied – included registered nurses, auxiliary nurses, social workers and physicians *Community surveys*: Women living in 19 low-income neighbourhoods served by the teaching hospital in Tegucigalpa	Nationally representative surveys The 3 surveys were comparable for demographic, socioeconomic and health service use factors, apart from a larger proportion of urban infants in the 1984 survey: *Residence in urban areas* 1981: 30.3% 1984: 36.8% 1987: 29.8% Health worker and community surveys Data reported to be comparable for 1982 and 1985 surveys were used as baseline and follow-up data respectively	Intervention The PROALMA project in Honduras ran from 1982 until 1988, with activities concentrated in urban areas. The project focused on changing health professionals' knowledge and attitudes about bf, changing hospital policies to promote early bf and rooming-in, and eliminating use of bottles or formula. Trained healthcare providers gave pre-natal education, counselling at delivery and postpartum support for women with bf problems Phases of the project *Model phase 1982–84* PROCOMSI mass media campaign starting with radio spots in 1981, followed by a radio course of bf early in 1983. Personnel linked to PROALMA were also involved in the development of PROCOMSI. In 1983, PROALMA staff began working in 2 national teaching hospitals in Tegucigalpa and San Pedro Sula, and a major health centre in Tegucigalpa. Institutions and staff collaborated to create a working model for the promotion of bf, and the model was taught at the target institutions during the model phase and the first 2 years of the national expansion phase (1983–86). Teaching included in-service training for healthcare professionals, students, traditional birth attendants, and other community health workers. It is estimated that at least 3000 such personnel were exposed to the model	Statistical techniques In order to yield nationally representative estimates, the survey responses for 1981 and 1984 were weighted, whilst the 1987 survey was self-weighted. Bf patterns: the probability of bf at each age, in months, and the median duration of lactation were computed by the single decrement life table procedure. Trend analysis was used to examine changes in bf patterns over time National trends Probability of initiating bf, 1981–84: increase of 9 percentage points in urban areas, and 1 percentage point in rural areas. Increases for 1984–87 were 4 and 2 percentage points respectively for urban/rural samples The median duration of bf increased by 2.5 and 1.7 months in the periods 1981–84 and 1984–87 respectively. At 5 months postpartum, an additional 42% of the urban infants in 1984 were breastfed compared with 1981. Similarly, at 9 and 11 months, 52% and 63% more urban infants were breastfed. Increases between 1981 and 1984, and between 1984 and 1987 for rural infants were smaller Increases also occurred among infants born in hospitals of any kind compared with those born	No information given concerning response rates during the surveys	Possible confounding factors In mid-1982, major price increases occurred in milk products. Between 1981 and 1988 the retail cost of formula rose by 66%, while the cost of whole milk rose by approximately 44%. There is no domestic powdered milk industry in Honduras. Milk imports decreased sharply in 1982 and 1986, but rose in the interim period. However, the proportion of infant formula to whole milk decreased to the level existing before extensive formula promotion began in the early 1970s. Trends of increased bf, decreased use of infant feeds and increased use of whole milk may be associated with a later introduction of the bottle, and increase in the use of water, or a switch from formula to whole milk – the latter being introduced later in infancy Other factors/determinants from data on national bf trends For 1984–87, the following factors were significant in explaining differentials in bf: place of birth; mother's age and education; household size; presence of flush toilet; urban residence

PROALMA, Proyecto de Apoyo a la Lactancia (Project for the Support of Breastfeeding); PROCOMSI, Proyecto de Communicación para la Salud Infantil (Communication Project for Infant Health)

continued

TABLE 29 contd *HSIs (general): before–after study*[91]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
continued Popkin *et al.*, 1991[91] Honduras			*National phase 1985–88* By 1985 the ministry of health had developed a national family planning and bf programme, which included the essential features of the model. National training continued at an accelerated rate during 1985 and 1986, and by 1986, two-thirds of the training was directed at personnel who did not work in the original hospitals and health centres Nationally representative surveys 1981: Contraceptive Prevalence Survey (n = 1540 infants) 1984: Maternal and Child Health/Family Planning Survey (n = 1471 infants) 1987: Epidemiology and Family Health Survey (n = 3354 infants) Health worker surveys 1982 (n = 338) and 1985 (n = 427) surveys of health professionals from the 3 major hospitals in Tegucigalpa and San Pedro Sula 1986: survey of health professionals from all 8 Honduran health regions (n = 437) Community surveys 1982 (n = 868 women) 1985 (n = 521 women) Data collection No information is given concerning the methods of data collection used during the surveys	at home. Between 1981 and 1984, at age 5 months, the proportion of those being breastfed increased by 14 percentage points among babies born in public hospitals and 15 points for those born in private hospitals, whilst at 9 months the increase was 16 points for the public and 12 points for the private hospitals. The proportion of infants born at home who were breastfed at these ages increased by 5 and 7 points respectively Effect of training on health workers In 1986, 58% of 437 health professionals had received training in bf from PROALMA or ministry of health personnel. Improvements were observed in the knowledge and attitudes of health workers between 1982 and 1986, with 11/12 items measured having a statistically significant improvement over time, and in 1986 there was a significant improvement for 10/12 items compared with 1982 Changes in bf patterns in urban communities Rates of initiation were 93% in 1982 and over 98% in 1985. The proportion breastfed at 3, 5 and 9 months increased by 24, 27 and 25 percentage points respectively for infants born in the public hospital. Among infants born at home or in private hospitals, the increases between 1982 and 1985 were 32 and 36 percentage points at 3 and 5 months, and 16 points at 9 months		

PROALMA, Proyecto de Apoyo a la Lactancia (Project for the Support of Breastfeeding); PROCOMSI, Proyecto de Communicación para la Salud Infantil (Communication Project for Infant Health)

TABLE 30 *HSIs (BFHI): RCT*[92]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Westphal *et al.*, 1995[92] Brazil Research aim To determine whether the SLC bf training course affects the HI's compliance with WHO/UNICEF's 'Ten steps for successful breastfeeding' Study design RCT Method of group allocation Paired then randomised to I or C Unit of allocation HI Unit of analysis HI Sample size calculation Not stated Outcome measures Evaluation of SLC course structure, process and outcomes (participants' knowledge and attitudes), assessed with reference to the 'Ten steps for successful breastfeeding' recommended by WHO/UNICEF Evaluation of institutional effects of SLC, assessed using domain theory[138]	Selection Not clear from the paper whether the 8 HIs selected were the only ones meeting the inclusion criteria, or if/how many HIs in the area did not meet them Inclusion criteria Public or philanthropic HI; located within 100 km of Sao Paulo; at least 2 births per day; not previously exposed to a similar course; professional staff available to attend the course full-time for 3 weeks Exclusion criteria Not stated	Participants' knowledge Average number of correct answers given by students of the SLC course (pre-course): overall 20.27 ± 7.41 (appears to be out of a possible maximum of 35 points) Institutional score (mean) in the 10-step score test (pre-course) I: 2.8 C: 2.75 (appears to be out of a possible maximum of 10 points) Trainees consisted of: Paediatricians: 6 Obstetrician: 1 Nurses: 5	I: *n* = 4 4 HIs sent personnel to SLC for their 3-week, full-time course. The SLC is based at a hospital that is a national centre for bf promotion in Brazil, which received the 'Baby Friendly Hospital' award from UNICEF in 1995. The course consisted of 45 units over 133 h, covering theoretical and practical aspects of bf; 66% of the time consisted of lectures, with the remainder being spent on practical activities, visits and videos. Most of the instructors were SLC professional staff C: *n* = 4 Did not receive SLC course Data collection Data from observations, questionnaires, interviews with managers and focus groups were collected during 2 2-day visits to each of the 8 HIs, before the course and 6 months after it. Participant observation (2 observers) was used to evaluate the course process. Trainees' knowledge was assessed using pre- and postcourse tests, and attitudes towards bf were assessed through group dynamics	Statistical techniques Descriptive Course process All 10 steps were covered, 5 and 9 the most and 10 the least. Trainees' and researchers' evaluations were close to maximum Participants' knowledge Average number of correct answers given by students of the SLC course (postcourse): overall 26.92 ± 2.10 (appears to be out of a possible maximum of 35 points) Participants' attitudes Analysis of statements recorded during group discussions showed that, postcourse, participants intended to change the routines and practices in their institutions Evaluation of institutional effects Changes had taken place in I HIs and not in C HIs, particularly in relation to steps 2 and 10 Institutional score (mean) in the 10-step score test (postcourse) I: 3.95 C: 2.95 (appears to be out of a possible maximum of 10 points) Domain analysis This revealed a lack of cohesion between policy, management and service domains in all the HIs studied	No details	Other data Most frontline personnel (all HIs) did not know how to access bf training. Professional staff wanted technical qualifications to enable them with skills for routine tasks, including dealing with mothers of newborns I HCs were unanimous that it was easier to implement new bf incentive activities (e.g. the creation of outpatient clinics for bf promotion) than to promote changes in established routines (bf in delivery room, rooming-in, no other foods, no artificial teats) Three professionals from each I HI attended: only I was an obstetrician. Some participants had difficulty gaining policy and administrative support for their proposed changes All the health professionals stressed the importance of promoting bf during antenatal care, but few hospitals provided such care

SLC, Santos Lactation Centre (Sao Paulo, Brazil); HI, health institution; I, intervention group; C, control group

TABLE 31 *HSIs (BFHI): before–after study*[93]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Buranasin, 1991[93] Thailand Research aim To determine the effect of rooming-in on the success of bf Study design Before–after study, obtaining data from 2 sources: (1) hospital; (2) community surveys Unit of allocation Infants (for both hospital and community studies) Unit of analysis Infants (for both hospital and community studies) Sample size calculation None reported Outcome measures Data from hospital: separation time and predominant bf rates at discharge (defined as infant's predominant source of nourishment being breastmilk) Data from community surveys: initiation rates; predominant bf at 0–4 months postpartum; current bf at 24 months postpartum	Sampling frame Women delivering in the Maharaj Nakhonratchasima Hospital, located in Nakhon-ratchasima province in the north-east region of Thailand Selection of participants to obtain hospital data MIPs from urban areas with normal deliveries (not breech presentation, not forceps or vacuum-assisted delivery, and not Caesarean section delivery). Two groups of 2000 infants were selected every other month from postnatal wards before and after the rooming-in system in 1987 and 1990 Selection of participants for community survey Mothers with children aged 0–24 months who resided in the communities were randomly selected for interviewing. Random sampling was done by listing all eligible children existing in the community and systematically selecting every tenth child until the predetermined number of children was obtained	Detailed data are not given, but authors state that family size, marital status, housing, education, age and employment were comparable between the 2 groups (unclear whether this refers to the hospital groups or community groups, or both)	B: 2000 infants recruited for hospital data and 210 mothers selected for community survey. At this time, the routine management for normal labour involved separation of mothers and babies, with babies brought to mothers at designated times, and prelacteal feeds were given. Routine for abnormal labour consisted of separation by putting newborns in a nursery, and bringing them to mothers when mothers were well or babies had improved Intervention In 1988, the hospital adopted a rooming-in system (as specified by WHO/UNICEF). Mothers undergoing normal delivery were sent to postnatal ward with baby. Prelacteal feeds were banned, and proper bf technique was encouraged. Mothers who had abnormal delivery had partial rooming-in, i.e. sent to specialised postnatal ward, and baby sent to nursery. Baby brought to mother within 2 h of delivery, then subsequently every 2 h to encourage bf A: 2000 infants recruited for hospital data, and 160 mothers selected for community survey Data collection Data from community surveys were obtained by interviews	Statistical techniques Not stated Hospital data *Predominant bf rate on discharge* B: 85% A: 99% $p < 0.05$ *Separation time (h)* B: 6.3 ± 3.2 A: 1.62 ± 0.42 $p < 0.05$ Community surveys *Initiation of bf* B: 92% A: 99% $p < 0.05$ *Predominant bf, 0–4 months* B: 33% A: 56% $p < 0.05$ *Current bf, 24 months postpartum* B: 44% A: 48% n.s.	Not stated	It is unclear whether the mothers recruited for the community survey were a subset of those recruited to obtain the hospital data Sampling for the community survey is systematic but does not appear to involve true randomisation

B, group studied before the intervention took place; A, group studied after the intervention took place

TABLE 32 *HSIs (WIC Program): RCT*[94]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants*	Intervention details	Results	Withdrawals	Additional comments
Brent *et al.*, 1995[94] USA Research aim To determine if a comprehensive bf promotional programme increases the incidence and duration of bf in a low-income population when compared with routine care Study design RCT Method of group allocation Non-blinded study; patients stratified by age into 3 groups (< 20, 20–29, ≥ 30 years); blocked randomisation was used, with 8 individuals per block Unit of allocation Individuals Unit of analysis Individuals Sample size calculation Not stated Outcome measures Incidence of bf in hospital, and at 2 weeks, 2 months and 6 months postpartum; median duration of bf Bf was defined as any human milk feedings, including supplementation with formula, other liquids, or solids	Selection Pregnant women attending the prenatal clinic of the Mercy Hospital of Pittsburgh were invited to participate in the study Inclusion criteria English-speaking; nulliparous Exclusion criteria Mothers separated from infants at birth; delivery at less than 37 weeks gestation; mothers of infants who stayed in the neonatal intensive care unit for more than 72 h; taking medications contraindicated in bf; infant not receiving care at The Mercy Hospital of Pittsburgh	Age < 20 years I: 21/51 (41%); C: 24/57 (42%) Eligible for SNPWIC I: 46/51 (92%); C: 51/57 (89%) Eligible for DPA I: 24/51 (47%); C: 33/57 (58%) Ethnicity – white I: 39/51 (78%); C: 38/57 (69%) Married I: 11/51 (22%); C: 8/57 (14%) Educational level ≥ 12 years I: 42/51 (82%); C: 49/57 (86%) Smoking I: 21/51 (41%); C: 20/57 (35%) Probable choice of bf at first prenatal visit I: 19/51 (37%); C: 17/57 (30%) Maternal chronic disease I: 7/50 (14%); C: 13/57 (23%) Complications during labour I: 11/51 (22%); C: 11/57 (19%) Complications during pregnancy I: 13/51 (26%); C: 4/57 (7%) Caesarean section I: 11/51 (22%); C: 13/57 (23%) Problem with infant's health; not requiring admission to neonatal intensive care unit for > 72 h I: 4/51 (8%); C: 4/57 (7%) Return to work/school within 2 months I: 12/50 (24%); C: 13/55 (24%) Return to work/school within 1 year I: 39/50 (78%); C: 13/55 (24%) Group comparability Groups comparable for the above, except maternal complications of pregnancy; multiple logistic regression analysis used to adjust for this, for between-group comparisons	The setting for both groups was the Maternal–Infant Lactation Centre of the Mercy Hospital, Pittsburgh, and its ambulatory paediatric and obstetric units I: *n* = 58 Comprehensive bf education and support was provided throughout the prenatal and postpartum periods and into the first year of infancy. Prenatal education was given regardless of the infant feeding preference stated at the first prenatal visit. Prenatal education consisted of 2–4 individual 10–15-min sessions with a lactation consultant discussing the benefits and practice of bf. Content of sessions was based on the patients needs and interests. After delivery, mothers were followed-up with daily inpatient rounds by the lactation consultant. Further follow-up consisted of a telephone call 48 h after discharge, a visit to the lactation clinic at 1 week, and lactation consultation present at each health supervision visit until weaning or when the infant was 1 year of age, whichever came first. Professional education was directed at nursing and medical staff who interacted with the bf dyad Patients who did not attend a minimum of 2 prenatal lactation consultations were excluded from the analysis C: *n* = 65 Routine care, consisting of optional prenatal bf classes; postpartum bf instruction by nurses and doctors; outpatient follow-up in the paediatric ambulatory department Data collection Data were collected by questionnaires administered non-blinded by the lactation consultant at the first prenatal visit, immediately postpartum, and at all paediatric health supervision visits	Statistical techniques For between-group comparisons: chi-squared test for categorical variables; Fisher's exact test used when expected frequencies were small; Student's *t* test for continuous variables; Wilcoxon Rank Sum test for ordinal data. Kaplan–Meier estimation used to analyse data on duration Incidence of bf in hospital I: 31/51 (61%); C: 18/57 (32%) $p = 0.002$ Controlling for the difference in pregnancy complication rates using multiple logistic regression analysis did not affect this difference Re-analysis, including 8 excluded control patients I: 31/51 (61%); C: 26/65 (40%) $p = 0.013$ Hospital incidence rates in those planning to bottle-feed/undecided I: 12/32 (38%); C: 4/40 (10%) $p = 0.005$ Incidence of bf when infant aged 2 weeks I: 47%; C: 18%; $p = 0.001$ Incidence of bf when infant aged 2 months I: 37%; C: 9%; $p = 0.0004$ Incidence of bf when infant aged 6 months I: 14%; C: 7%; n.s. Median duration of bf I: 84 days; C: 33 days; $p = 0.005$	I: 7 patients attended only 1 prenatal lactation consultation. Of these, in terms of incidence of bf in hospital, 2 women breastfed and 5 bottle-fed C: 8 patients received lactation consultation in the inpatient unit and/or at the outpatient lactation clinic, and were excluded from the analysis of duration	

I, intervention group; C, control group; SNPWIC, Supplemental Nutrition Program for Women, Infants, and Children; DPA, Department of Public Assistance; * *Figures shown are as reported in the original paper*

TABLE 33 *HSIs (WIC Program): RCT*[95,96]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Sciacca *et al.*, 1995[95,96] USA Research aim To determine the effects of a partner-supported, incentive-based educational programme on rates and duration of bf among low-income women Study design RCT Method of group allocation Not stated Unit of allocation Women Unit of analysis Women Sample size calculation None reported Outcome measures Infant feeding method at hospital discharge and at 2 weeks, 6 weeks and 3 months postpartum; data for intermediate outcomes were collected by pre- and post-test questionnaire (post-test questionnaire was given to I only after 2-h bf class); questionnaire was tested for content validity, clarity and readability by a panel	Selection Pregnant women enrolled in a WIC program, attending the 2 clinic sites in Flagstaff, Arizona Inclusion criteria Primiparous pregnant women; expected due date between May 1992 and December 1992; with interest (expressed via questionnaire) in participating in the programme with partner or baby's maternal grandmother Exclusion criteria Multiparous pregnant women	Age *< 21 years* I: 13/26 (50%) C: 10/29 (34%) *> 21 years* I: 13/26 (50%) C: 19/29 (66%) Formal education *< 12 years* I: 10/26 (38%) C: 17/29 (59%) *> 12 years* I: 16/26 (62%) C: 12/29 (41%) Ethnicity *White* I: 16/26 (62%) C: 20/29 (69%) *Non-white* I: 10/26 (38%) C: 9/29 (31%) Group comparability I and C were comparable for all the above variables, and were also comparable for bf knowledge	I: *n* = 34 Received usual WIC bf education (see C for details) plus the bf incentive programme, Caring Connection, consisting of special incentives for women and their partners to participate in a bf class and childbirth preparation classes. The bf class (single 2-h session) covered bf concerns of both parents; basics of milk production; nursing techniques; typical problems and solutions; pumping and storage information. The importance of early nursing was stressed, and benefits and myths of bf were addressed. Women received a gift bag and a breast pump, and partners received a pair of tickets to a football game. Gift incentives were also given to couples attending the childbirth preparation classes (5 x 1 h). Women were encouraged to use the WIC peer support programme for bf. This was the same programme as for C, except that women in I were automatically assigned a peer counsellor and were encouraged via an incentive to contact the counsellor within 2 days of delivery. Mothers who were bf at least half of the time at discharge, 6 weeks and 3 months postpartum, received additional gift incentives C: *n* = 34 Received usual WIC bf education only, consisting of: prenatal childbirth preparation sessions; breast pump rental programme; infant shirts provided to bf mothers; display of bf promotion posters at WIC clinics; peer support programme for WIC mothers who plan to breastfeed; optional bf group classes Data collection Data were collected from mothers in both groups at hospital discharge and at 2 weeks, 6 weeks and 3 months postpartum	Statistical techniques Binomial proportional analyses of the feeding data were performed; McNemar's test was used to analyse intermediate outcomes Ever breastfed at hospital discharge I: 26/26 (100%); C: 24/29 (83%) $p < 0.05$ Feeding method 2 weeks postpartum *Exclusive bf* I: 21/26 (81%); C: 10/29 (35%) *Not exclusively bf* I: 5/26 (19%); C: 19/29 (66%) $p < 0.05$ Feeding method 6 weeks postpartum *Exclusive bf* I: 13/26 (50%); C: 7/29 (24%) *Not exclusively bf* I: 13/26 (50%); C: 22/29 (76%) $p < 0.05$ Feeding method 3 months postpartum *Exclusive bf* I: 11/26 (42%); C: 5/29 (17%) *Not exclusively bf* I: 15/26 (58%); C: 24/29 (83%) $p < 0.05$ Exclusive formula-feeding Further analysis showed that the proportion of women who formula-fed exclusively vs those not exclusively formula-feeding was significantly higher in C compared with I at all time points ($p < 0.05$) Intermediate outcomes Women and partners in I experienced significantly positive changes in bf knowledge and attitudes over time. Also, more women in I breastfed despite their prenatal feeding intentions. Partners of women in I were perceived to be more supportive of bf than those in C. It is unclear whether there was a significant between-group difference	I: 8 overall 2 gave birth before they could attend an expectant couple class; 6 did not attend any intervention sessions for various reasons C: 5 overall All 5 left region before giving birth	This table reports data from 2 papers, reporting different outcomes from the same participants. Sciacca and colleagues[95] reported data for initiation and duration of bf, and Sciacca and colleagues[96] reported data for intermediate outcomes

I, intervention group; C, control group

TABLE 34 *HSIs (WIC Program): non-RCT*[67]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Caulfield *et al.*, 1998[67] USA Research aim To examine the effectiveness of single and combined effects of a motivational video and peer counselling on bf initiation and continuation among African-American WIC participants in Baltimore, USA Study design Non-RCT; 2 x 2 factorial design Method of group allocation 4 WIC clinics; random allocation of intervention per clinic Unit of allocation Group Unit of analysis Individual Sample size calculation None stated Outcome measures Initiated bf (%); bf at 7–10 days (%); bf initiation by intention to breastfeed at enrolment (%); bf initiation by intention to bottle-feed at enrolment (%); bf at 7–10 days by intention to breastfeed at enrolment (%); bf at 7–10 days by intention to bottle-feed at enrolment (%) OR/CI for bf interventions and their association with (1) bf initiation and (2) continuation to 7–10 days	Selection Women were recruited at the time of registration for antenatal care at the WIC clinics Inclusion criteria Ethnicity – African-American; entering antenatal care before 24 weeks gestation; WIC-eligible and carrying a singleton pregnancy; planning to keep the baby; planning to remain in the catchment area Exclusion criteria Those for whom bf was contraindicated (e.g. HIV+)	Age C I1 I2 I3 *< 18 years* 21 (37) 17 (27) 18 (33) 15 (23) *18–25 years* 23 (40) 34 (53) 22 (40) 35 (53) *> 25 years* 13 (23) 13 (20) 15 (27) 16 (24) Parity C I1 I2 I3 *0:* 13 (23) 31 (48) 11 (20) 21 (32) *1:* 15 (26) 12 (19) 14 (25) 18 (27) *> 1:* 29 (51) 21 (33) 30 (55) 27 (41) Chi-squared test; $p < 0.05$ Education C I1 I2 I3 *< High school* 49 (86) 41 (64) 41 (75) 56 (85) *High school* 5 (9) 16 (25) 9 (16) 7 (11) *> High school* 3 (5) 7 (11) 5 (10) 3 (5) Chi-squared test; $p < 0.05$ Single C I1 I2 I3 51 (89) 52 (82) 47 (85) 59 (89) Smoked before pregnancy C I1 I2 I3 21 (37) 18 (28) 13 (24) 23 (35) Hours worked before pregnancy C I1 I2 I3 *none:* 17 (30) 10 (16) 17 (30) 16 (24) *1 to 19:* 8 (14) 13 (20) 6 (11) 16 (24) *20–40:* 15 (26) 35 (55) 24 (44) 26 (39) *> 40:* 17 (30) 6 (9) 8 (15) 8 (12) Chi-squared test; $p < 0.05$	I1: $n = 64$ Video intervention: played continuously in the WIC waiting area without staff supervision; video modified from the 'Best Start'* and featured WIC counselling techniques; posters and pamphlets were distributed and bf advice by WIC service providers was encouraged to complement and reinforce the video messages I2: $n = 55$ Peer counselling: former WIC clients who had breastfed completed a 5-week training programme; support was offered from the time of enrolment to 16 weeks postpartum. The initial talk upon enrolment assessed attitudes and knowledge. Counsellors offered one-to-one counselling and group sessions. Women were seen/contacted 3 or more times in pregnancy, and weekly after delivery until 16 weeks if bf. Contact was at the WIC clinic, at home or by telephone I3: $n = 66$ Combined all of the components of video and peer counselling CI: $n = 57$ Standard WIC service, which includes ascertaining choice of infant feeding, providing encouragement and support for bf Data collection Paper does not mention when data collected, or by whom, or whether assessor was blinded to type of intervention	Number initiating bf (%) C I1 I2 I3 15 (26) 32 (50) 34 (62) 34 (52) Chi-squared test; $p < 0.05$ Number bf at 7–10 days (%) C I1 I2 I3 8 (14) 20 (31) 21 (38) 26 (39) Chi-squared test; $p < 0.05$ Bf initiation by intention to breastfeed at enrolment (%) C I1 I2 I3 62 77 86 83 Bf initiation by intention to bottle-feed at enrolment (%) C I1 I2 I3 16 21 35 27 Bf at 7–10 days by intention to breastfeed at enrolment (%) C I1 I2 I3 63 77 68 79 Note: among those who initiated Bf at 7–10 days by intention to bottle-feed at enrolment (%) C I1 I2 I3 43 17 44 40 Note: among those who initiated OR/CI for bf interventions and their association with (1) bf initiation and (2) continuation to 7–10 days *I1* (1) 1.36 (0.52 to 3.54) (2) 0.79 (0.25 to 2.52) *I2* (1) 3.84 (1.44 to 10.21) (2) 1.11 (0.34 to 3.61) *I3* (1) 1.92 (0.78 to 4.76) (2) 1.52 (0.50 to 4.59) Control (1) 1.00 (2) 1.00	• 674 identified as eligible • 126 (18.7%) refused to participate • 548 enrolled • 425 at the second point of contact (34 weeks gestation): 35 lost due to miscarriage/stillbirth/carrying twins; remaining loss was refusal to continue • 273 at 7–10 days postpartum: 38 lost due to ineligibility; 114 lost to follow-up • 242 included for analysis: 31 women had incomplete data on key variables Analyses of loss to follow-up Characteristics of women seen and lost at 7–10 days: lost to follow-up more likely to be multiparous	OR (CI) for other factors associated with (1) bf initiation and (2) continuation to 7–10 days using multiple logistic regression Infant feeding instruction in hospital (1) 2.01 (1.02 to 3.94) (2) 2.22 (1.05 to 4.69) Given artificial milk discharge pack (1) 0.22 (0.07 to 0.67) (2) 0.17 (0.07 to 0.44) Mother intending to breastfeed at enrolment (1) 8.93 (4.59 to 17.35) (2) 12.57 (5.43 to 29.14) Vaginal delivery (1) 0.50 (0.22 to 1.16) (2) Not in logistic regression model

C, control group; I1, first intervention group; I2, second intervention group; I3, third intervention group

* *Bryant C, Lazarov M, Light R, Bailey DF, Coreil J, D'Angelo SL. Best Start: breastfeeding for healthy mothers, healthy babies – a new model for breastfeeding promotion.* J Tenn Med Assoc *1989;**82**:642–3*

continued

TABLE 34 contd *HSIs (WIC Program): non-RCT*[67]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
continued Caulfield *et al.*, 1998[67] USA		Employed during pregnancy C I1 I2 I3 7 (13) 21 (33) 9 (17) 18 (28) Chi-squared test; $p < 0.05$ Intention to breastfeed (%) C I1 I2 I3 *At enrolment* 23 53 53 44 *At 34 weeks* 14 38 42 41 Chi-squared test; $p < 0.05$ Group comparability Clinic level data had suggested comparability across the 4 study clinics. However, parity, education and employment status (before and during pregnancy) were each significantly different. Differences were adjusted for in the analysis				

C, control group; I1, first intervention group; I2, second intervention group; I3, third intervention group

TABLE 35 *HSIs (WIC Program): non-RCT*[98]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Reifsnider & Eckhart, 1997[98] Oklahoma, USA Research aim To examine the effect of specific prenatal bf information, provided in group classes by nurse practitioners, on bf rates among WIC participants Study design Non-RCT with concurrent control groups; prospective design Method of group allocation Experimental bf classes were scheduled alternately with the standard prenatal nutrition classes; women were assigned systematically, according to the next available nutrition class Unit of allocation Individuals (mothers) Unit of analysis Individuals (mothers) Sample size calculation None reported Outcome measures Bf initiation and duration	Selection The study was conducted in the health departments of 3 rural Oklahoma counties where WIC services are provided. All pregnant women who qualified for this WIC program during a 6-month period from January to June 1986 were screened for enrolment into the study Inclusion/exclusion criteria Desire to breastfeed; age at least 18 years at the time of delivery; infant birthweight at least 5 lb; no severe congenital anomalies; discharge of mother and baby from the hospital at the same time; no previous bf experience; resident of 1 of 3 counties included in the study	Family income (overall sample) This could not exceed 185% of the poverty level (adjusted for family size) in order to qualify for WIC, but many women had family incomes approaching the poverty level Ethnicity (overall sample) Hispanic: 1 Native American: 1 African-American: 3 White, non-Hispanic: 26 Maternal age, mean ± SD, in years (range) I: 22.9 ± 4.9 (18–35) C: 20.8 ± 1.9 (18–25) Maternal education, mean ± SD, in years (range) I: 11.6 ± 0.9 (9–12) C: 11.9 ± 0.9 (9–13) Number married (%) I: 10/14 (71%) C: 7/17 (41%) Number primiparous (%) I: 10/14 (71%) C: 4/17 (82%) Group comparability Groups were reported to be comparable for maternal age, ethnicity, education, parity and martial status	I: n = 23 Women received bf education in a classroom format with optional follow-up class. The first class covered basic bf education, initiation and maintenance of lactation, and advantages of bf; the second class covered the mechanics of bf problems and appropriate management C: n = 24 Women received the standard WIC prenatal education class which recommended the appropriate diet for pregnancy, and advised that bf is the preferred method of infant feeding The classes were taught by 2 nurse practitioners. At WIC follow-up visits, mothers were offered either a bf food voucher (supplemental food for mother only), or a formula voucher (30 cans of concentrated infant formula) Data collection All participants were interviewed by WIC clerks, trained by the nurse practitioners, when they returned for their 1-month postpartum WIC visit. Food voucher use was reviewed during the subsequent 6 months. If the vouchers issued were for infant formula, the participant was contacted to determine when the infant had been weaned	Statistical techniques Initiation and duration of bf were examined with a 1-way ANOVA. Effects of group assignment, parity, marital status and educational level were tested. Bf duration was grouped by month and examined using a chi-squared test Initiation of bf I: 13/14 (93%) C: 13/17 (76%) n.s. Mean duration of bf I: 76.1 ± 104 days C: 29.5 ± 43.6 days p = 0.05 When the percentage of mothers still bf was compared month by month, no significant difference between I and C was seen until the third month, when 4 mothers in I were still bf vs 1 in C. There was no statistically significant difference after 4 months, when 1 mother in I weaned her infant	• 9 participants moved out of the county after attending the experimental or control class, and before their 1-month post-delivery visit at the WIC office • 3 women had spontaneous abortions before 20 weeks gestation • 2 women delivered preterm infants weighing less than 5 lb • 2 women delivered infants with severe congenital anomalies Participants available for final data analysis I: 14 C: 17 Attendance at classes for I 7 participants attended only the first class; 7 participants attended both classes There was no statistically significant difference in the age, educational level, marital status, or mean number of days of bf duration between those who attended only 1 class and those who attended both	Parity and initiation of bf 4/7 (57%) multiparous women initiated bf 22/24 (92%) primiparous women initiated bf p = 0.03

I, intervention group; C, control group

TABLE 36 *HSIs (WIC Program): non-RCT*[97]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Schafer *et al.*, 1998[97] USA Research aim To determine whether a volunteer peer support programme increases the uptake of bf Study design Non-RCT Method of group allocation I: women resident in 2 counties, eligible for this WIC program C: women resident in 6 control counties, eligible for this WIC program No explanation of how the 2 and 6 counties were selected as intervention and control counties Unit of allocation Area Unit of analysis Group Sample size calculation Not reported Outcome measures Initiation and duration of bf	Selection Pregnant women and postpartum women who qualified for WIC resident in 8 counties in Iowa Inclusion criteria Not stated for the individuals entered into the study but eligibility for the counties were listed as: predominantly rural; lacking an Expanded Food and Nutrition Education Program; no significant bf promotion programmes within 3 years; the WIC clinics must have access to computerised records of clients; local agency personnel agree to participate Exclusion criteria Not stated	Age (years) I: 23.0 ± 4.8 C: 25.3 ± 5.9 Socio-economic status Low income Ethnicity I* C White 82% 99% Hispanic 4% 1% Black 8% 0% Baseline initiation rates I: 22.5% C: 27.5% Group comparability States no significant differences on above variables	I: *n* = 143 One-to-one trained volunteer peer support pre- and postpartum, by telephone and personal meetings; peer counsellors provided both educational and moral support; volunteers taught lessons on healthy diet and bf, and maintained informal contact to answer queries or concerns; frequency of contact not mandated Intervention group completed a exit interview at 12 weeks with the local programme coordinator for the county C: *n* = 64 No intervention Control group attended postnatal WIC clinics which obtained standard computerised data on bf	Post-intervention initiation rates I: 117/143 (82.0%) C: 20/64 (31.0%) Mean duration rates I: 5.7 weeks C: 2.5 weeks I (*n* = 72) C (*n* = 20) 2 weeks 81 18 4 weeks 56 10 8 weeks 48 10 12 weeks 43 0 $p < 0.001$ for 2, 4, 8 and 12 weeks Other beneficial/adverse effects None stated Other outcomes None stated Costs None stated	Intervention group 241 eligible; 143 enrolled – no information on the 98 refusals – 72 completed all data collection measures High mobility among the population, hence the high number lost to follow-up States no significant differences in baseline characteristics of the 71 lost to follow-up	Unclear why the control group is much smaller than the intervention group. Control sample drawn from 6 counties and intervention from just 2; moreover, control data is obtained from computerised records requiring neither active participation nor consent – no explanation of discrepancy given

I, intervention group; C, control group

**The relative frequencies of participants in the intervention arm belonging to different ethnic groups do not sum to 100%. The figures shown here are as reported in the original paper, and the authors do not attempt to explain this discrepancy*

TABLE 37 *HSIs (WIC Program): before–after study*[99]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Carroll, 1994[99] USA Research aim To assess the effectiveness of the WIC program in Alabama Study design Before–after Unit of allocation Individuals Unit of analysis Individuals Sample size calculation None Outcome measures Bf rates	Selection Participants of the Alabama WIC program	No details reported	B: Assessment of bf rates in December 1990 Intervention From December 1990, the Alabama WIC program employed a state bf coordinator; designated bf contact persons for each of 120 WIC clinics; employed lactation consultants at 4 sites; trained existing staff; provided professional resources and educational tools. The guidelines for bf as identified by the National Association of WIC Directors were implemented. The programme focused on educating and providing the needed tools for existing staff to assist bf mothers. All pregnant WIC participants received bf education at each WIC prenatal visit from professional staff. New bf materials were developed or obtained (pamphlets, 'Best Start'* materials, posters, videos, library resources and breast pumps). The programme also included an incentive scheme whereby each bf mother received a gift for her or her infant, for each month of bf, for up to 1 year. A monthly newsletter was sent to all pregnant women and to new mothers A: Assessment of bf rates in December 1992 Data collection WIC data used, comprising monthly state computer printouts detailing changes in bf patterns	Statistical techniques No details Women bf (% of all WIC participants) B – December 1990: 1063 (17%) A – December 1992: 2171 (29%) 52% change Women not bf (% of all WIC participants) B – December 1990: 5161 (83%) A – December 1992: 5242 (71%) 2% change All postpartum women B – December 1990: 6227 A – December 1992: 7438 17% change	No details	

B, group studied before the intervention took place; A, group studied after the intervention took place

* *See reference in* Table 34 *footnote*

TABLE 38 *HSIs (WIC Program): before–after study*[100]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Grummer-Strawn *et al.*, 1997[100] USA Research aim To determine whether MPCP increases bf incidence for the whole population of Mississippi WIC. To determine what staff or programme characteristics are associated with higher success rates Study design Before–after Method of group allocation Clinics that had/had not implemented MPCP by 1 January 1993, as recorded on PedNSS Unit of allocation/analysis Group and time Sample size calculation Not reported Outcome measures Change in initiation rates; influence of programme characteristics on effectiveness	Selection MIPs registered with Mississippi WIC and staff (n = 97) working in clinics with MPCP (n = 62) Inclusion criteria Data from infants' initial WIC clinic visits in 1989 and 1993; postal questionnaire data from all staff working for MPCP, in 62 clinics, in 1994 Exclusion criteria Responses from staff working in 11 of the 62 clinics where MPCP had been implemented after 1 January 1993 were excluded	Age (years) Median age of mothers: 23 Median age of staff: 32 Socio-economic status All MIPs were WIC clients; just over half of the staff had been WIC clients Ethnicity WIC clients: 61% of mothers black; 38% of infants white non-Hispanic Staff: 86% white non-Hispanic Other Staff worked as peer counsellors (approximately 50%), lactation specialists or lactation consultants; paid hours averaged 10 per week; caseload was 40–49 different participants per month; all staff had children and each had bf her last child; median duration of staff bf was 18 months Group comparability Authors state that there did not seem to be systematic differences between counties where MPCP had and those where it had not been implemented	I: Data from infants' initial visits to 52 clinics that had implemented MPCP by 1 January 1993 Data from 97 MPCP staff surveyed in 1994 MPCP assigned a peer counsellor to each woman enrolling in WIC. Contact continued at least monthly during pregnancy and after the birth, usually by telephone or mail. Discussions covered bf advantages, initiation, management, physical problems and bf at school or work. Problems beyond the scope of basic bf management were referred to a lactation specialist/consultant C: Data from infants' initial visits to the remaining 30 clinics that did not have MPCP by 1 January 1993	Statistical techniques • Absolute difference in percentage point increases for clinics with and without MPCP • OR of trend ever bf in 1993 vs 1989 in clinics with and without MPCP • Logistic regression for a series of explanatory variables • Analogous statistics for various programme characteristics Change in initiation rates *Total ever breastfed* I: 12.3% (1989); 19.9% (1993) C: 9.2% (1989); 10.7% (1993) *White infants ever breastfed* I: 20.9% (1989); 30.8% (1993) C: 19.6% (1989); 22.0% (1993) *Black infants ever breastfed* I: 6.3% (1989); 12.1% (1993) C: 3.7% (1989); 5.1% (1993) Other outcomes Clinics with MPCP for longer, and clinics with at least 1 lactation specialist/consultant showed greater increase in ever bf Peer counsellors who spent more than 45 min per participant were more effective than those spending less time Costs Researchers state they sought to investigate cost effectiveness of MPCP for the whole state WIC population; however, costs are not discussed	Missing data Data from initial visits were available from PedNSS on approximately all 30,000 infants per year certified in the Mississippi WIC Each PedNSS record had a field for 'ever breastfed'. A high proportion of this data was missing (33.8% in 1989 and 40.0% in 1993) Bf incidence data were available for 18,889 infants in 1989 and 17,216 infants in 1993 The trends in the percentage of missing data were similar for clinics with and without MPCP (29.0–33.6% and 39.2–43.8%, respectively)	Stated limitations External factors may have led to the reported increases Staff/programme characteristics are those reported in 1994, not those of 1989–93 High rate of missing data Factors/determinants Clinics with at least 50% of staff previously being on WIC, and clinics where the mean age of staff was > 35 years were more effective There were no significant differences between clinics with or without black staff members Length of time bf or as peer counsellor did not improve staff effectiveness

MPCP, Mississippi Peer Counselling Programme; PedNSS, Pediatric Nutrition Surveillance System (a continuous, statewide surveillance system in place in Mississippi since 1984); I, intervention group; C, control group

TABLE 39 *HSIs (WIC Program): before–after study*[101]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Long *et al.*, 1995[101] USA Research aim To determine whether initiation and duration rates of bf among low-income Native American women were affected by the addition of a bf peer counsellor programme at SLC Study design Before–after Method of group allocation By date Unit of allocation Cohort Unit of analysis Cohort Sample size calculation Not stated Outcome measures Bf initiation and continuation rates; bf definition: as long as a mother was nursing for at least once a day, she was classified as a bf mother	Selection Native American women enrolled in the WIC program at SLC; peer counsellors trained by Utah WIC Inclusion criteria I: Women enrolled February to November 1992 C: Records from enrolled women who gave birth betweeen January 1991 and January 1992 Peer counsellors had successfully breastfed at least 1 infant for at least 2 months, spoke both English and Navajo, owned a telephone, had access to reliable transportation, and were willing to talk to unfamiliar people Exclusion criteria Women were screened for contraindications to bf: HIV, using drugs contraindicated during bf, toxic levels of alcohol or chemical contaminants No-one was excluded	Age (years) 19–30 Socio-economic status Family income no more than 185% of poverty level Ethnicity I: 60 Native American, 3 white C: 72 Native American, 3 white, 2 Hispanic, 1 Asian Women who did not identify themselves as Native American maintained ties to the Indian population through a spouse or child Group comparability Groups were similar with regard to demographic data reported; no data on C prenatal intention to breastfeed	I: $n = 63$ Scheduled for bi-monthly clinic visits and at least 2 nutrition contacts with registered dietician or certified lactation educator per 6 months of enrolment in the SLC WIC program Received explanation of peer counsellor programme – told to expect contact from counsellor during last month of pregnancy and encouraged to contact her earlier if questions or problems arose Counsellors ($n = 2$) successfully completed Utah WIC training including 12 h input, supervised counselling and final examination (content not specified) in February 1992 Had contact with I prenatally at SLC and by telephone and home visits and postnatally at 1, 2 and 4 weeks C: $n = 78$ Content of standard WIC prenatal care is not clearly reported	Statistical techniques Mean and standard error for all demographic variables; chi-squared test for differences in initiation rates; non-parametric Mann–Whitney *U* test for duration data; bf rates in C were 70% so $p \geq 0.08$ determined as an acceptable level of significance Change in initiation rates I: 84% ($n = 45$), C: 70% ($n = 77$); $p = 0.07$ Change in duration rates* At 1 week: Same as at initiation At 2 weeks: I: 73% ($n = 45$), C: 65% ($n = 77$) At 1 month: I: 71% ($n = 45$), C: 57% ($n = 76$) At 2 months: I: 55% ($n = 42$), C: 41% ($n = 68$) At 3 months: I: 49% ($n = 41$), C: 36% ($n = 67$); $p = 0.08$ At 6 months: I: 21% ($n = 34$), C: 31% ($n = 65$) Other outcomes Bf rate in I at 6 months lower than expected Costs Estimated saving to WIC on formula milk of at least US$10,000 Peer counsellor employment costs during study less than US$1000 Possibly other reductions in healthcare costs owing to bf	How many per group, with reasons I: 18 missing cases from initiation due to EDD after November 1992 Some women left the SLC WIC program before 6 months postpartum (number not stated, but data missing for up to 9 women) C: Some women left the SLC WIC program before 6 months postpartum (number not stated, but data missing for up to 13 women) Intention-to-treat analysis Yes	Not clear when initiation rates were measured (? at 1 week postpartum) Counsellors did supervised counselling before February 1992; this may have contaminated C Discussion includes Native American beliefs about bf

SLC, Salt Lake City Indian Health Care Center; I, intervention group; C, control group; EDD, expected date of delivery

** These figures are calculated on the diminishing numbers in the Intervention and Control groups following withdrawals per group. The numerators (numbers of women breastfeeding in each group) are not provided however*

TABLE 40 *HSIs (WIC Program): before–after study*[103]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Michaels, 1993[103] USA Research aim To determine the effectiveness of bf promotion on the Utah WIC program Study design Before–after (cross-sectional) Method of allocation Not stated Unit of allocation Group Unit of analysis Group Sample size calculation Not stated Outcome measures Percentage of women bf at birth; percentage of women bf at 6 months; percentage of women perceiving WIC promotion of bf	Selection Mothers in the WIC program in Utah Inclusion criteria Not stated Exclusion criteria Not stated	Not stated	In 1990, the Utah WIC program made bf promotion a priority. A range of activities were implemented: • Bf pamphlets for mothers were developed or revised • Educational materials, videos, books and journals for professional WIC staff were updated and available for loan – 45 staff attended a 5-day lactation training course and each WIC appointed a staff member as a bf resource person • Guidelines for bf counselling were developed for staff and peer groups – 45 peer counsellors were trained • WIC newsletters/bulletins featured bf sections • Breast pumps were purchased and made available for loan to WIC employees and a limited number of WIC mothers *Before* Women in the WIC program in 1989; no numbers given *After* Women in the WIC program in 1991; no numbers given	Percentage of women bf Before / After birth 50 / 67 6 months 21 / 30 Percentage of women perceiving WIC promotion of bf in 1991 survey 79%	Not stated	Source of data/bf rates not stated

TABLE 41 *HSIs (WIC Program): before–after study*[102]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Nadel, 1993[102] USA Research aim To evaluate an intervention designed to increase the rate of bf to 35% within 1 year among a low-income, multi-ethnic population Study design Before–after Method of allocation Not stated Unit of allocation Individuals Unit of analysis Individuals Sample size calculation Not applicable – proportion of entire programme population Outcome measures Rates of bf initiation	Selection All women on Passaic WIC program, north-east New Jersey Inclusion criteria Low income Exclusion criteria Not stated	Not stated The Passaic WIC program grew by 23% during period of bf promotion intervention owing to dramatic increase in unemployment in the area	Intervention is reported to have started April 1992 I: *n* = 4000 • Hire and train lactation instructor and 2 peer counsellors who are also lactation consultants to train 40 peer counsellors and 60 WIC staff members • Prenatal bf group and one-to-one education • Bilingual bf education booklet • Bf promotional material and advertising (local) • Annual in-service bf programme to hospital staff from WIC program director to promote consistent advice and support across health sectors • Postnatal services such as peer support, telephone counselling and incentives/prizes	Statistical techniques Not stated Change in initiation rates B: 25% (April 92) A: 33% (September 92) numbers of women on which these figures are based are not clear – see comments Previous rates 29% – October 90 34% – September 91 28% – January 92 3 lactation instructors and 3 peer counsellors were employed by the Passaic WIC program in September 1991; following staffing cuts in October 91, 1 lactation instructor and 2 peer counsellors	Not stated	Paper states 4000 clients within Passaic WIC program, although the number of women and the data for this figure are not provided. Also, any change in numbers owing to the 23% increase in clients may or may not be factored into this figure Possible contamination from other interventions or factors during 1-year intervention period

I, bf promotion intervention; B, before intervention group in April 1992; A, after intervention group in September 1992

TABLE 42 *HSIs (training of health professionals): before–after study*[105]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Bleakney & McErlain, 1996[105] Northern Ireland Research aim To evaluate the effects of infant feeding guidelines on health professionals' knowledge and attitudes Study design Before–after (cross-sectional) Unit of allocation Individuals Unit of analysis Individuals Sample size calculation None reported Outcome measures Changes in health professionals' knowledge and attitudes with respect to infant feeding	Selection All midwives, HVs, dieticians, CMOs, SCMOs, GPs and community pharmacists working in the EHSSB area Inclusion/exclusion criteria All staff, as above	B: numbers surveyed in 1991 CMOs/SCMOs: 40 Dieticians: 34 HV: 234 Midwives: 568 GPs: 384 Pharmacists: 222 Overall: 1482 A: numbers surveyed in 1993 CMOs/SCMOs: 25 Dieticians: 45 HV: 216 Midwives: 548 GPs: 386 Pharmacists: 227 Overall: 1447 Female respondents 1991: 78%; 1993: 81% For both surveys, 99% of male respondents were either GPs or pharmacists Bf of respondents' own children for at least 6 weeks 1991: 77%; 1993: 85% Group comparability The 2 survey groups were reported to be comparable for the following variables: profession; gender; age; frequency of giving infant feeding advice; distribution of respondents by year of qualification; whether respondents had children. 70% of 1993 respondents had participated in the 1991 survey	B: 1991 Postal survey of health professionals by anonymous questionnaire undertaken, which included questions to assess knowledge of, and attitude to, bf, and questions concerning characteristics of respondents. Scales were developed for the knowledge and attitude questions, and were tested for validity and reliability Intervention Consensus guidelines on infant feeding, developed by a multidisciplinary team and published in 1991, were implemented using a cascade approach. Teams were established and trained in 9 management units. Financial, audio-visual and written resources were made available. Seminars were organised for all professional groups. Copies of guidelines were provided to all participants A: 1993 Survey repeated, using same questionnaire with some supplementary questions to determine the impact of the infant feeding initiative. Posters and reminders were used to encourage response, and GPs and pharmacists were sent a second questionnaire because of their particularly low response rates	Statistical techniques ANOVA Knowledge scores All groups increased knowledge scores over time; $p < 0.0001$ for mean difference in overall scores. The following independently explained the greatest proportion of variation in scores: profession 31%; gender 21%; reading guidelines 20%; frequency of giving infant feeding advice 15% ($p < 0.0001$ for all 4). No significant difference in scores of those who had/not participated in the survey Attitude scores Difference in overall mean scores over time not statistically significant. Several variables were found to have an independent and statistically significant effect on scores, but the proportion of variability explained by these was small: profession 9%; own child breastfed 7%; frequency of giving bf advice 6%; reading guidelines 4% ($p < 0.0001$ for all 4) Penetration of guidelines 81% of respondents had read the guidelines and 83% had received a copy of them. Respondents who had read the guidelines were: HVs: 95% Midwives: 93% CMOs: 81% Dieticians: 75% GPs: 55% Pharmacists: 50%	Response rates by profession B: 1991 CMOs/SCMOs: 52% Dieticians: 88% HV: 64% Midwives: 68% GPs: 43% Pharmacists: 52% Overall: 59% A: 1993 CMOs/SCMOs: 48% Dieticians: 91% HV: 71% Midwives: 68% GPs: 31% Pharmacists: 48% Overall: 57%	

CMO, clinical medical officer; SCMO, senior clinical medical officer; GP, general practitioner; EHSSB, Eastern Health and Social Services Board; B, group studied before the intervention took place; A, group studied after the intervention took place

TABLE 43 *HSIs (training of health professionals): before–after study*[104]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Brimblecombe & Cullen, 1977[104] UK Research aim To determine whether the provision of seminars to MW and HV improves the incidence of bf Study design Before–after (cross-sectional) Unit of allocation Individuals Unit of analysis Individuals Sample size calculation None reported Outcome measures Bf rates at discharge from hospital; bf rates 6 weeks postpartum; factors influencing the choice of infant feeding method Data analysis was blinded	Selection MW and HV in Exeter district Mothers normally resident in Exeter district at the time of their deliveries, irrespective of place of delivery Inclusion criteria As above Exclusion criteria Mothers whose babies did not survive up to the time of the first questionnaire (8–16 days postpartum)	Comparability between B and A not reported, except to say that the groups were 'similar'	B: The first survey included 500 mothers who had babies between 1.1.75 and 28.2.75 Three seminars were held for MW and HV during June 1975 so that all staff attended 1 seminar. Advantages of bf and methods of helping mothers to breastfeed were discussed A: The second survey included a similar group of 539 mothers who had babies between 1.7.75 and 14.9.75 Data collection Data were collected via questionnaires administered by the MW 8–16 days postpartum during an interview with the mother. In the case of twins, a questionnaire was completed in respect of each baby. Those bf at this point were sent a follow-up questionnaire at 6 weeks postpartum, with a reply-paid envelope. HV contacted those who did not return the follow-up questionnaire	Statistical techniques *t* test; chi-squared test Bf rates on discharge B: 228/500 (45.6%) A: 264/539 (49.0%) n.s. Bf rates at 6 weeks postpartum B: 161/500 (32.2%) A: 171/539 (31.7%) n.s. Possible confounding factors The authors state that the 2 surveys were conducted at a time when a great deal of interest in bf was being generated both locally and nationally. It is possible that mothers received extra help with bf during the first survey, despite MW and HV being asked not to change their policies during this time During the early part of 1975, supplies of National Dried Milk became limited for a period of about 4 months The authors state that the medical and MW staff in the CU were responsible for planning and organising the surveys and seminars, and possibly continued to take an active interest in promoting bf, thereby promoting higher rates over time in the CU	Numbers of non-respondents B First questionnaire: 0 Second questionnaire: 17 A First questionnaire: 0 Second questionnaire: 2	Data on factors/determinants Place of delivery Bf rates higher among home births than general practice unit or CU births (differences n.s.). Bf rates among CU births showed a significant increase between B and A ($p \leq 0.05$), but no such increase shown among general practice unit births Social class Mothers from social classes 1 and 2 were most likely to breastfeed both at discharge and at 6 weeks, followed by mothers from social class 3 non-manual. Mothers from social classes 3 manual, 4 and 5 were least likely to breastfeed ($p \leq 0.01$ but comparison unclear). A significant difference was noted between social class 3 non-manual and manual People who influenced mothers' choice of feeding For both surveys, mothers considered their own convictions to be the most important influence Other factors influencing choice Greatest was mothers' knowledge of effects of the chosen method on infant health; this was more likely to encourage bf than bottle-feeding. Previous experience of infant feeding and convenience was also important but more likely to encourage bottle-feeding than bf Reasons for discontinuing bf Question in second survey only, at 6 weeks postpartum. Most important reasons were baby not satisfied/ crying excessively, sore nipples/other breast discomfort, and milk drying up. Combinations of these factors sometimes quoted Note: data also given on the effects on choice of feeding method of whether mother/ previous children breastfed, maternal age, and gestation at first antenatal care, but information presented overall for both surveys, with no breakdown for B and A

MW, midwives; B, before group; A, after group; CU, consultant unit

TABLE 44 *HSIs (training of health professionals): before–after study*[106]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Ellis and Hewat, 1983[106] Canada Research aim To study the effectiveness of an in-service programme for nurses on bf Study design Before–after (cohort) Unit of allocation Group Unit of analysis Group Sample size calculation None Outcome measures Percentage of nurses attending; differences in scores between RNs and PNs; numbers of nurses reading journal articles at the time of follow-up; mean knowledge score at follow-up tests	Selection All nurses at the maternity unit of a British Columbia lower mainland hospital were invited to participate on a voluntary basis Inclusion criteria Not stated Exclusion criteria Not stated	• 55 RNs of whom: 2 were senior administrators; 4 were head nurses; 1 was a clinician; 50 staff nurses • 25 PNs Length of experience: 1–42 years (mean 9.68 years) 37% breastfed own infant	All volunteers were asked to complete an anonymous questionnaire assessing attitude, experience and practice in relation to bf An in-service education course was provided over 3 classes, repeated 13 times in 1 month; a video was screened 6 times to augment the classes; journal articles were available at 4 nurses' stations to disseminate research findings; a clinician attended the ward each day for 2.5 months to reinforce group teaching, demonstrate good practice and provide practical support to mothers Knowledge was assessed at 1 and 3 months after the education programme using a 45-item questionnaire: 4 items related to attitude, 35 to knowledge about bf	% of nurses attending at least 1 in-service bf event RN: 25/55 (45%) PN: 20/25 (79%) n.s. Response frequencies on 11 items at follow-up showed considerable disagreement, hence conflicting advice to bf mothers RNs held more positive attitudes to bf compared with PNs ($p = 0.05$) Knowledge scores of PNs were more related to having read bf articles than knowledge scores of RNs ($p = 0.006$) Mean knowledge score (max 36) 25.86 ± 5.9; range 12–35 Mean knowledge score (max 36) 26.08 ± 5.9; range 12–35 Change over time 0	112 RNs invited: 55 participated 94% of intensive care nurses; 48% labour delivery nurses; and 36% of postpartum nurses completed the test	The introductory test was designed to highlight learning needs Follow-up tests were designed to test the content taught This study is not a pre- and post-intervention direct comparison

RN, registered nurse; PN, practical nurse

TABLE 45 *HSIs (training of health professionals): before–after study*[107]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
McIntyre & Lawlor-Smith, 1996[107] Australia Research aim To determine health professionals' level of bf knowledge, and to evaluate whether a series of 2 workshops would alter their knowledge Study design Before–after (cohort) Unit of allocation Individual health professionals Unit of analysis Individual health professionals Sample size calculation None Outcome measures Knowledge of bf including bf physiology, immunology, problem management, infant nutrition and relevant maternal factors	Selection Health professionals (GPs, MCHNs, RMs, ENs), NMAA counsellors and pharmacists in the Southern Metropolitan Area of Adelaide were invited to attend 2 workshops held during a 2-month period	Occupation GP: 13 RM: 31 MCHN: 13 NMAA: 3 EN: 3 Pharmacist: 2 Total: 65 Age (years)/years since training GP: 33.4 ± 4.5/8.2 ± 3.5 RM: 39.0 ± 7.8/14.4 ± 9.8 MCHN: 40.2 ± 6.3/12.5 ± 10.5 NMAA: 33.0 ± 2.6/1.3 ± 0.6 EN: 34.3 ± 1.5/15.3 ± 0.6 Pharmacist: 36.5 ± 2.1/13.5 ± 0.7 Number of children/bf duration (average months child fed) GP: 2.0 ± 1.1/9.1 ± 3.4 RM: 2.0 ± 0.7/10.4 ± 6.0 MCHN: 2.1 ± 0.6/9.2 ± 6.3 NMAA: 2.0 ± 0.0/24.4 ± 3.7 EN: 0 Pharmacist: 2.5 ± 0.7/5.5 ± 0.7	Before *n* = 65 Participants completed questionnaire before the first workshop Intervention The workshops were held in 1994 and 1995; each workshop was repeated on 3 separate occasions on different evenings of the week. Content was based on attendees' needs, and included: advantages of bf; cracked nipples; mastitis; the unsettled baby; settling techniques; sleep problems; social and cultural aspects of bf; failure to thrive; breast refusal; weaning; drugs and bf; postnatal depression. Much of the information was given as case study presentation. GPs and other health professionals presented the information at the workshops After *n* = 65 65 participants attended both workshops and completed both questionnaires Data collection The questionnaire was a modified version of one developed by Lowe (1990)* and comprised 38 statements discussed during workshops	Statistical techniques Questionnaire scores for the total group and all subgroups of health professionals were compared, before and after the workshops, using a paired *t* test. The subgroups of NMAA counsellors, ENs and pharmacists were too small for statistical analysis. Professional subgroups were not pooled for purposes of analysis because of the disparity in their professional training and occupations. The Student's *t* test was used for between-group comparisons Mean percentage of correct answers pre-/post-workshop GP: 78.5 ± 13.7/91.3 ± 8.7 $p < 0.05$ RM: 72.2 ± 9.0/86.8 ± 7.9 $p < 0.001$ MCHN: 76.5 ± 13.2/90.7 ± 4.0 $p < 0.001$ NMAA: 87.7 ± 3.0/93.0 ± 4.0 EN: 64.0 ± 3.0/83.3 ± 5.5 Pharmacist: 39.5 ± 0/84.2 ± 7.4 Overall: 73.7 ± 12.8/88.5 ± 7.4 $p < 0.001$ Differences between occupational groups There were no statistically significant differences between GPs, RMs and MCHNs in either the pre-workshop scores or the post-workshop scores	Health professionals who attended the workshops but did not complete both pre- and post-workshop questionnaires were not included in the analysis (but numbers not given)	It is unclear whether all staff in the metropolitan area were invited to attend the workshops

MCHN, maternal and child health nurse; RM, registered midwife; EN, enrolled nurse; NMAA, Nursing Mothers' Association of Australia

* *Lowe T. Breastfeeding: attitudes and knowledge of health professionals.* Aust Fam Physician *1990;**19**:392–8*

TABLE 46 *HSIs (training of health professionals): before–after study*[108]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
Stokoe and Clarey, 1994[108] England Research aim To determine the benefits of midwife training on the rates of bf problems Study design Before–after (cross-sectional) Unit of allocation Group Unit of analysis Group Sample size calculation Not stated Outcome measures Percentage of mothers intending to breastfeed; percentage of mothers initiating bf; percentage of mothers exclusively bf at first postnatal visit; number of bf women changing to bottle-feeding or partial bf by first postnatal visit; percentage of bf women changing to bottle-feeding only by first postnatal visit; percentage of bf mothers reporting bf problems; length of stay	Selection All women from Oxfordshire delivering during March 1993 and 6 months later in September 1993 Inclusion criteria Not stated Exclusion criteria Not stated	Not stated	Before *n* = 353 (March 1993) Intervention 11 training sessions were set up, led by the John Radcliffe bf adviser, targeted at midwives. The session contents were based on problem areas highlighted by the mothers from the March survey, in particular bf technique and milk supply After *n* = 356 (September 1993) Data collection By local health visitors using questionnaire completed at first postnatal visit, 2 weeks after hospital discharge	Mothers intending to breastfeed Before: 73.0% After: 74.4% Mothers initiating bf† Before: 71.3% After: 71.9% Mothers exclusively bf at first postnatal visit Before: 55.2% After: 58.1% Number of bf women changing to bottle-feeding or partial bf by first postnatal visit Before: 48 (23.8%) After: 37 (19.1%) % of bf women changing to bottle-feeding only by first postnatal visit Before: 19.0% After: 14.4% Mothers reporting bf problems Before: 70.8% After: 72.2% Length of stay *Before* < 48 h: 61.4% 5 + days: 17.6% *After* < 48 h: 52.6% 5 + days: 24.1%	March survey: 66.3 % response rate September survey: 74.9% response rate	Since training alone was unsuccessful 3 new joint initiatives were launched to support women in the early weeks of bf: (1) improving hospital/community communications; (2) prompt community support for bf mothers following discharge; (3) helpline for bf problems

* *These figures are as reported in the original paper. The denominators (the actual number of participants in each group) were not available however*
† *As a % of those intending to breastfeed*

TABLE 47 *HSIs (social support from health professionals): RCT*[113]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
Oakley *et al.*, 1990[113] UK Research aim To determine the effectiveness, in medical and psychological terms, of a programme of home visits to women at above average risk of having a low-birthweight baby Study design RCT Method of group allocation Randomised in balanced blocks stratified by centre; not concealed Unit of allocation Individual Unit of analysis Group Sample size calculation Sample size of at least 420 chosen to give an 80% chance (α = 0.05) of identifying a difference in the mean birthweight of 150 g, assuming a SD of 550 g Outcome measures Initiation rates at hospital discharge; women's views	Selection Women booking for delivery at the antenatal clinics of 4 hospitals in the Midlands and South of UK Inclusion criteria At least 1 previous normally formed baby weighing under 2500 g following spontaneous onset of labour; less than 24 weeks gestation with a singleton pregnancy; fluent in English; agreed to participate	Age I: mean 27.9 years; SD 3.5 years; 4% under 20 years C: mean 28.1 years; SD 3.5 years; 4% under 20 years Socio-economic status *Married or cohabiting* I: 84%; C: 81% *Unsupported* I: 16%; C: 19% *Working class by partner's occupation* I: 78%; C: 75% *Partner unemployed* I: 18%; C: 19% *Employed in pregnancy* I: 30%; C: 34% Ethnicity 5% both groups Afro-Caribbean or Asian Other *More than 1 previous low-birthweight baby* I: 14%; C: 13% *Gestational age at booking* I: mean 15.7 weeks; SD 3.5 C: mean 15.6 weeks; SD 3.5 *Smoking at booking* I: 41%; C: 40% Group comparability Both groups were at higher than average risk, both obstetrically and socially, of having a low-birthweight baby, according to the criteria used	I: *n* = 255 In addition to standard care, women in the intervention group received a minimum package of 3 home visits (at 14, 20 and 28 weeks gestation) plus 2 telephone contacts or brief home visits between these times from a research midwife (1 for each of the 4 centres). The midwives carried pagers and were on call 24 h a day. They were asked to provide as much support as the mothers asked for, within the constraints of their caseload, and to give advice or information about specific topics only when asked for. They did not provide any clinical care, but referred women as appropriate to health or social services C: *n* = 254 Received standard care; standard care at the 4 participating institutions is not described	Statistical techniques Chi-squared and Student's *t* tests for discrete and continuous variables respectively 95% CI of relative risks using method of Katz and colleagues (1978)† Change in initiation rates I: 105 (46%) bf at discharge C: 89 (39%) bf at discharge Other outcomes • More C women admitted to hospital antenatally (I: 41%, C: 52%) • More spontaneous onset of labour (I: 74%, C: 68%) and spontaneous vaginal delivery (I: 81%, C: 75%) and less epidural use (I: 11%, C: 16%) in I group • Similar numbers of babies resuscitated at birth/admitted to neonatal unit, but I babies required less invasive methods for resuscitation and less intensive and special neonatal care • I babies' birthweight was a mean of 38 g higher than that of the C babies • I mothers reported significantly higher postnatal health scores for themselves and their babies • Women's attitudes to the social support intervention were positive; 80% of postnatal respondents said the midwife listened and this was important	How many per group/reasons Of the 507 women with case note information, 5 sets of twins (3 in I, 2 in C) were diagnosed after randomisation and were excluded, as well as 4 terminations (2 in I, 2 in C) and 12 miscarriages (6 in I, 6 in C; all below 1000 g) Intention-to-treat analysis Yes 92% of I were seen at home at least 3 times Researchers state that as a consequence of the recruitment method used, there was a degree of overflow of support to the control group which may have resulted in a narrowing of the differences found	Authors state: "A sign test based on the 15 hypotheses of the study prespecified in the original protocol shows that the probability of our data favouring the intervention group for 13 of these (as it does) is 0.0009. However, this needs to be interpreted conservatively as the hypotheses were not all independent."

I, intervention group; C, control group

* *Figures shown are as reported in the original paper*

† *Katz D, Baptista J, Azen SP, Pike MC. Obtaining confidence intervals for the risk ratio in cohort studies.* Biometrics *1978;**34**:469–74*

TABLE 48 *Peer support: non-RCT*[111]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
Kistin *et al.*, 1994[111] USA Research aim To determine whether peer support increases bf initiation, duration and exclusivity in a population of low-income urban women Study design Non-RCT Method of group allocation Resources insufficient for all who requested the intervention to receive it; priority given to first-time mothers and those with previous bf problems; remainder formed control group Unit of allocation Individual mothers Unit of analysis Individuals who received/did not receive input requested Sample size calculation Not reported Outcome measures *Any bf*: defined as nursing 1 or more times per day (at hospital discharge, > 6 weeks, > 12 weeks) *Exclusive bf*: defined as feeding the infant only breastmilk (at hospital discharge, > 6 weeks, > 12 weeks) *Duration*: length of time until infant received no milk	Selection Women who gave birth at CCH, the only public hospital in Chicago (5500 deliveries at CCH in 1989; 90% of family incomes of patients at CCH at or below poverty level; 21.8% postnatal women who gave birth at CCH in 1988 breastfed at discharge) PCs from same racial or socio-economic background as CCH patients, had breastfed, desired to help other women to breastfeed and completed training Inclusion criteria Women spoke English or Spanish, planned to breastfeed and requested PC Exclusion criteria None stated	Age (years) Mean: 21–22 Ethnicity *African-American* I: 40/59 (68%) C: 28/43 (65%) *Hispanic* I: 3 (5%); C: 3 (7%) *White* I: 9 (15%); C: 8 (19%) *Other* I 7 (12%); C: 4 (9%) Education (< 12 years) I: 18/59 (31%) C: 14/43 (33%) Plan work or school I: 32/59 (54%) C: 20/43 (47%) Prior bf I: 13/59 (22%) C: 6/43 (14%) Perceived support for bf I: 32/59 (54%) C: 28/43 (65%) Group comparability Comparable ($p > 0.05$) for race, age, previous bf experience and perceived support for bf from the baby's father or grandmother	I: $n = 59$ Received PC input: prenatal talk with PC if possible; telephone calls from PC at least twice per week until bf established; telephone call from PC every 1–2 weeks for the next 2 months and 'as needed' after that. PC training used the model of Paulo Freire for popular education, emphasising empowerment of trainees. PC training provided by CBTF (bf training providers since 1987). Headings listed (bf promotion and management; infant growth, development and common illness; when and how to refer to professionals) and content related to bf not specified. PC caseloads were limited to 2–5. PCs received supervision every 2 weeks from the project director who was experienced in lactation management and community organisation C: $n = 43$ Requested but did not receive PC input. No bf protocol and no other bf promotion activity at CCH at the time of the programme Data collection Data collected at initial interview and follow-up telephone calls I telephoned by PC, C by 1 author and a trained research assistant PCs were paid for time spent at the hospital but not for telephone calls	Initiation rates at hospital discharge *Any bf* I: 55/59 (93%) C: 30/43 (70%) Chi-squared test; $p < 0.05$ *Exclusive bf* I: 45/59 (77%) C: 17/43 (40%) Chi-squared test; $p < 0.05$ Duration: mean number of weeks of bf *Exclusive* I: 8, C: 4 *Bf at least once per day* I: 15, C: 8 $p < 0.05$ Any bf (at least once a day) at > 6 weeks I: 38/59 (64%) C: 12/43 (28%) Chi-squared test; $p < 0.05$ Exclusive bf at 6 weeks I: 25 (44%) C: 7 (16%) Chi-squared test; $p < 0.05$ Any bf at > 12 weeks I: 26/59 (44%) C: 5/43 (12%) Chi-squared test; $p < 0.05$ Exclusive bf at 12 weeks I: 17/59 (29%) C: 3/43 (7%) Chi-squared test; $p < 0.05$	Data was collected until 12 weeks postpartum or until the client was lost to follow-up I: 5 lost to follow-up before 12 weeks C: 4 lost to follow-up before 12 weeks	The authors of the paper conclude that PCs help women to carry out their plans to breastfeed, emphasising that this study included only those who intended to breastfeed and were open to a PC Not clear how women came to hear about and to request PC, other than that the article states that staff in the bf programme [*sic*] made rounds of the postnatal wards on 5 days per week

CCH, Cook County Hospital; PC, peer counsellor; I, intervention group; C, control group; CBTF, Chicago Breastfeeding Task Force

* *These figures are as reported in the original paper. Denominator information (the actual number of participants in each group) was not available however*

TABLE 49 *Peer support: non-RCT*[112]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
McInnes, 1998[112] UK (Glasgow, Scotland) Research aim To determine whether a programme of peer counselling and support increases the prevalence and duration of bf in a socially deprived community Study design Community based, non-RCT Method of group allocation By geographical area Unit of allocation Group based on residential area Unit of analysis Group based on residential area Sample size calculation Not reported Outcome measures Intending to breastfeed antenatally (booking and return visits); initiated bf at delivery; any bf at discharge from hospital/at 6 weeks; exclusive bf at discharge/at 6 weeks	Inclusion criteria Women booked for antenatal care in 2 geographically separate socially deprived areas of Glasgow during a 2-year period Helpers (peer counsellors), selected by health professionals, lived in the intervention area, had breastfed for at least 3 months, had at least 1 child under 5 years old, and had an interest in helping other mothers to breastfeed Helpers were screened by local police before contact with study participants Exclusion criteria None stated	Age Not stated Socio-economic status Living in socio-economically deprived areas of postwar local authority housing in Glasgow with young families, high unemployment and mainly unskilled workers Ethnicity Not stated Other Bf incidence in the 2 areas was around 8% prior to the study Group comparability Researcher states that groups were fairly similar, with any differences that did occur tending to favour bf in the control group	I: *n* = 474 These women booked for antenatal care in Easterhouse and received 2 antenatal visits from a helper, who provided information about bf so that women could make an informed choice about feeding their babies. Those who chose bf received at least 2 postnatal visits from a helper Helper training was based on the BEST bf course (Warren†) C: *n* = 521 These women booked for antenatal care in Drumchapel and received standard care ('standard care' not described) Data collection Data collected using 4 self-completion questionnaires: 2 antenatal and 2 postnatal	Intending to breastfeed at booking I: 86/474 (18.1%); C: 111/521 (21.3%) I women stating an intention to breastfeed at booking were significantly more likely to initiate bf ($p < 0.01$) and to be bf at discharge ($p < 0.01$) and 6 weeks ($p < 0.05$) Intending to breastfeed at return antenatal visit I: 94/399 (23.6%); C: 91/430 (21.2%) Significantly more I women stated a change in their feeding intention in favour of bf between booking and return ($p < 0.05$) Initiation rates at delivery I: 105/449 (23.4%); C: 94/477 (19.7%) Any bf at discharge I: 82/449 (18.3%); C: 69/477 (14.5%) Exclusive bf at discharge I: 66/449 (14.7%); C: 65/477 (13.6%) Any bf at 6 weeks I: 43/447 (9.6%); C: 36/472 (7.6%) Exclusive bf at 6 weeks I: 37/447 (8.3%); C: 25/472 (5.3%) Other beneficial/adverse effects Mothers valued helper support; helpers responded to the needs of individual women, sometimes beyond the stipulated 4 visits; helpers assisted mothers with often profound emotional repercussions of stopping bf prematurely	How many per group *At first questionnaire (booking)* I: 474 (100%); C: 521 (100%) *Second antenatal questionnaire completed by* I: 399 (84%); C: 430 (83%) *Delivery feeding data obtained from hospital records for* I: 449 (95%); C: 477 (92%) *Third questionnaire completed 0–2 days after the birth by* I: 350 (78%); C: 370 (78%) *Fourth questionnaire completed 6 weeks after the birth by* I: 447 (94%); C: 472 (91%) Reasons for withdrawals Miscarriage, neonatal death, moved out of Glasgow Intention-to-treat analysis Yes	Sought to avoid contamination by geographical separation of I and C Results showed the intervention had a positive effect on bf intention and initiation, mainly due to those who intended to breastfeed maintaining their decision No effect shown on those with the intention to bottle-feed or who were undecided about feeding method, or on feeding behaviour at 6 weeks Researcher cites Neyzi and colleagues (1991)‡, Bloom and colleagues (1982)§, Long and colleagues (1995)[101] and Houston and Howie (1981)¶ in support of the possibility that this may be because the postnatal support provided by the intervention was flexible, rather than frequent and regular

I, intervention group; C, control group

* *Figures shown are as reported in the original paper*
† *Warren J. BEST Breastfeeding Course. Available from Jenny Warren at 37 Bothwell Road, Hamilton ML3 0AS, UK*
‡ *Neyzi O, Olgun P, Kutluay T,* et al. *An education intervention on promotion of breastfeeding.* Paediatr Perinat Epidemiol *1991;**5**:286–98*
§ *Bloom K, Goldbloom RB, Robinson S, Stevens FE. Factors affecting the continuance of breastfeeding.* Acta Paediatr Suppl *1982;**300**:9–14*
¶ *Houston MJ, Howie PW. Home support for the breastfeeding mother.* Midwife, Health Visitor and Community Nurse *1981;**17**:378–82*

TABLE 50 *Media campaigns: before–after study*[109]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Coles *et al.*, 1978[109] UK Research aim To measure the prevalence of and attitudes towards bf before and after a media campaign Study design Before–after study (cross-sectional) Method of group allocation Not stated Unit of allocation Individuals Unit of analysis Individuals; primiparous and multiparous groups; social class; ethnic groups Sample size calculation None Outcome measures Prevalence of bf in 1975 and 1977 from birth to 3 months for primiparous and multiparous women Intention to breastfeed, ethnicity and proportion of women bf by social class	Selection All pregnant women who delivered in a UK hospital over a 1-month period in May and June 1975 and February 1977 Inclusion criteria Mothers who were still bf at 1 month were sent the second questionnaire at 3 months Exclusion criteria Not stated	Age Not stated Socio-economic status 40% of mothers from social classes I and II compared to national average of 19% Ethnicity Not stated Group comparability Not stated	B: *n* = 217 (1975) Media campaign directed at mothers, doctors, midwives and health visitors; no other information on intervention A: *n* = 252 (1977) All mothers who had delivered in hospital in study period were sent a questionnaire at home at 1 and 3 months after delivery (if still bf); if no reply, followed-up by letter, telephone or personal visit Data collection A dietician spoke to all mothers delivered within 2 weeks in 1975 and 4 weeks in 1977 on postnatal wards shortly after delivery to record factors' information	Statistical techniques Not stated Change in initiation rates *Primiparous* 1975: 81% 1977: 89% $p < 0.001$ *Multiparous* 1975: 57% 1977: 72% $p < 0.001$ Change in duration rates at 3 months *Primiparous* 1975: 28% 1977: 42% *Multiparous* 1975: 24% 1977: 37%	100% response rate for 1 month questionnaire: 217 mothers in 1975 and 252 mothers in 1977 2 women did not respond to 3-month questionnaire owing to moving abroad: if 1975 or 1977 not stated	Possible contamination from any other intervention or promotion activity between 1975 and 1977 Intention to breastfeed of 381 mothers class I and II: 82% class III: 61% class IV and V: 54% When standardised for social class distribution of the 1970 British Births Survey, proportion intending to breastfeed reduced to 62% Reasons stated by primiparous mothers for choosing bottle-feeding and stopping bf were similar to those in the 1975 National Infant Feeding Survey No significant differences in intention to breastfeed between ethnic groups

B, group studied before the intervention; A, group studied after the intervention

TABLE 51 *Media campaigns: before–after study*[110]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Friel *et al.*, 1989[110] Newfoundland, Canada Research aim To examine the impact of a promotion campaign on knowledge and attitudes of high school female students towards bf Study design Before–after (part cohort) Method of group allocation Random selection by class from each of 3 grades (10, 11 and 12) allocated to 1 of 3 groups: before group; after group, who were in before group; after group, who were not in before group, acting as control Unit of allocation 1 of 3 groups based on whether had taken pre-intervention test or not Unit of analysis 1 of 4 groups as follows: G1 – completed pretest, saw campaign, completed post-test G2 – completed pretest, did not see campaign, completed post-test G3 – did not complete pretest, saw promotion campaign, completed post-test G4 – did not complete pretest, did not see campaign, completed post-test Sample size calculation Not stated Outcome measures Change in knowledge about bf; change in attitude about bf	Selection Girls with mean age of 16 distributed through 3 grades (10–12) in 2 regional high schools in St John's, Newfoundland Inclusion criteria High school females aged 15 years Exclusion criteria Not stated	Age (years) All subjects aged 14–19 Mean age: 16.3 Socio-economic status Not stated Ethnicity Not stated Group comparability Not stated	B: *n* = 333 (late December 1985) Intervention Promotion campaign from 4.2.86 to 14.3.86 (6 weeks) including: television commercial about bf aired on 2 local stations which ran for 15 sec, 5 times per week on each station; advertisements (appeared once); articles in 3 local newspapers A: *n* = 463 (late March 1986) *n* = 273: also completed pretest; *n* = 190: not completed pretest Data collection At time of pretest, women were not informed of campaign or planned post-test Women were surveyed within school and data were obtained on both occasions by same interviewer Questionnaire was developed and tested for reliability, based the 'Attitude Toward Breastfeeding Scale', using Spearman–Brown Corrected Split Half (odd–even) Index (0.83) and reliability of 'Knowledge Toward Breastfeeding Scale' using Kuder–Richardson formula (0.62) 4 sets of questions: knowledge about bf (20 questions); attitudes towards bf (18 statements scored on 5-point Likert Scale); exposure to bf; intention of bf in future Additional background information collected on number of children in each woman's family and their age and television-viewing habits	Statistical techniques SPSS for 2-way ANOVA to take into account exposure to campaign and if taken pretest Differences between groups assessed using Duncan's Multiple Range tests Change in knowledge Knowledge was significantly increased ($p < 0.05$) for women who had taken only pretest or pre- and post-tests regardless of exposure to media promotions Television commercial Saw / Didn't see *Pretest* 11.65 ± 2.26 (*n* = 221) / 11.38 ± 2.58 (*n* = 48) *No pretest* 11.05 ± 2.24 (*n* = 152) / 11.28 ± 2.26 (*n* = 32) No significant effect Newspaper advertisement Saw / Didn't see *Pretest* 11.34 ± 2.71 (*n* = 41) / 11.64 ± 2.27 (*n* = 215) *No pretest* 11.54 ± 2.35 (*n* = 26) / 10.97 ± 2.17 (*n* = 149) No significant effect Change in attitude No significant differences in pretest attitude scores between those who did or did not see promotional campaign Television commercial Saw* / Didn't see *Pretest* 3.51 ± 0.38 (*n* = 221) / 3.37 ± 0.38 (*n* = 48) *No pretest* 3.53 ± 0.37 (*n* = 152) / 3.41 ± 0.31 (*n* = 32)	Before group: 60 women did not complete pretest as not in school that day 31/10 women were not sure if they had seen the advertisement/TV commercial and were excluded from ANOVA	Any other bf promotion intervention may have been a confounding factor prior to or during the 6-week intervention period The number of groups used for analysis (4) was different to that used for allocation (3) Factors: 63% of all women reported they were not breastfed; 56% of all women reported that their siblings were not breastfed either; about 20% were uncertain of feeding method for themselves or their siblings; 81% of all women reported having seen someone breastfeed Reference to Manitoba Pediatric Society (1982)[118] study as impetus for intervention (see multifaceted interventions/ before–after; page 39 and *Table 56*) National bf rates reported at 25% from 1965 to 1971 1975 – Vancouver: 68–93% 1978 – Toronto and Montreal: 60–70% bf at hospital discharge

G1, group 1 for analysis of results; G2, group 2 for analysis of results; G3, group 3 for analysis of results; G4, group 4 for analysis of results; B, group studied before the intervention; A, group studied after the intervention

**Women who had seen commercial had significantly higher scores ($p < 0.05$) than those who did not regardless of whether they completed pretest or not*

continued

TABLE 51 contd *Media campaigns: before–after study*[110]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
continued Friel *et al.*, 1989[110] Newfoundland, Canada			Post-test questionnaire included question on whether women had seen TV commercial and/or advertisement	Newspaper advertisement Saw / Didn't see *Pretest* 3.47 ± 0.34 (*n* = 41) / 3.48 ± 0.39 (*n* = 215) *No pretest* 3.56 ± 0.39 (*n* = 26) / 3.48 ± 0.36 (*n* = 149) No significant effect Attitude to bf and intention to breastfeed: Intended to breastfeed: 3.71 ± 0.31 Did not intend to breastfeed: 3.15 ± 0.29 Significantly favourable attitude to bf for those women reported as intending to breastfeed: $p < 0.05$ Exposure 373 subjects saw the television promotion compared with 67 who read the newspaper promotion Costs Not stated		

G1, group 1 for analysis of results; G2, group 2 for analysis of results; G3, group 3 for analysis of results; G4, group 4 for analysis of results; B, group studied before the intervention; A, group studied after the intervention

TABLE 52 *Multifaceted interventions: non-RCT*[114]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Rodriguez-Garcia *et al.*, 1990[114] Mexico Research aim To evaluate 3 methods of promoting bf Study design Non-RCT Method of group allocation 4 sites chosen with the infrastructure to conduct a community intervention: 1 chosen randomly as the control site with no intervention; the remaining 3 were allocated different interventions Unit of allocation Group Unit of analysis Group Sample size calculation None stated Outcome measures Numbers of women bf; numbers of women exclusively bf at 1 month; numbers bf at 5 and 6 months	Selection Pregnant women attending antenatal clinics in 4 communities Inclusion criteria Women aged between 15 and 45 years; gestation up to 8 months; previous birth living 6 months or more Exclusion criteria Primigravidae Selection of bf promoters including living in the community, having 4 or more years of schooling, having breastfed own children and leadership capacities in volunteer activities in the community	Age Not stated Socio-economic status Low socio-economic status, either unemployed or below minimum wage; approx. 3–4 years of education Ethnicity Not stated Group comparability Not stated	I1: *n* = 160 Individual teaching and counselling by trained volunteers resident in the community; use of extensive educational materials (volunteers trained by the site supervisor – the person in charge of research activity on a locality basis) I2: *n* = 122 Group teaching of mothers by site supervisor I3: *n* = 148 Combined group and individual teaching by site supervisor and trained volunteers C: *n* = 155 No intervention Prior to project implementation, project staff were trained in areas of coordination, supervision, bf promotion and research according to their specific role. A bf reference manual was also developed for project use Data collection Monthly until 6 months postpartum by a research assistant at each site	Change in initiation rates *Baseline* I1–I3: 74.9%; C: 65.9% *Post-intervention* I1–I3: 88.8%; C: 56.0% Exclusive bf at 1 month I1–I3: 70.5%; C: 63.3% Exclusive bf at 5 months I1–I3: 13.7%; C: 14.7% Exclusive bf at 6 months I1–I3: 9.4%; C: 3.3% *p*-values not given	No information given on losses to follow-up	The paper presents only preliminary analyses of data. It combines the 3 interventions for the results section. It does state that interventions with trained volunteers are the most effective Informal peer support groups of bf mothers developed spontaneously as a result of programme activities Factors: Why women breastfeed "the best food": 30.8% "a family tradition": 12.8% "healthier": 28.2% "less work": 28.2% "cheaper": 28.2% "baby likes it": 28.2% "mother likes it": 28.2% Why women did not breastfeed "not enough milk": 24.6% "baby did not want to breastfeed": 22.5% "mother's health problems": 14.6% 28.5% of women felt that physicians influenced their decision to breastfeed

I1, first intervention group; I2, second intervention group; I3, third intervention group; C, control group

TABLE 53 *Multifaceted interventions: before–after study*[115]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Hartley and O'Connor, 1996[115] USA Research aim To determine the effect of the 'Best Start'* bf educational programme on the initiation of bf in urban women of lower socio-economic status, primarily African-American women Study design Before–after (cross-sectional) Method of group allocation MIPs were consecutively assigned to intervention or control groups Unit of allocation MIPs Unit of analysis MIPs Sample size calculation Chosen on basis of a goal of doubling existing bf rates; a 1-tailed test; $\alpha = 0.05$ and a power of 0.8 Outcome measures Initiation of bf at hospital discharge and bf at 2 weeks. Bf was defined as supplementing breastmilk with less than 120 ml of formula per day. Partial bf was defined as supplementing breastmilk with more than 120 ml formula per day	Selection 90 consecutive MIPs of low income, infants born in January and February 1993 before programme implementation; 90 consecutive MIPs of low-income, infants born in January and February 1994 Inclusion criteria Low income and if feeding data were available from both the hospital chart and the infant's outpatient clinic chart for 2-week visit Exclusion criteria Not stated	Age (years) *Pre-intervention group* ≤ 19: 18/21% 20–29: 56/65% ≥ 30: 12/14% *Post-intervention group* ≤ 19: 27/33% 20–29: 46/57% ≥ 30: 8/10% Ethnicity *Pre-intervention group* African-American: 73/85% White: 13/15% *Post-intervention group* African-American: 75/93% White: 6/7% No. of children *Pre-intervention group* 1st child: 36/42% > 1 child: 50/58% *Post-intervention group* 1st child: 30/37% > 1 child: 51/63% Insurance *Pre-intervention group* Medicaid: 81/94% Private: 5/6% *Post-intervention group* Medicaid: 76/94% Private: 5/6% Group comparability No statistically significant difference between these 2 groups for these factors	B: $n = 90$ Pregnant women were seen by obstetric–gynaecology residents and nurse practitioners with no standard bf teaching component A: $n = 90$ At the first and all subsequent prenatal visits, pregnant women received the standardised programme based on checklist of bf topics to be discussed during prenatal visit. Lactation nurses were available to help new mothers initiate bf and to help secure a breast pump Health professionals and clerical staff of the Women's Health Centre (University Hospitals) had attended a 'Best Start'* bf education training programme from Wellstart, San Diego Pamphlets, posters, videos, prenatal bf classes and peer support counsellors through the WIC Program were also introduced into the clinic Data collection Data from before and after implementation of the 'Best Start'* programme were collected from hospital health centre records following discharge and 2-week clinic visits Intervention based on the theory of social marketing combining principles of commercial marketing with health education to promote a socially beneficial practice. 3-step strategy for trained health professionals to educate women during prenatal visits, first eliciting the mother's concerns about bf, acknowledging those concerns and explaining the benefits of bf	Statistical techniques Chi-squared test Initiation rates at hospital discharge B: 13/86 (15%) A: 25/ 81 (31%) $p < 0.05$ Bf rates at 2 weeks B: 11/86 (13%) A: 17/81 (21%) $p = 0.2$ Other beneficial/adverse effects Initiation of bf by mothers < 19 years of age increased by 3 times, although this was not statistically significant owing to small numbers: 2/18 (11%) – 1993 10/27 (37%) – 1994 The same was true of mothers older than 30 years: 1/12 (8%) – 1993 3/8 (37%) – 1994 Initiation of bf by African-American mothers increased significantly from 12% (9/73) in 1993 to 31% (23/75) in 1994 $p < 0.01$ There was no statistically significant change in bf rates of white and other women; however, numbers analysed were small	In the 1993 pre-intervention group, 2 mothers withdrew from the bf group and 1 from the non-bf group to begin partial bf. Because of the small number of women using partial bf, analysis includes only women with full bf The numbers for bf rates at 2 weeks included 1 woman who changed from partial bf to full bf	Possible contamination from any other external intervention or promotion activity between 1993 and 1994 The number of children or previous pregnancies had no effect on the rate of initiation of bf

White, white and other; Private, commercial insurance and other; B, group studied before the intervention; A, group studied after the intervention

* *See reference in* Table 34 *footnote*

TABLE 54 *Multifaceted interventions: before–after study*[116]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Kirk, 1980[116] Scotland Research aim To evaluate the impact of guidelines on infant feeding practices Study design Before–after (cross-sectional) Method of group allocation Consenting mothers attending given child welfare clinics, satisfying the selection and inclusion criteria Unit of allocation Group Unit of analysis Group Sample size calculation Not stated Outcome measures Percentage of mothers given any professional infant feeding advice; percentage of mothers given any lay infant feeding advice; percentage of mothers given any media infant feeding advice; percentage of mothers encouraged to breastfeed; percentage initiating bf; number of mothers bf at 2 weeks; number of mothers bf at 4 months; percentage bf by social class; percentage bf by parity; percentage bf by hospital of delivery; percentage of mothers receiving professional advice on artificial milk/infant feeds; percentage of mothers introducing solids, by social class	Selection Mothers attending 4 child welfare clinics Inclusion criteria Healthy babies aged between 4 and 12 months born in Edinburgh Before Babies born between April 1974 and March 1975 After Babies born between October 1976 and September 1977	Social class *Before* Middle class: 41 Working class: 35 *After* Middle class: 114 Working class: 83 Parity *Before* Primiparous: 41 Multiparous: 37 *After* Primiparous: 110 Multiparous: 90 Hospital of delivery *Before* Hospital A: 25 Remainder: 53 *After* Hospital A: 71 Remainder: 129 No significant differences in parity or social class by place of delivery	Before: *n* = 78 After: *n* = 200 6 of 23 DHSS recommendations relate to infant feeding practices. Summarised: 1. Mothers should breastfeed for a minimum of 2 weeks, preferably 4–6 months 2/3. Artificial milk should approximate, as far as possible, human milk. Manufacturers should ensure mothers will reconstitute the milk accurately 4. Mothers are to avoid adding cereal to bottle-feeds 5. Mothers should delay weaning to solids until at least 4 months 6. Mothers and manufacturers should avoid adding salt and sugar to infant foods In response to these guidelines: Autumn 1975: the media began to give extensive coverage to the advantages of bf and the problem of unmodified dried infant milks Early 1976: the promotion of bf became policy among the medical and nursing profession in Scotland. Antenatal clinics offered routine infant feeding advice	Initiation of bf Before: 34 (44%); After: 137 (68%) Chi-squared test; $p < 0.005$ Number of mothers bf at 2 weeks Before: 23 (29%); After: 98 (49%) Chi-squared test; $p < 0.005$ Number of mothers bf at 4 months Before: 8 (10%); After: 74 (37%) Chi-squared test: $p < 0.0005$ Percentage bf by social class Before: Initial 56 Mid, 31 Work; 2 weeks 34, 26; 4 months 15, 6 After: Initial 84 Mid, 51 Work; 2 weeks 64, 30; 4 months 50, 21 Chi-squared test; $p < 0.05$; initial/before Chi-squared test; $p < 0.005$; all/after Percentage bf by parity Before: Initial 49 Pri, 38 Multi; 2 weeks 32, 27; 4 months 15, 5 After: Initial 81 Pri, 53 Multi; 2 weeks 61, 34; 4 months 49, 22 Chi-squared test; n.s.; before Chi-squared test; $p < 0.0005$; all/after Percentage bf by hospital of delivery Before: Initial Hosp A 44, Others 43; 2 weeks 35, 28; 4 months 12, 9 After: Initial Hosp A 83, Others 60; 2 weeks 68, 39; 4 months 52, 27 Chi-squared test; n.s.; before Chi-squared test; $p < 0.0005$; all/after	Not stated	Percentage mothers given any professional infant feeding advice *Before–after* Antenatal clinic: 50/74 Ward sister/staff: 53/80 Midwife (home): 6/22 Health visitor (home): 40/65 Child welfare clinic: 24/48 Percentage of mothers given any lay infant feeding advice *Before–after* Mother: 44/62 Husband: 27/70 Other: 42/87 Percentage of mothers given any media infant feeding advice *Before–after* Radio and TV: 10/42 Magazines and newspapers: 29/63 Books: 30/41 Percentage of mothers encouraged to breastfeed – source *Before–after* Antenatal clinic: 27/68 Ward sister/staff: 23/72 Midwife (home): 4/19 Health visitor (home): 15/44 Child welfare clinic: 10/22 Mother: 20/31 Husband: 5/51 Other: 23/72 Radio and TV: 9/42 Magazines and newspapers: 17/60 Books: 23/38

DHSS, Department of Health and Social Security; Mid, middle class; Work, working class

$^{*}p < 0.01$; $^{\dagger}p < 0.001$

continued

TABLE 54 contd *Multifaceted interventions: before–after study*[116]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
continued Kirk, 1980[116] Scotland Data collected by final year student/qualified dietician trained in interview techniques. Interviews used a structured questionnaire				Percentage of mothers receiving professional advice on artificial milk/infant feeds Before / After Choice 34% / 36% Pro modified milk 4% / not on sale Pro evaporated milk 26% / not stated Pro cow's milk < 4 months 4% / 3% Anti unmodified milk/ evaporated/cow 0% / 0% Anti cereal in bottle-feeds < 4 months 0% / 19% Pro cereal in bottle-feeds < 4 months 20% / 14% Anti sugar in infant food 0% / 2% Pro sugar in infant food 30% / 32% Anti salt in infant food 0% / 0% Introduction to solids < 4 months 25% / 15% Percentage of mothers introducing solids, by social class All / Middle class / Working class *Before* 1 month 14 / 5 / 26 2 months* 38 / 24 / 57 3 months 81 / 78 / 86 4 months 95 / 93 / 97 *After* 1 month 8 / 4 / 14 2 months 17 / 9 / 30 3 months† 59 / 42 / 82 4 months 90 / 87 / 94 Bottle-feeding mothers introduced solids earlier than bf mothers $p < 0.001$ at 3 months; n.s. at 4 months		

DHSS, Department of Health and Social Security; Mid, middle class; Work, working class

*$p < 0.01$; †$p < 0.001$

TABLE 55 *Multifaceted interventions: before–after study*[117]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
Lal *et al.*, 1992[117] India Research aim To determine whether selected mother and child health problems can improve through community participation of women in peer support activities Study design Before–after (cross-sectional) Method of group allocation Not stated Unit of allocation Group Unit of analysis Group Sample size calculation Not stated Outcome measures Rates of initiation of bf on the same day or immediately after delivery and at 6 months	Selection for before and after intervention data collection Not stated Selection for intervention All pregnant women and mothers in 10 villages of a community development area Exclusion criteria Not stated	Not stated Group comparability Not able to compare	Intervention 288 women were selected to receive 1 week of training on key mother and child health problems for subsequent work as community-based women groups Distribution of educational material and dissemination of health messages through education, promotional (e.g. media) and other activities to advocate bf and weaning B: n = 300 Baseline survey on range of health practices A: n = 300 Post-intervention survey on same range of health practices Data collection No further details on data collection process	Statistical techniques Not stated Change in initiation rates (%) B: 69/300 (23.1) A: 181/300 (60.2) $p < 0.05$ Change in duration rates at 6 months (%) B: 147/300 (49.0) A: 181/300 (60.2) $p < 0.05$ Other outcomes Continue feeding (bf?) during illness B: 11.7% A: 40.5% $p < 0.05$	No withdrawals apparent in data collection process	Possible contamination from any other intervention during the 2-year intervention period

B, group studied before the intervention; A, group studied after the intervention

* *Figures shown are as reported in the original paper*

TABLE 56 *Multifaceted interventions: before–after study*[118]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Manitoba Pediatric Society, 1982[118] Manitoba, Canada Research aim To determine the effectiveness of an intervention designed to increase the proportion of mothers who breastfed their infants for 2 months or longer by 100% Study design Before–after (cross-sectional) Method of group allocation Not stated Unit of allocation Group Unit of analysis Group Sample size calculation Not stated Outcome measures Rates of bf at hospital discharge and 2 months; reasons for choosing infant feeding method; factors influencing discontinuation of bf	Selection for before and after intervention data collection All infants born in Manitoba in first week of December 1978 and December 1979 Inclusion criteria All pregnant women in the province of Manitoba including the capital, rural areas and Indian reservations Exclusion criteria Infants living outside the province	Age (years) *Before group* < 18: 9/11% > 18: 268/59% *After group* < 18: 8/12% > 18: 241/58% Marital status *Before group* Single: 44/25% Married: 233/63% *After group* Single: 36/33% Married: 213/60% Parity *Before group* Primiparous: 128/64% Multiparous: 149/51% *After group* Primiparous: 93/56% Multiparous: 156/56% Place of residence *Before group* U: 142/62% R: 110/55% Res: 25/36% *After group* U: 126/66% R: 99/47% Res: 23/39% Infant birthweight *Before group* < 2500 g: 14/43% ≥ 2500 g: 237/60% *After group* < 2500 g: 17/41% ≥ 2500: 232/57%	Intervention: *n* = not stated • Guideline of recommended procedures for preparing and establishing bf sent to all physicians, nurses and home economists in Manitoba • Poster promoting bf distributed to physicians' offices, health units, hospitals and relevant centres, and information pamphlet with practical advice on initiation and maintenance of bf at hospitals and health units • Letters, posters and curriculum supplements encouraging education on infant nutrition in health and home economics programmes were sent to all junior and senior high schools • Media campaign including public newsletters, press releases, radio and television, and a post office stamp reading "Breastfeed – the Best Start in Life" B: *n* = 277 infants A: *n* = 249 infants Data collection Introductory letters mailed to parents of all newborn infants and follow-up telephone/personal contact at 6 months postpartum by researchers/nurses	Statistical techniques Differences of infant feeding method and influencing factors were analysed by chi-squared tests with Yates's correction when applicable Change in initiation rates at time of discharge from hospital *Before group* U: 88/142 (62%) R: 61/110 (55%) Res: 9/25 (36%) *After group* U: 84/127 (66%) R: 47/99 (47%) Res: 9/23 (39%) No significant difference Change in duration rates In 1979, significantly more infants ($p < 0.05$) from U areas than from R areas (50% vs 36%) were still bf at 2 months of age. Data from Res not included owing to small numbers	6 infants in 1978 and 5 in 1979 lived outside the province and were excluded 2 infants died and 2 mothers declined to participate in the before–after survey	Possible contamination of results owing to retrospective nature of survey recording bf rates on mother's recall, particularly for duration data (point of contact at 6 months postpartum for recall of bf practice at 2 months postpartum) No significant difference in the reasons mothers gave for choice of infant feeding method. Mothers from R and U areas who chose bf were significantly more likely to be married, older and live in an urban area. Mother's parity and the sex, weight and maturity of infant did not influence mother's choice Main reasons for discontinuing bf were cited as: inconvenience (B: 51% / A: 23%); not enough milk (B: 32% / A: 33%); breast problems (B: 6% / A: 18%); returning to work (B: 6% / A: 18%). Significantly fewer women in A discontinued bf owing to inconvenience and significantly more did so owing to breast problems and returning to work Unmarried mothers were more likely to choose bottle-feeding (no data)

B, group studied before the intervention; A, group studied after the intervention; U, urban setting/Winnipeg; R, rural setting/outside Winnipeg and Indian Reservations; Res, Indian Reservation

TABLE 57 *Multifaceted interventions: before–after study*[119]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results*	Withdrawals	Additional comments
McDivitt *et al.*, 1993[119] Jordan Research aim To examine the impact of a broadcast media intervention for promoting changes in bf behaviour in Jordan Study design Before–after (cross-sectional) Method of group allocation Systematic random sample of blocks selected followed by quota sample of households within random blocks Unit of allocation Group of mother–child pairs Unit of analysis Group of mother–child pairs Sample size calculation Not stated. Does not claim to be representative of all mothers of young children but claims to be representative of those mothers for whom a campaign about bf would be most relevant Outcome measures Rates of initiation of bf (no reported cut-off); exclusive bf rates; rates of immediate initiation; rates of early initiation (mother reported initiating within 6 h); knowledge of early initiation of bf; exposure to bf programme	Selection for data collection Mothers of 35 years old or younger with at least 1 child aged 2 years and younger Inclusion criteria for post-intervention survey In addition to above criteria, subset of women with a child born after the seminar (20 months old or younger at time of interview) Exclusion criteria As above	Maternal age (after weighting) Mean age of mothers in post-intervention sample: 27.2 years compared to mothers in pre-intervention sample of 26.6 years ($p < 0.05$) Group comparability The 2 data sets were made comparable by using the same selection criteria. However, a significantly smaller proportion of the women interviewed pre-intervention compared to post-intervention were from urban areas (69.9% vs 73.5%, $p < 0.05$), higher socio-economic status (44.6% vs 51.2%, $p < 0.01$) and more likely to have given birth in a private hospital (18.0% vs 29.6%, $p < 0.0001$). Samples were then weighted to match distributions on residence, mother's education and household economic status. The weighting procedure also eliminated difference by site of last birth. After weighting, maternal age was the only differing characteristic (see above)	Intervention 2-day seminar promoting role of health professionals in promoting timely initiation of bf attended by 130 health professionals, ministry of health, private health sector and community representatives. Recommendations for legislation to support bf, educational programmes and changes in hospital policies and practices arose from the seminar (see Additional comments) Daily radio and television broadcast spots during May to July 1989 and March to April 1990, including dramas, testimonials and advice from a fictitious female doctor B: $n = 800$ Baseline survey in August and September 1988 A: $n = 777$ July and August 1990 Data collection For both surveys, mothers were interviewed in Arabic by trained female interviewer on demographic characteristics, media sources used and bf KAP. Timing of initiation was determined by retrospective recall of mothers about their youngest child and if the child had ever been breastfed, if bf started on first day after delivery and if so, how many hours after delivery	Statistical techniques Cronbach test used to assess reliability of scales selected to measure knowledge of bf ($\alpha = 0.63$, $p < 0.0001$) and exposure to media campaign ($\alpha = 0.67$) Change in initiation rates B: 724/800 (90.5%) A: 755/777 (97.2%) $p < 0.0001$ The authors stated, however, that this may have been either the result of pre-existing trends or a side effect of the campaign but it was not the main objective of the campaign Change in exclusive bf rates B: 58% receiving supplements A: 60% receiving supplements No significant difference Timely initiation B: 40% ($n = 716$); A: 54% ($n = 750$) Shift towards earlier initiation is significant at $p < 0.001$ using Kolmogorov–Smirnov 2-sample test Initiation within 1 h of birth B: 3%; A: 18% Knowledge of early initiation B: 51%; A: 75%; $p < 0.0001$ Knowledge of use of colostrum B: 40%; A: 72%; $p < 0.0001$ Exposure to media programme A: 85% of respondents had scores of 3–5 (maximum = 5) on campaign-exposure scale	Not stated	Increased initiation of bf *per se* was not a focus of the campaign and any change in initiation cannot be assumed to be a result of the intervention Possible contamination from other bf promotion activities during 2-year intervention period or continuation of existing trend towards increased and earlier initiation of bf. During the intervention period, public hospital policies and practices were changing to support immediate initiation of bf, including rooming-in, early mother–infant contact, decreased use of glucose supplements and revision of curriculum for training hospital nurses Logistic regression analyses were carried out to control for media exposure, demographics and existing trends for timely initiation The adjusted ORs for having given birth after both the seminar and the launch of the media campaign are both statistically significant, with the latter being substantially larger. Media exposure did not add significantly to the prediction of timely initiation over and above these other measures Model 2 incorporates the effects of media exposure after the start of the mass media campaign. This interaction significantly predicted timely initiation and adding it to the model reduced the OR of seminar plus media to non-significance. Before the start of the media campaign, bf within 6 h was initiated by approximately 45% of mothers regardless of whether they had low or high media exposure. After the start of the media messages, 42% of mothers with low media exposure initiated bf within 6 h compared with 57% of those with high media exposure, i.e. media exposure was a significant predictor of the increase in timely initiation

B, group studied before the intervention; A, group studied after the intervention; KAP, knowledge, attitudes and practices

* *Figures shown are as reported in the original paper. The numbers of women who initiated breastfeeding in a 'timely' manner are not*

TABLE 58 *Multifaceted interventions: before–after study*[120,125,126]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Rea, 1990[120] Rea and Berquo, 1990[125] Monteiro *et al.*, 1990[126] Brazil Research aim To evaluate the impact of the BNBP on protecting, promoting and supporting bf, particularly among low-income families Study design Before–after (cross-sectional) Method of group allocation Random sample of mothers/infants using well-baby clinics Unit of allocation Group of MIPs Unit of analysis Group of MIPs Sample size calculation Same sampling procedure used for both before–after groups – no further details provided Outcome measures Prevalence of bf in Sao Paulo and Recife at maternity discharge; prevalence of bf in Sao Paulo and Recife at time of interviews; average duration of full and partial bf (days) in Sao Paulo and Recife; average duration of exclusive bf including feeding of water and tea (days) in Sao Paulo and Recife	Selection of participants for baseline data 1981: 300 mothers with infants from 0 to 8 months in RMA and 300 in GSP Selection of participants for evaluation data 1987–88: 500 mothers of children from 0 to 12 months (location of mothers not stated, linked paper Rea and Berquo (1990)[125] cites 497 mothers in GSP only) Inclusion criteria As above Exclusion criteria Not stated	Not stated Group comparability Not stated	National executive group and state committees created within ministry of health to coordinate the programme, in collaboration with voluntary institutions Intervention *n* = national target population • Launch of BNBP in March 1981 with national media programme using television and radio, press and other promotions such as lottery tickets, bills etc • Train and update health professionals on bf • Encourage research benefiting the BNBP • Orient non-professional health workers • Promote restructure of health services, e.g. rooming-in • Include bf in primary school and literacy teacher training curricula • Create a Brazilian Code based on the WHO Code • Legislation for working mothers • Peer support groups • Disseminate bf information to authorities • Inform mothers about bf by education and media activities Data collection Interviews of mothers held in public health clinics or private medical offices using similar instrument (with additional questions in 1987)	Prevalence of bf at maternity discharge B1: 91.3% (300) A1: 94.7% (380) n.s. B2: 88% (300) A2: 93.8% (356) $p < 0.05$ Prevalence of bf at moment of interview B1: 41.2% (274) A1: 63.0% (360) $p < 0.005$ B2: 32.2% (264) A2: 51.0% (333) $p < 0.0005$ Average duration (days) of exclusive bf B1: 43.2% (300) A1: 66.6% (380) B2: 14.6% (300) A2: 31.7% (380) Average duration (days) of full and partial bf B1: 89.4 (300) A1: 127.5 (380) B2: 65.6% (300) A2: 104.4% (380)	Not stated Not clear how many MIPs were included in each data collection group and if any withdrew Linked paper Rea and Berquo (1990)[125] cites 497 mothers interviewed in Sao Paulo, suggesting a possible total of 3 withdrawals from this post-intervention group	Paper cited 500 mothers being interviewed for post-intervention group data. Results tables indicate 360 mothers in Sao Paulo post-intervention group and 333 mothers in Recife post-intervention group Not clear on numbers of participants in different groups, and when, how and what data was collected from different groups and numbers used for result sets Linked paper Rea and Berquo (1990)[125] reported a that representative sample of 497 mothers with children aged 0–12 months in Sao Paulo only were interviewed to recall information on duration of bf Possible contamination from other bf activities/trends during 6-year intervention period See linked papers: Rea and Berquo (1990)[125] and Monteiro *et al.* (1990)[126]

BNBP, Brazilian National Breastfeeding Programme; RMA, Recife Metropolitan Area (state capital in northeast Brazil); GSP, greater Sao Paulo (Brazil's largest city); WHO Code, WHO/UNICEF Code of Marketing of Breast Milk Substitutes[30]*; B1, 1981 Sao Paulo before intervention group; A1, 1987 Sao Paulo after intervention group; B2, 1981 Recife before intervention group; A2, 1987 Recife after intervention group*

TABLE 59 *Multifaceted interventions: before–after study*[121]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Sloper *et al.*, 1975[121] England Research aim To assess the effectiveness of a ward policy to encourage bf Study design Before–after (cross-sectional) Method of group allocation All women at discharge from study maternity ward Unit of allocation Group Unit of analysis Group Sample size calculation None stated Outcome measures At hospital discharge: rates of exclusive bf; rates of mixed feeding; rates of bottle-feeding	Selection All mothers discharged from a single maternity ward over a 20-week period in 1972–73 Inclusion criteria As above Exclusion criteria Not stated	No data provided for age, socio-economic status or ethnicity	B (weeks 1–5): n = 129 Survey of all women at discharge from a single maternity ward for classification of infant feeding method Intervention (at week 5) After the initial 5 weeks a ward seminar involving mid-wifery staff discussed the poor preliminary rates, recommended staff to make additional efforts to encourage bf and to cease offering complementary feeds to breastfed babies A (weeks 6–20): n = 306 Survey of all women at discharge from a single maternity ward for classification of infant feeding method Data collection Postal questionnaires at 3 and 8.5 months after the study period for all mothers bf at discharge	Exclusive bf at hospital discharge B: 18 (14%); A: 112 (37%) $p < 0.001$ Any bf at hospital discharge B: 17 (13%); A: 10 (3%) Bottle-feeding at hospital discharge B: 94 (73%); A: 184 (60%) Ceased bf A group stopped bf 3.5 weeks later than B group (n.s.) Introduction of bottle-feeds among babies exclusively bf at discharge A group consistently introduced bottle-feeds 2–4 weeks later than the B group (significant)	• 435 patients discharged • 165 recorded as bf on discharge • 2 excluded on social grounds • 8 removed – stated they had never breastfed Follow-up questionnaire at 3 months: 85% response Follow-up questionnaire at 8.5 months: 80% response	Factors influencing successful lactation (defined as any bf beyond 1 month postpartum) *How mother herself was fed and success at bf* (total) Breastfed 46 (60) Bottle-fed 21 (35) Not known 5 (5) Significant success if breastfed herself as a child Maternal parity: n.s. *Socio-economic class of mothers and success at bf* (total) I and II 51 (63) II 15 (26) IV and V 4 (10) Some of main influences on how mother fed her baby (replies as % of total) Health visitor, district nurse or midwife 24 Patient herself 23 Others 18 Relative 12

B, group studied before the intervention; A, group studied after the intervention

TABLE 60 *Multifaceted interventions: before–after study*[122]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Valdés *et al.*, 1993[122] Chile Research aim To assess the effectiveness of a hospital- and clinic-based bf promotion programme in a middle class urban environment in Chile Study design Before–after (cross-sectional) Method of group allocation B: mothers in study hospital for postpartum stay prior to implementation of programme A: Mothers in study hospital for postpartum stay as programme is implemented Unit of allocation Group Unit of analysis Group Sample size calculation None stated Outcome measures Pretest/post-test scores assessing knowledge of health professionals attending a bf workshop; timing of first feed; supplementary feeds in hospital; duration of exclusive bf; duration of lactational amenorrhoea; age in months; percentage receiving supplements of water, formula and solids; cost-effectiveness analysis	Selection Women who gave birth at the Clinical Hospital of the Catholic University of Chile and were seen for follow-up at the outpatient clinic Inclusion criteria Ages 18–39 years; parity of 5 or less; healthy mother; no history of infertility; couple in stable union; work situation compatible with 6 months of exclusive bf; term, vaginal delivery; singleton birth; healthy, weighing over 2500 g at delivery; written informed consent of the couple Exclusion criteria None stated	Mean age (years)/SE B: 26.6/4.7 A: 27.1/5.0 Socio-economic status Middle class Married B: 92.9% A: 95.7% Mother's education *Primary or secondary* B: 61.6% A: 65.9% *Technical or university* B: 38.4% A: 34.1% Father's education *Primary or secondary* B: 56.6% A: 56.2% *Technical or university* B: 45.5% A: 43.8% Parity B A 1 46.0% 33.6% 2 34.8% 38.2% 3 14.4% 18.2% 4 4.8% 10.0% Previous bf experience B: 94.0% A: 94.6% Group comparability Parity: $p < 0.002$ Prepregnancy weight: $p < 0.01$ Project entry weight: $p < 0.05$ No other differences noted	B: $n = 313$ Mothers invited to participate in the project during their postpartum stay in hospital **prior to** the initiation of the intervention programme A: $n = 422$ Breastfeeding Promotion Programme (BFPP) Training of the health team: 2 representatives received Wellstart training and educational materials; dissemination of information and practice guidelines for bf management Pregnant women received individual health education during each antenatal visit, they were also invited to group sessions between 32 to 40 weeks of pregnancy. Nurse-trainers led groups of 5–6 to discuss concerns and experiences, technique and bf information. Videos were used and materials distributed Hospital practice was modified to allow early contact: babies were put to breast in the delivery or recovery room; 24-h rooming-in was reinforced; supplementary feeding was discouraged Professional support during postnatal stay Invited to attend open clinic on bf after discharge Entry to study at outpatient clinic 7–10 days postpartum. Follow-up interviews at 30, 60, 90, 120, 150, 180 days B group also followed up at 12 and 18 months All women interviewed about bf status, menstruation, intercourse and contraception usage. Paediatric team examined the child growth, use of supplementary foods and general health Data collection Unclear who collected data for the study	Pre-post test scores – day workshop for health professionals ($n = 40$) Pretest: 51% Post-test: 83% Change in hospital practice: mean time of first feed B: 6.7 h; A: 2.8 h $p < 0.0001$ Percentage receiving postnatal supplementary feeds in hospital B: 53%; A: 19% $p < 0.01$ Percentage receiving postnatal supplementary feeds after discharge and before outpatient visit B: 6.3%; A: 1.6% $p < 0.001$ Percentage using pacifiers at first outpatient clinic B: 25.5%; A: 15.1% $p < 0.002$ Percentage reporting lactation problems at first outpatient clinic B: 24%; A: 31% $p < 0.002$ Percentage reporting amenorrhoea at 6 months B: 22%; A: 56.2% No *p*-value Estimated costs per patient day of recovery: separate recovery vs rooming-in (recovery together) Separate: $3.57 Together: $2.35 14% cost savings 34% personnel savings	Drop-out rate B: 4% A: 3%	Secondary outcomes were reported in this study (percentage bf exclusively at 6 months postpartum) but these have not been recorded here because the associated initiation rates were not reported.

SE, standard error; B, group studied before the intervention; A, group studied whilst receiving the intervention

TABLE 61 *Multifaceted interventions: before–after study*[123]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments
Vandale-Toney *et al.*, 1992[123] Mexico Research aim To determine whether a programme of bf promotion facilitated bf initiation in postpartum wards of HGM Study design Before–after (cross-sectional) Method of group allocation By date Unit of allocation Group Unit of analysis Group Sample size calculation Not reported Outcome measures Health professionals' agreement with expert opinion on management of lactation; lactation management practices in the postnatal areas; mothers' feeding intentions; feeding methods at 1 and 4 months; infant health outcomes	Selection Women having their first baby at HGM (a state hospital in the capital city with approximately 6000 births per year); HGM staff Inclusion criteria Women who gave birth in October and November 1988 or April to June 1989 to a healthy baby About half of the obstetric and paediatric staff received training Exclusion criteria Not stated	Age Average 20 years Socio-economic status At least 80% of HGM's patients are economically marginal and 20% have no regular income Ethnicity Not stated Other About 15% of pregnancies classified as high risk; 10% premature labours (before 37 weeks); 15% LBW; staff trained included senior and junior medical staff, nurses and social workers; Caesarean section rate in the before group was 30% and in the after group was 38% Group comparability Not possible to compare owing to lack of data per group	Before *n* = 390 35 mothers observed for 3 h after the birth (October/November 1988); 175 interviewed postnatally in HGM; 95 interviewed at home at 1 month; 85 interviewed at 4 months after the birth Intervention • Staff training (*n* = 110) January to June 1989: Wellstart International Lactation Management training • Antenatal classes about bf February to June 1989 (attended by < 25% of after group) • Standard postnatal care at HGM for mothers and healthy babies took place in 8-bedded wards 12–18 h after vaginal delivery and 30 h after Caesarean section • Policy changes included: bottle-feeds on paediatrician's order only; time newborns and mothers separated reduced; personnel trained in lactation management allocated to postnatal areas; infant feeding information provided by a formula company replaced by classes on advantages and techniques of bf After *n* = 377 32 mothers observed for 3 h after the birth (April to June 1989); 176 mothers interviewed postnatally in HGM; 94 interviewed at home at 1 month; 75 interviewed at 4 months after the birth)	Statistical techniques Chi-squared test Change in initiation rates *Before* 96% (*n* = 175) intended some bf; 77% (*n* = 35) observed to be bf; 1 bottle of formula given at mother's request *After* 97% (*n* = 176) intended some bf; 78% (*n* = 32) observed to be bf; 1 bottle of glucose solution requested and given Change in duration rates *Exclusive bf* Before: 34% at 1 month; 2.4% at 4 months After: 38% at 1 month; 0% at 4 months *Weaning started before 3 months* Before: 82% After: 78% *Weaning started before 5 months* Before: 98% After: 100% *Average age weaning completed* Before: 12 weeks After: > 17 weeks Other beneficial/adverse effects *Infants seen to be healthy at 1 and 4 months* Before: 57% / 53% After: 62% / 78% *Infants taken to a doctor ill in the first/fourth month* Before: 38% / 41% After: 17% / 31% *Average weight of infants at 1.5 and 4.5 months* Before: 4.5 / 6.4 kg After: 4.7 / 7.1 kg	Reasons Many mothers were lost to follow-up because the addresses they gave were in the poorer areas at the edges of the city where the street layout is informal or non-existent. Others had moved or had given false addresses Intention-to-treat analysis Apparently so	6000 births per year would be approximately 500 per month, 1000 in each study period. The numbers interviewed may or may not be all the primiparous mothers of healthy babies

HGM, Mexico City General Hospital; LBW, low birthweight (2500 g or less)

TABLE 62 *Multifaceted interventions: before–after study*[124]

Study details	Participant selection and inclusion/exclusion criteria	Baseline characteristics of participants	Intervention details	Results	Withdrawals	Additional comments*
Wright *et al.*, 1997[124] USA Research aim To evaluate a bf promotion programme designed to incorporate cultural understandings about infant feeding and perceived barriers to bf Study design Before–after (cross-sectional) Method of group allocation Consecutive births over a defined time Unit of allocation Group of infants Unit of analysis Group of infants Sample size calculation Not stated Outcome measures Initiation of bf; hospital feeding practices (bf or formula); mean age (days) at starting formula; mean age (days) last known to be bf; factors affecting decision to start and terminate bf; predictors of bf	Selection All infants born at Shiprock Indian Health Service Hospital during previous year (1.6.90 to 30.5.91, *n* = 988) and following year (24.9.91 to 24.9.92, *n* = 870) intervention Inclusion criteria As above Exclusion criteria Not stated	Age and parity (only 2 maternal characteristics recorded on infant's chart) were collected although not stated Paper reports any changes in bf could not be attributed to differences in the birthing population since there were no differences in maternal age and parity between the 2 cohorts	Intervention Involved training 45 health staff, and changing hospital policy and practice in order to: phase out discharge packs containing formula; review educational materials that undermine bf; provide bf education in prenatal visits and after delivery; separate bf and bottle-feeding mothers; promote initiation within 30 min of delivery; encourage rooming-in; discouraging supplemental feeds; promote bf through radio, billboard, T-shirts and slide show; review educational materials and development of appropriate materials including video and brochures; promote peer support programme based on 'Foster Grandmother' programme with traditional elder who has breastfed her children B: *n* = 988 A: *n* = 870 The hospital delivery log at the time of birth in the labour ward was reviewed to collect infant data for B and A groups. Data on infant feeding practice, demographics and delivery were collected for each clinic visit Data collection Two researchers collected and checked data. Follow-up to other clinics as necessary to complete data set	Statistical techniques Not stated Rate of initiation of bf B: 71.1% A: 81.1% $p < 0.00001$ Proportion of infants being breastfed in hospital including possible formula-feeding B: 64.2% A: 77.8% $p < 0.00001$ Mean age (days) at starting formula: B: 11.7 A: 48.5 $p < 0.001$ Mean age (days) last known bf B: 100.6 A: 131.6 $p < 0.001$	Not reported	Data on factors/determinants Ethnographic interviews of 35 Navajo participants (male and female, elder and of childbearing age) and structured questionnaire with 250 postpartum Navajo women identified cultural beliefs which regarded bf as the proper way to feed an infant The main reasons reported for not wanting to breastfed were problems with work or school (30%; *n* = 17/56) and negative perceptions of bf (27%; *n* = 15/56). The main reasons reported for starting formula were maternal employment (28%; *n* = 44/172), not associated with lower rates of bf, and insufficient milk (16%; 26/172) The main reasons reported for stopping bf were baby did not like the breast (26%; *n* = 29/110), baby's condition or age (23%; *n* = 25/110) and maternal condition (22%; *n* = 24/110) The theoretical bases of intervention were: community empowerment based on Paulo Freire's work;[139,140] and social marketing techniques incorporating cultural knowledge[141,142]

B, before intervention baseline data group; A, after intervention group

* *Figures shown are as reported in the original paper*

Appendix 4

Quality appraisal tables

TABLE 63 *Health education: RCTs*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	True randomisation	Comparability of groups reported at baseline	Blinded outcome assessment	Outcome measures*	Withdrawals†	Intention-to-treat analysis
Hill, 1987[69]	✔	64 (2)	✗	Not stated	✔	Not stated	1°, 2°, intermediate	✗	✗
Kaplowitz & Olson, 1983[70]	✔	44 (2)	✗	Not stated	✔	Not stated	1°, 2°, intermediate	✔b	✗
Kistin *et al.*, 1990[65]	✔	159 (3)	✗	✔ but only 2/3 groups were randomised	✔	Not stated	1°, 2°	✔a but only for non-medical withdrawals	✗
Loh *et al.*, 1997[71]	✔	193 (2)	✗	✗	✔	Not stated	1°, 2°	✔a	✗
McEnery & Rao, 1986[72]	✔	69 (2)	✗	Not stated	✗	Not stated	1°, 2°	✔b	✗
Ross *et al.*, 1983[73]	✗	247 (4)	✗	Not stated	✔ for 2/4 groups only	✔	2°, intermediate	✗	✗
Rossiter, 1994[74]	✔	194 (2)	✗	Not stated	✔	✗	1°, 2°, intermediate	✔b	✗
Serwint *et al.*, 1996[75]	✔	156 (2)	✔ but calculated numbers not recruited	✔	✔	Not stated	1°, 2°	✔a	✔
Wiles, 1984[76]	✔	40 (2)	✗	✗	✔	Not stated	1° (1 month postpartum), 2°, intermediate	✗	✗

**1°, primary outcome; 2°, secondary outcome*

†✗, withdrawals not reported; ✔b, withdrawals reported but either not by group or without reason; ✔a, reported by group with reason

TABLE 64 *Health education: non-RCTs*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	Method of group allocation stated	Comparability of groups reported at baseline	Blinded outcome assessment	Outcome measures*	Withdrawals†	Intention-to-treat analysis
Agboatwalla & Akram, 1997[77]	✗	300 (2)	✔	✗	✔	Not stated	Intermediate	✗	Unclear
Barwick *et al.*, 1997[78]	✔	38 (2)	✗	✗	✔	Not stated	1°, 2°	n/w	n/a
Gilmore *et al.*, 1979[79]	✗	111 (2)	✗	✔	✗	Not stated	1°	✗	Unclear
Kjellmer *et al.*, 1978[80]	✔	2000 (2)	✗	✔	✔	Not stated	1°, 2°, intermediate	✔b	✗
Roman, 1992[81]	✔	89 (2)	✗	✔ (self-selection)	✔	Not stated	Intermediate	✗	✗
Vega-Franco *et al.*, 1985[82]	✔	50 (2)	✗	✔	✔	Not stated	1°, 2°	n/w	✔
Verma *et al.*, 1995[83]	✗	301 (2)	✗	✔	✔ but no data shown	Not stated	Intermediate	n/w	n/a

1°, primary outcome; 2°, secondary outcome

†*✗, withdrawals not reported; n/w, no withdrawals; ✔b, withdrawals reported but either not by group or without reason*

n/a, not applicable

TABLE 65 *Health education: before–after studies (cross-sectional)*

Study	Are the groups selected from a suitable sampling frame?	Are the groups selected from the same sampling frame?	Random sampling for the groups?	If not random, what method of allocation was used? (state method)	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Were groups comparable for possible confounding factors?	Did the authors adjust for the effects of confounding factors?	Withdrawals*	Was the analysis appropriate?
Hart *et al.*, 1980[84]	✔	✔	✗	All mothers of children within specified age range invited	✗	✔	None stated	Unclear	✗	✗	✔
Thorley *et al.*, 1997[86]	✔	✔	✗	All pregnant women registered at a GP practice in 2 4-year periods	✗	✗	None stated	✔ for age	Adjusted for parity and social class	n/w	✔

**✗, withdrawals not reported; n/w, no withdrawals*

TABLE 66 *Health education: before–after studies (cohort)*

Study	Was the study group selected from a suitable sampling frame?	Was the study group selected randomly from the sampling frame?	If not random, what method of selection was used? (state method)	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Withdrawals*	Was the analysis appropriate?
Redman *et al.*, 1991[85]	✔	✗	Not stated	✗	✔	None stated	✔b	✔

*✔b, withdrawals reported but either not by group or without reason

TABLE 67 *HSIs (general): RCT*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	True randomisation	Comparability of groups reported at baseline	Blinded outcome assessment	Outcome measures*	Withdrawals†	Intention-to-treat analysis
Lindenberg *et al.*, 1990[66]	✔	375 (3)	✗	✔ for I1 ✗ for I2	✔	Not stated	1° and 2°	✔b	✔

*1°, primary outcome; 2°, secondary outcome

†✔b, withdrawals reported but either not by group or without reason

I1, intervention group 1; I2, intervention group 2

TABLE 68 *HSIs (general): non-RCT*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	Method of group allocation stated	Comparability of groups reported at baseline	Blinded outcome assessment	Outcome measures*	Withdrawals†	Intention-to-treat analysis
Lutter *et al.*, 1997[68]	✔	442 (2)	✗	✗	✔	✔	1°, 2°, intermediate	✔b	✗
Palti *et al.*, 1988[87]	✔	230 (2)	✗	✗	✔	Not stated	1°, 2°	✗	Unclear
Winikoff *et al.*, 1987[88]	✗	400 (4)	✗	✗	✔	Not stated	1°, 2°, intermediate	✗	Unclear

*1°, primary outcome; 2°, secondary outcome

†✔b, withdrawals reported but either not by group or without reason; ✗, withdrawals not reported

TABLE 69 *HSIs (general): before–after studies (cross-sectional)*

Study	Are the groups selected from a suitable sampling frame?	Are the groups selected from the same sampling frame?	Random sampling for both groups?	If not random, what method of allocation was used?	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome?	Were groups comparable for possible confounding factors?	Did the authors adjust for the effects of confounding factors?	Withdrawals*	Was the analysis appropriate?
Bradley & Meme, 1992[89]	Hospitals: as many as possible from the population appear to have been recruited Interviewees: unclear	✔ for both hospitals and interviewees	Hospitals: ✗ Interviewees: random sampling is mentioned for one subset of staff, but unclear whether this was true randomisation	Unclear	✗	✔	None stated	Unclear for both hospitals and interviewees	✗	✗	✔
Bruce & Griffioen, 1995[90]	✔	✔	✗	Mothers: as many as possible in the target population were surveyed Staff: unclear	✗	✔	None stated	No confounding factors described	No confounding factors described	Response rates to surveys reported	✔
Popkin *et al.*, 1991[91]	✔	✔	✗	Households were selected systematically for national survey – the method of allocation is not described Methods of selection for the health worker and community surveys are not stated	✗	✔ National survey ✗ Health worker and community surveys	Change in price of milk products	For all surveys, baseline and follow-up groups were reported to be comparable	✔	✗	✔

* *✗, withdrawals not reported*

TABLE 70 *HSIs (BFHI): RCT*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	True randomisation	Comparability of groups reported at baseline	Blinded outcome assessment	Outcome measures	Withdrawals	Intention-to-treat analysis
Westphal *et al.*, 1995[92]	✔	8 (2) unit of allocation is health institution	✗	Not stated	✗	Not stated	Intermediate	n/w	n/a

n/w, no withdrawals; n/a, not applicable

TABLE 71 *HSIs (BFHI): before–after study (cross-sectional)*

Study	Are the groups selected from a suitable sampling frame?	Are both groups selected from the same sampling frame?	Random sampling for both groups?	If not random, what method of allocation was used? (state method)	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Were groups comparable for possible confounding factors?	Did the authors adjust for the effects of confounding factors?	Withdrawals*	Was the analysis appropriate?
Buranasin, 1991[93]	✔	✔	✗	Systematic sampling used, not true randomisation	✗	✔	None stated	Reported to be comparable for demographic variables, but no other data given	✗	✗	✔

**✗, withdrawals not reported*

TABLE 72 *HSIs (WIC Program): RCTs*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	True randomisation	Comparability of groups reported at baseline	Blinded outcome assessment	Outcome measures*	Withdrawals†	Intention-to-treat analysis
Brent *et al.*, 1995[94]	✔	123 (2)	✗	✔	✔	✗	1°, 2°	✔a	✗
Sciacca *et al.*, 1995[95, 96]	✔	68 (2)	✗	Not stated	✔	Not stated	1°, 2°, intermediate	✔a	✗

**1°, primary outcome; 2°, secondary outcome; †✔a, reported by group with reason*

TABLE 73 *HSIs (WIC Program): non-RCTs*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	Method of allocation	Comparability of groups reported at baseline	Blinded outcome assessment	Objective outcome measures	Withdrawals*	Intention-to-treat analysis
Schafer *et al.*, 1998[97]	✔	207 (2)	✗	✔	✔	Not stated	✔	✔a	✔
Caulfield *et al.*, 1998[67]	✔	242 (4)	✗	✔	✔	Not stated	✔	✔a	✔
Reifsnider & Eckhart, 1997[98]	✔	47 (2)	✗	✔	✔	Not stated	✔	✔b not by group	✔

**✔a, reported by group with reason; ✔b, withdrawals reported but either not by group or without reason*

TABLE 74 *HSIs (WIC Program): before–after studies (cross-sectional)*

Study	Are the groups selected from a suitable sampling frame?	Are both groups selected from the same sampling frame?	Random sampling for both groups?	If not random, what method of allocation was used? (state method)	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Were groups comparable for possible confounding factors?	Did the authors adjust for the effects of confounding factors?	Withdrawals*	Was the analysis appropriate?
Carroll, 1994[99]	✔	✔	✗ all participants of Alabama WIC program selected	✗	✗	None stated	Not stated	Not stated	✗	✔	✔
Grummer-Strawn *et al.*, 1997[100]	✔ all records that were available	✔ for 2 time periods	✗	Not stated	✗	✔	Researchers mention other bf programmes and media campaigns in the area around the time of the intervention	Not stated	✗	✔a large amounts of data missing from both groups	✔
Long *et al.*, 1995[101]	✔	✔	✗	Not stated	✗	✔	Not stated	Possible contamination of control group because of counsellors' training prior to intervention	✗	✔b	✔
Michaels, 1993[103]	✔	✔	✗	All eligible in given time periods	✗	✗	Not stated	✗	✗	✗	✔
Nadel 1993[102]	✔	✔	✗	Not stated	✗	✔	The Passaic WIC program increased by 23% during the intervention	Newly unemployed new WIC clients may have shown some differences from long-term poor WIC clients	✗	✗	✔

**✔a, reported by group with reason; ✔b, withdrawals reported but either not by group or without reason; ✗, withdrawals not reported*

TABLE 75 *HSIs (training of health professionals): before–after study (cross-sectional)*

Study	Are the groups selected from a suitable sampling frame?	Are the groups selected from the same sampling frame?	Random sampling for groups?	If not random, what method of allocation was used?	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Were groups comparable for possible confounding factors?	Did the authors adjust for the effects of confounding factors?	Withdrawals*	Was the analysis appropriate?
Brimblecombe & Cullen, 1977[104]	✔	✔	✗	Place of residence and date of baby's birth	✗	✔	Change in policy on postnatal length of stay at local hospital; national and media bf campaigns; limited supplies of National Dried Milk in early 1975	✔	✗	✔b no reasons given	✔
Stokoe & Clarey, 1994[108]	✔	✔	✗	All women delivering within specified period considered	✗	✗	None stated	Not stated	✗	✔b	✔
Bleakney & McErlain, 1996[105]	✔	✔	✗	All relevant individuals were contacted	✗	✔	None stated	✔ 70% overlap between before–after groups	✔ discussed in some detail	Detailed response rates given	✔

**✔b, withdrawals reported but either not by group or without reason*

TABLE 76 *HSIs (training of health professionals): before–after study (cohort)*

Study	Was the study group selected from a suitable sampling frame?	Was the study group selected randomly from the sampling frame?	If not random, what method of selection was used?	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Withdrawals*	Was the analysis appropriate?
McIntyre & Lawlor-Smith, 1996[107]	✔	✗	Invited health professionals who attended 2 workshops and completed documentation	✗	✗ not clear who was invited	None are reported affecting change in knowledge among the 65 who attended both workshops and completed the documentation	✗	✔
Ellis & Hewat, 1983[106]	✔	✗	All staff invited to participate	✗	✗	None stated	✔b	✔

**✗, withdrawals not reported; ✔b, withdrawals reported but either not by group or without reason*

TABLE 77 *HSIs (social support from health professionals): RCT*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	True randomisation	Comparability of groups reported at baseline	Blinded outcome assessment	Outcome measures*	Withdrawals†	Intention-to-treat analysis
Oakley *et al.*, 1990[113]	✔	509 (2)	✔	Randomised in balanced blocks stratified by centre Not concealed	✔	Not stated	1°	✔ a	✔

*1°, primary outcome

†✔a, reported by group with reason

TABLE 78 *Peer support: non-RCTs*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	Method of allocation	Comparability of groups reported at baseline	Blinded outcome assessment	Objective outcome measures	Withdrawals*	Intention-to-treat analysis
McInnes 1998[112]	✔	995 (2)	✗	✔	✔	Not clear	✔	✔a	✔
Kistin *et al.*, 1994[111]	✔	102 (2)	✗	Not clear	✔	✗	✔	✔b	✗

*✔a, reported by group with reason; ✔b, withdrawals reported but either not by group or without reason

TABLE 79 *Media campaigns: before–after studies (cross-sectional)*

Study	Are the groups selected from a suitable sampling frame?	Are both groups selected from the same sampling frame?	Random sampling for both groups?	If not random, what method of allocation was used? (state method)	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Were groups comparable for possible confounding factors?	Did the authors adjust for the effects of confounding factors?	Withdrawals*	Was the analysis appropriate?
Coles *et al.*, 1978[109]	✔	✔	✗	All eligible women in 2 time frames: 1 month in 1975; 1 month in 1977 Numbers of women in primiparous and multiparous sub-groups not stated	✗	✗	Approximate 2-year interval between pre- and post-intervention bf rates	✗	✗	Response rates at 1 and 3 months	✔
Friel *et al.*, 1989[110] †	✔	✔	Random selection by class from each of 3 school grades	Random selection	✗	✔	Any other bf promotion activity that may have occurred during the 3-month intervention and data collection period Authors analysed for influence of pretest (same test used after intervention)	Over 50% of participants in the before group were also included in the after group	✗ age only	✔a	4 groups used for analysis compared to 3 groups used for allocation

**✔a, reported by group with reason*

† Post-cohort, post-cross-sectional study design

TABLE 80 *Multifaceted interventions: non-RCT*

Study	Clear inclusion and exclusion criteria	Overall sample size (arms)	*A priori* sample size calculation	Method of allocation	Comparability of groups reported at baseline	Blinded outcome assessment	Objective outcome measures	Withdrawals*	Intention-to-treat analysis
Rodriguez-Garcia *et al.*, 1990[114]	✔	585 (4)	✗	✔	✗	✗	✔	✗	n/a

**✗, withdrawals not reported*

n/a, not applicable

TABLE 81 *Multifaceted interventions: before–after studies (cross-sectional)*

Study	Are the groups selected from a suitable sampling frame?	Are both groups selected from the same sampling frame?	Random sampling for both groups?	If not random, what method of allocation was used? (state method)	*A priori* sample size calculation	Clear inclusion and exclusion criteria	What factors (other than the intervention) may affect the outcome? (state factors)	Were groups comparable for possible confounding factors?	Did the authors adjust for the effects of confounding factors?	Withdrawals*	Was the analysis appropriate?
Hartley & O'Connor, 1996[115]	✔	✔	✗	Consecutive allocation	✔	✔	Not stated	✔	✔	✔a	✔
Kirk, 1980[116]	✔	✔	✗	All those eligible were recruited	✗	✔	Not stated	✗	✗	✗	✔
Lal *et al.*, 1992[117]	✗ not stated	✗ not stated	✗	Not stated	Not stated	✗	Not stated	Not stated	✗ not stated	✗	✔
Manitoba Pediatric Society, 1982[118]	✔	✔	✗	Not stated	Not stated	✔	Not stated	✔	✔	✔a	✔
McDivitt *et al.*, 1993[119]	✔	✔	✔	Random	Not stated	✔	Not stated	✔	✔	✗	✔
Rea, 1990[120] Rea & Berquo, 1990[125] Monteiro *et al.*, 1990[126]	✔	✔	✔	Random	✗	✗	Not stated	Not stated	✗	✗	✔
Sloper *et al.*, 1975[121]	✔	✔	✗	All those discharged during study period	✗	✔	Not stated	Not stated	✗	✔a	✔
Valdes *et al.*, 1993[122]	✔	✔	✗	Mothers in study hospital during study time period	✗	✔	Not stated	✔	✔	✔b proportions only provided	✔
Vandale-Toney *et al.*, 1992[123]	✔	✔	✗	Women delivering during study period	✗	✗	Not stated	Not stated	✗	✔b reasons reported	✔
Wright *et al.*, 1997[124]	✔	✔	✗	Consecutive births for 2 1-year periods	✗	✔	Not stated	Not stated	✗	n/w	✔

**✔a, reported by group with reason; ✗, withdrawals not reported; ✔b, withdrawals reported but either not by group or without reason; n/w, no withdrawals*

Appendix 5
Excluded studies

Study	Setting/participants	Interventions	Reasons for exclusion
Akram *et al.,* 1997[143]	Pregnant women living in 2 urban squatter settlements of Karachi, Pakistan	Health education programme vs no programme	Focus of study secondary outcomes rather than initiation
Anonymous, 1993[144]	China	Implementation of BFHI (before–after study)	Initiation rates not reported
Banapurmath & Selvamuthukumarasamy, 1995[145]	Women undergoing birth by Caesarean section at a hospital in India	Antenatal bf advice vs antenatal advice plus postnatal assistance vs usual care	All women initiated bf; the study focused on the timing of initiation
Barros *et al.*, 1994[146]	Women wishing to breastfeed living in urban areas in Portugal	Postnatal visits vs usual care	Initiation rates not reported; intervention did not take place before the first breastfeed
Bathija & Anand, 1987[147]	Women delivering in general hospitals and private maternity homes in India	Perinatal bf information plus postnatal visits vs usual care	Retrospective controls
Belizan *et al.*, 1995[148]	Women with risk factors for obstetric complications delivering in 4 hospitals in Latin America (Argentina, Brazil, Mexico, Cuba)	Antenatal visits and bf education vs usual care	No relevant outcomes reported
Bishop, 1984[149]	Maternity nurses in USA	Self-study with bibliographic package vs video vs lecture/ discussion	Insufficient details available (abstract only)
Blaikley *et al.*, 1953[150]	Primiparae in London, UK	Supervision of lactation management vs usual care	No relevant outcomes reported
Bradley *et al.*, 1990[151]	Primiparae living in large metropolitan areas in Australia	Delivery in family birthing centre vs conventional delivery suite	No relevant outcomes reported
Canahuati, 1990[152]	Honduras	PROALMA project (national bf promotion programme)	Initiation rates not reported; study focused on duration
Carpenter *et al.*, 1968[153]	Women living in Chicago, USA	Emotional support during pregnancy vs usual care	No relevant outcomes reported
Chan-Yip & Kramer, 1983[154]	Women belonging to a Chinese community in Montreal, Canada	Bf promotion programme	No relevant outcomes reported
Cohen & Mrtek, 1994[155]	Female employees returning to work after childbirth, USA	Comparison of 2 corporate lactation programmes	No relevant outcomes reported
Dance *et al.*, 1994[156]	Women from Asian communities living in Birmingham, UK	Asian linkworker programme (before–after study)	Focus was duration of bf
Dasgupta *et al.,* 1997[157]	Women living in Calcutta, India	BFHI (before–after study)	All women initiated bf; the study focused on the timing of initiation and use of other feeds
Davies-Adetugbo, 1996[158]	Women living in rural communities in Nigeria	Ante- and postnatal bf counselling vs usual care	All women initiated bf; the study focused on the timing of initiation
Davies-Adetugbo *et al.*, 1997[159]	Health workers in rural communities in Nigeria	Bf training for health workers	No relevant outcomes reported
De Chateau & Wiberg, 1977[160]	Primiparae in Sweden	Increased early contact vs usual care	Reported duration only

continued

continued

Study	Setting/participants	Interventions	Reasons for exclusion
De Gale, 1995[161]	School children from 2 schools in Wrexham, North Wales, UK	School-based bf promotion programme	No relevant outcomes reported
Duffy *et al.*, 1997[162]	Primiparae wishing to breastfeed, Western Australia	Antenatal education vs usual care	Reported duration only
Endresen & Helsing, 1995[41]	Maternity staff in Norway	Implementation of national policy based on WHO/UNICEF's 'Ten steps to successful breastfeeding' (before–after study)	No relevant outcomes reported because the main focus of the study is regarding duration or exclusivity of bf
Evans *et al.*, 1986[163]	Women with healthy infants living in Seattle, USA	Provision of formula samples on discharge vs no provision	The intervention was not intended to promote bf; all women were bf on discharge
Frank *et al.*, 1987[164]	Women with infants not requiring more than 48 h in neonatal intensive care unit in Boston City Hospital, USA	Usual postpartum bf counselling plus provision of commercial discharge pack vs usual counselling plus bf discharge pack vs special bf counselling plus commercial discharge pack vs special counselling plus bf discharge pack	Most women initiated bf; the study focused on duration of bf
Gagnon *et al.*, 1997[165]	Women delivering at a specified hospital in Montreal, Canada	One-to-one nurse support during labour vs usual care	No relevant outcomes reported
Gainotti & Pagani, 1980[166]	Maternity nurses, and mothers of healthy newborns in Italy	Nursing training programme plus provision of support and information to mothers (ante- and postnatal) vs usual care	Retrospective controls
Gainotti & Pagani, 1988[167]	Newborns with birthweight above 2500 g delivered at a specified hospital in Como, Italy	Programme to promote early contact and bf vs usual care	Retrospective controls
Gale *et al.*, 1989[168]	Women with uncomplicated gestation delivering at a university-affiliated hospital in Jerusalem	3-hourly bf vs 4-hourly bf	All women initiated bf; no relevant outcomes reported
Gerstner, 1988[169]	Women delivering in a hospital in Vienna, Austria	Rooming-in vs usual care	Retrospective controls
Gonzales, 1990[170]	Women delivering at a specified maternity hospital in Manila, Philippines	Implementation of rooming-in and lactation management programme (before–after study)	No relevant outcomes reported
Gonzalez *et al.*, 1983[171]	Santiago, Chile	National bf promotion programme (before–after study)	Reported duration only
Granadillo *et al.,* 1994[172]	Primary care setting in Merida, Venezuela	Child health education programme vs usual care	Intervention did not take place before the first breastfeed
Grossman *et al.*, 1988[173]	Pregnant women from low-income population, Ohio, USA	Antenatal education package vs usual care	Insufficient details available (abstract only)
Grossman *et al.,* 1990[174]	Low-income women who had delivered a full-term healthy infant at Ohio State University Hospital, Columbus, USA	Intensive postpartum education and support for bf vs usual care	Reported duration only
Gupta & Gupta, 1992[175]	Mothers with child less than 6 months old, India	Evaluation of local campaign against bottle-feeding	No relevant outcomes reported
Handfield & Bell, 1995[176]	Pregnant women attending a Family Birth Centre in Melbourne, Australia	Childbirth education programme	Single group survey, no controls
Hardy *et al.*, 1982[177]	Women delivering at a university maternity hospital in Brazil	Antenatal education programme plus postnatal support vs usual care	Study focused on duration
Hodnett & Osborn, 1989[178]	Women with uncomplicated pregnancies delivering at a teaching hospital in Toronto, Canada	Comparison of 2 antenatal educational programmes and one-to-one professional support	No relevant outcomes reported

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Study	Setting/participants	Interventions	Reasons for exclusion
Jingheng *et al.*, 1994[179]	Women registered with the Luwan District Maternal and Child Health Centre, China	Bf education programme (teaching, discussion, video) vs usual care	Retrospective controls
Johnson, 1982[180]	Women delivering at a local public maternity hospital in Houston, USA	Care provided by specially trained primary healthcare workers vs usual care	No relevant outcomes reported
Johnson *et al.*, 1984[181]	Women delivering at a local public maternity hospital in Houston, USA	Referral card vs bf manual vs card plus manual plus postpartum bedside teaching session	Study focused on duration
Jones & West, 1986[182]	Women delivering in a district general hospital in Cardiff, UK	Provision of lactation management nurse vs usual care	No relevant outcomes reported
Kasemsarn *et al.*, 1995[183]	Thailand	Implementation of national policy based on WHO/UNICEF's 'Ten steps to successful breastfeeding' (before–after study)	No relevant outcomes reported
Katcher & Lanese, 1985[184]	Employees at a medical centre in New Jersey, USA	Workplace intervention	Reported duration only
Kennell *et al.*, 1991[185]	Women from a low-income population delivering at a maternity hospital in Houston, USA	Continuous support during labour vs monitoring by an inconspicuous observer	No relevant outcomes reported
Lilley & Harrison, 1996[186]	Newborns with family history of asthma or IgE-mediated allergy, Canada	Antenatal bf education and postnatal support vs usual care	Insufficient details available (abstract only)
Long, 1995[187]	Midwives and mothers at University College Hospital, London, UK	Bf workshop for mothers and midwives vs usual care	Insufficient details available (numbers and characteristics of participants not provided)
Longo *et al.*, 1997[188]	Staff in obstetric services in Missouri Hospitals, USA	Consumer reports in obstetric care	No comparison group
Macquart-Moulin *et al.*, 1990[189]	Women delivering in a specified hospital in Pertuis, France	Information provision (before–after study)	Some participants received the intervention postnatally
Mapata *et al.*, 1988[190]	Women with healthy newborns, Indonesia	Rooming-in vs separation	No relevant outcomes reported
Mata *et al.*, 1983[191]	Women attending an antenatal clinic at a specified hospital in Costa Rica	Implementation of rooming-in (before–after study)	No relevant outcomes reported
Mata *et al.*, 1988[192]	Mothers delivering at a specified hospital in Costa Rica	Rooming-in plus promotion of colostrum feeding plus early mother–infant stimulation vs mother–infant separation	Retrospective controls; no relevant outcomes reported
Mongeon & Allard, 1995[193]	Women wishing to breastfeed attending an antenatal clinic in Montreal, Canada	Volunteer telephone support programme vs usual care	Most women initiated bf; focus of study was duration
Myres *et al.*, 1981[194]	Health professionals in Canada	National programme to increase awareness of the value of bf among health professionals	No comparison group
Nanavati *et al.*, 1994[195]	Mothers attending a lactation management clinic in Bombay, India	Lactation management service	No comparison group, and no relevant outcomes reported
Neifert *et al.*, 1988[196]	Adolescent primiparae delivering at a specified hospital in Denver, Colorado, USA	Hospital discharge gift packs oriented towards bottle-feeding vs bf pack	All women initiated bf; focus of the study was duration
Neuhaus *et al.*, 1992[197]	Prospective mothers and fathers in Cologne, Germany	Antenatal information evenings for prospective parents	No comparison group
Neutzling *et al.*, 1993[198]	Women enrolled in child health programme in Pelotas, Brazil	Bf promotion programme	No comparison group

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Study	Setting/participants	Interventions	Reasons for exclusion
Neyzi *et al.*, 1991[199]	Women delivering at a specified hospital in Istanbul, Turkey	Continued support for mothers vs usual care	Initiation of bf not reported; focus of study is duration
Nikodem *et al.*, 1993[200]	Mothers from low-income urban population attending a specified hospital in Witwatersrand, South Africa	Bf video vs video on healthy eating for adults	Initiation of bf not reported; focus of study is duration
Oakley & Rajan, 1988[201]	Women with history of low-birthweight baby attending antenatal clinics at 4 hospitals in the UK	Social support intervention vs usual antenatal care	No relevant outcomes reported
Obi & Osuhor, 1984[202]	Women attending an antenatal clinic at a teaching hospital in Benin City, Nigeria	Antenatal bf advice	No comparison group
Olds *et al.*, 1986[203]	Primiparous women, either teenagers, unmarried, or of low socio-economic status, living in New York, USA	Follow-up only vs free transport to antenatal care plus follow-up vs antenatal home visits plus free transport plus follow-up vs postnatal home visits plus antenatal visits plus free transport plus follow-up	No relevant outcomes reported
Oseid *et al.,* 1983[204]	Women attending maternity hospitals in Louisiana, USA	Rooming-in vs usual care	Timing of intervention unclear
Pastore & Nelson, 1997[205]	Women attending a bf drop-in centre in Richmond, British Columbia, Canada	Bf drop-in centre	Focus of study was duration; initiation not reported; no comparison group
Perez & Valdes, 1991[206]	Women from urban, lower-middle class population delivering at a specified hospital in Santiago, Chile	Bf promotion programme vs usual care	Focus of study was duration; initiation not reported
Perez-Escamilla *et al.*, 1992[207]	Healthy, pregnant women living in Hermosillo, Sonora State, Mexico	Rooming-in vs rooming-in plus individual bf guidance vs separation	Focus of study was duration; initiation not reported
Pichaipat *et al.*, 1992[208]	Thailand	Hospital-based bf promotion programme (before–after study)	Insufficient details available
Pinelli *et al.*, 1993[209]	Women attending antenatal classes at 3 hospitals in Toronto, Canada; also health professionals working at the hospitals	Implementation of a bf protocol (before–after study)	Focus of study was duration; initiation not reported
Polit, 1989[210]	Teenage mothers in 4 USA cities	Comprehensive programme of services for pregnant and parenting teenagers vs no programme	Retrospective data collection
Prasad & Costello, 1995[211]	Women from village areas near a town delivering at a local hospital, India	Care provided by specially trained maternity staff vs usual care	All women initiated bf; the study focused on the timing of initiation
Procianoy *et al.*, 1983[212]	Women from a low-income population delivering in a free public hospital in Brazil	Rooming-in vs usual care	Reported duration only
Pugin *et al.,* 1996[213]	Women delivering in a specified hospital in Santiago, Chile	Bf promotion programme (before–after study)	Focus of study was duration; initiation not reported
Redman *et al.*, 1995[214]	Women booked for delivery at a specified hospital in Newcastle, New South Wales, Australia	Antenatal education programme	Focus of study was duration vs standard care
Ricco, 1984[215]	Children living in the catchment area for a child health programme in Sao Paulo, Brazil	Primary Child Health Care Program (before–after study)	Focus of study was duration; initiation not reported
Rooks *et al.*, 1989[216]	Women delivering at 84 free-standing birth centres in USA	Data from birth centres compared with all women who gave birth (data from National Center for Health Statistics)	No relevant outcomes reported

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Study	Setting/participants	Interventions	Reasons for exclusion
Rush *et al.*, 1988[217]	WIC participants in 19 states of the USA	The WIC Program vs Commodity Supplemental Food Program	No relevant outcomes reported
Salariya *et al.*, 1979[218]	Women attending an antenatal clinic in Dundee, UK	Early initiation of bf vs usual care	Focus of study was duration; initiation not reported
Savina & Kennedy, 1989[219]	Women living in rural communities in the Philippines	Ante- and postnatal bf education programme vs usual care	All women initiated bf during first 3 days postpartum; focus of study was use of other feeds and lactation-associated amenorrhea
Schwartz *et al.*, 1995[220]	WIC participants, USA	WIC program vs no programme	Retrospective study
Shoham-Yakubovich *et al.*, 1990[221]	Mothers of young children in villages of West Bank territories, Jerusalem	Health education course on infant feeding practices vs no health education	Focus of study was duration and weaning practices; initiation not reported
Sjolin *et al.*, 1979[222]	Women attending an antenatal clinic at a specified hospital in Uppsala, Sweden	Bf counselling vs usual care	Focus of study was duration; initiation not reported
Sosa *et al.*, 1976[223]	Primiparous women from a poor, urban dwelling population in Guatemala City, Guatemala	Early mother–infant contact vs separation according to usual hospital routines	Focus of study was duration; initiation not reported
Spira & Ayme, 1991[224]	France	Public health interventions	Duration only reported
Stern *et al.,* 1992[225]	Women delivering at a specified hospital in Melbourne, Australia	Family birth centre	No relevant outcomes reported
Steyn *et al.*, 1989[226]	Women delivering in hospitals in the South-Western Cape, South Africa	Small mass media campaign plus interpersonal communication for bf promotion vs small mass media campaign alone	Retrospective study design
Stockbauer, 1986[227]	WIC antenatal participants living in Missouri, USA	WIC prenatal program vs non-WIC care	No relevant outcomes reported; retrospective study design
Swanwick, 1992[228]	Women delivering at a specified hospital in Southampton, UK	Bf leaflet vs usual care	Focus of study is duration of bf; also, postnatal intervention
Tandon, 1989[229]	School children and pregnant and lactating women living in rural areas and tribal villages of India	National Child Health Programme vs no intervention	No relevant outcomes reported
Thomson *et al.*, 1979[230]	Primiparous women from a variety of ethnic backgrounds delivering at a specified hospital in Montreal, Canada	Early contact vs usual care	No relevant outcomes reported
Torres Diaz *et al.*, 1996[231]	Mothers and children being monitored under a child health programme in Malaga, Spain	Health education programme vs usual care	Retrospective control group
Tuttle & Dewey, 1995[232]	Hmong immigrants living in Northern California, USA, participating in WIC program	WIC program plus peer counselling from trained Hmong women vs no programme	Retrospective control group
Verronen *et al.*, 1980[233]	Women delivering at the Central Hospital of Tampere, Finland	Rooming-in plus bf on demand plus avoidance of supplementary bottle-feeding vs usual care	No relevant outcomes reported
Verronen *et al.*, 1981[234]	Finland	Bf promotion programme vs usual care	Retrospective controls
Verronen *et al.*, 1983[235]	Finland	Hospital-based bf promotion programme (before–after study)	Insufficient details available (abstract only)
Verronen, 1988[236]	Women delivering in Tampere Central Hospital, Finland	Hospital-based bf promotion programme (before–after study)	No relevant outcomes reported

continued

continued

Study	Setting/participants	Interventions	Reasons for exclusion
Wainwright, 1981[237]	White, married, working class primiparae, intending to breastfeed, UK	Antenatal preparation for bf (reading, mothercare classes)	Initiation rates reported for overall sample, but not per group
Waldenstrom & Nilsson, 1994[238]	Women delivering at a specified hospital in Stockholm, Sweden	Hospital birth centre vs usual care	No relevant outcomes reported
Waldenstrom & Swenson, 1991[239]	Women delivering at a specified hospital in Uppsala, Sweden	Nocturnal rooming-in (before–after study)	No relevant outcomes reported
Weinmann & Weinmann, 1987[240]	Women delivering within a specified county in Germany	Bf educational campaign (before–after study)	Focus of study is duration of bf

Appendix 6

Explanatory notes for figures

Individual relative risk estimates for the outcome of initiation of breastfeeding

Data from RCTs

The relative risk is a method of expressing effect size with reference to the rate of an event (e.g. numbers of women initiating breastfeeding). The relative risk of an event is the risk (or likelihood) of the outcome in the treatment (intervention) group divided by the risk in the control (e.g. standard care) group.[62] The figures show calculated individual relative risks with 95% CIs for initiation of breastfeeding from studies where data allows an estimation. The point estimates are not cumulative (i.e. results from individual studies have not been combined), and should not be considered as pooled results. Results from the trials have not been pooled owing to variation between trials with regard to participants, interventions and outcome assessments (see *Tables 4–62* and chapter 4 for further details). Where possible, the individual relative risks have been calculated on an intention-to-treat basis. This means that, when the data from primary studies allowed, participants were analysed according to the group to which they were initially allocated, regardless of whether or not they later withdrew.

In the figures, the individual point estimate effects are represented by the large black dots, and the horizontal lines on either side of these represent the associated 95% CIs. When the dots are to the right of the central vertical line, the treatment is estimated to be superior to the control, and when the dots appear to the left of the line, control programmes are considered to produce more favourable results than the interventions. Only when the dots and horizontal lines are clear of the central line can between-group differences be considered as statistically significant. In cases where the CI crosses the central line, this indicates a non-significant trend. Where a dot is on (or near) the central line, treatment effects are estimated as equivalent (or almost equivalent) between groups, and the associated *p*-value will approach 1.000. Wide CIs indicate greater uncertainty around the estimate effect, whilst narrower intervals suggest greater confidence and a more precise estimate. Please see separate notes (with *Figures 2, 4* and *7*) for trials with three or more arms.[65–67]

Data from non-RCTs

Figures are included that represent data from both RCTs and non-randomised trials with a concurrent control group. It should be noted that the latter are likely to be more subject to participant selection bias compared with RCTs. This is of particular concern in evaluations where no details are provided on the method of group allocation. Findings should therefore be considered with caution. Specific annotation has been added to one figure to help with interpretation.[68]

Appendix 7

Trajectory of knowledge base

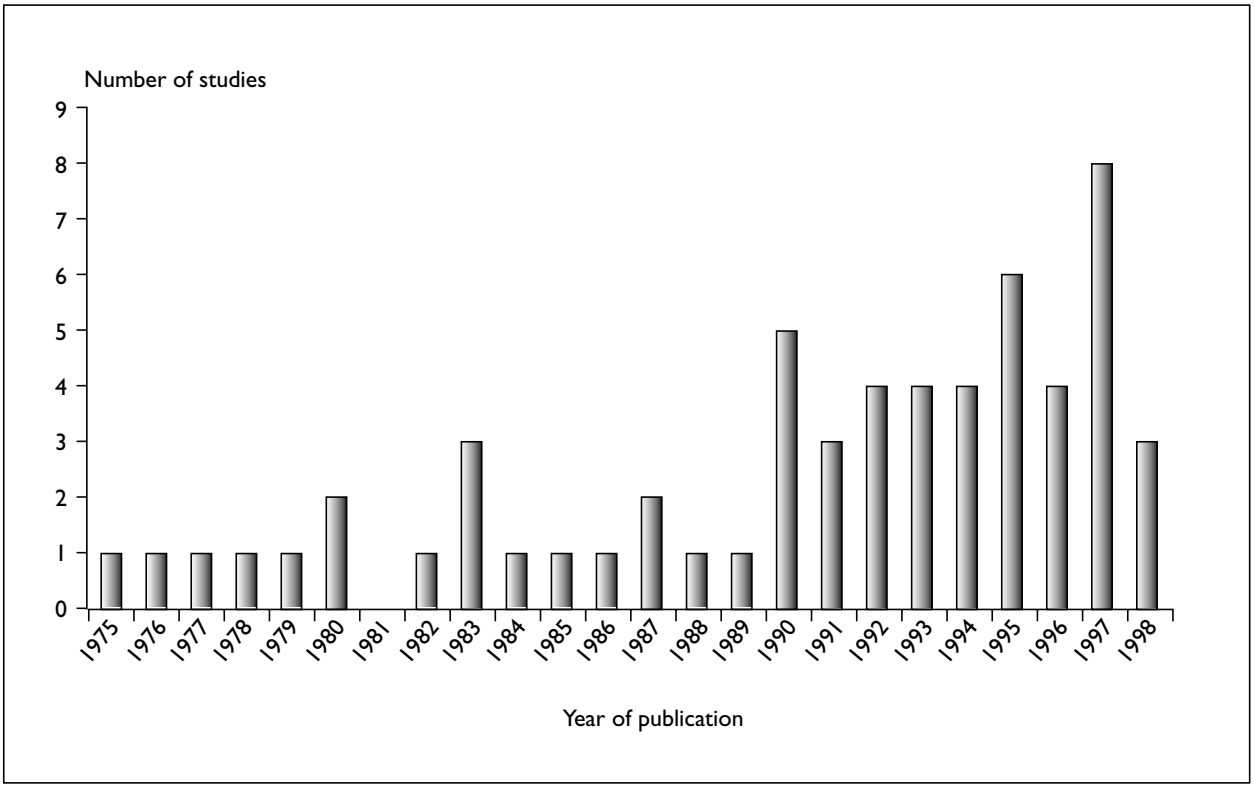

FIGURE 11 *Number of studies by year of publication*

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This report was identified as a priority by the Primary and Community Care Panel.

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Feedback

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We look forward to hearing from you.

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