

The Research section

In this section, Ruth Hewston, Catherine Ayre and Rosemary Dodds present an NCT evidence based briefing on Colic in Babies; the Journal Club appraises research looking at the 'Effect of breastfeeding on intelligence in children'; an article on World Alliance for Breastfeeding Action's work to highlight the effects of policies to prevent mother-to-infant HIV transmission in Africa; No travellers – a report on gypsy and traveller women's experiences of maternity care – Statistics Digest: Northern Ireland; and Research Roundup

Colic in babies:

An NCT Evidence Based Briefing

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Despite 40 years of research into colic in babies, we still do not know what causes it. Many 'cures' have been suggested and marketed, but these never help all babies suffering from colic, and some may even be harmful.

A review of the literature on support for parents of babies with colic, concludes that colic disrupts family life, puts a strain on the relationship between parents and creates feelings of guilt and loss of control. Parents described distress and feelings of failure when they were unable to find a way to soothe or console their baby.¹

Colic continues to affect significant numbers of babies. Their 'tired, frustrated and concerned parents' seek help from health professionals in the hope of finding 'a way to comfort their child'² Professionals, in turn, 'believe that they have to do something because of the trouble parents are experiencing'³ Mostly, however, the treatments they suggest have little effect.²

This briefing aims to examine what colic is, and to explore some of the possible causes of and risk factors for colic. It will also investigate the evidence for and the effectiveness of existing treatments.

Definition and symptoms

At its most simple, colic is characterised as 'excessive crying'³ or 'extended and repeated periods of crying or fussing'³ in babies who are otherwise healthy and thriving.^{3,2} A commonly used definition is 'Wessel's rule of three', which defines infantile colic as 'crying for at least three hours a day, at least three days a week, and for at least three weeks' duration.⁴

However, there is no standard definition of colic, and therefore studies may actually be comparing dissimilar groups of babies. Reijneveld et al. found that some parents whose children met the Wessel definition of colic did not perceive their crying to be problematic.⁵ Conversely, some babies whose parents considered them to be colicky cried significantly less than this. This supports one view that babies with 'colic' may just be

those whose crying is on the 'extreme end of normal'.

Colicky crying generally occurs 'in the late afternoon or evening'⁷ Such crying has been described as 'high pitched screaming' and as 'paroxysms of irritability and fussing'² Babies with colic generally cannot be consoled by 'routine comfort measures'⁸

A number of other symptoms may accompany the crying, for example, 'flushing of the face, drawing up of the legs, passing of gas, and difficulties in passing stools'³ as well as 'arching the back, clenching fists ... and difficulty settling'² However, these symptoms are not unique to colic,⁷ and it is not clear whether or not they are integral to it.³

Colic typically begins 'in the first few weeks of life'⁶ Its duration varies: from the literature, it generally resolves by three to four months⁷ but may not improve until six months of age.²

Prognosis

As a result of the baby's distress and inconsolable crying, parents may experience 'significant suffering', including distress and sleep deprivation, which may affect their relationship with their child.⁸ Colic 'reduces confidence in parents' infant-caring capabilities', and according to one author, can lead to 'earlier discontinuation of nursing, the early introduction of solids, frequent formula changes, maternal distress and irritability, disturbed maternal-infant interaction, and increased risk for physical abuse and preschool behaviour problems'^{8,9}

There is debate about whether colic has longer-term effects on children. One prospective study of 561 women found that children with colic had no detectable cognitive deficit at the age of five years.¹⁰ However, there was an association in those children whose unexplained crying had not resolved by 13 weeks of age with lower IQs and poorer fine motor skills at five years of age. Another study found that families whose children had suffered from colic expressed more dissatisfaction with their 'daily family functioning' three years later.⁸ It has also been suggested that babies who

suffer from colic may have an increased risk of developing allergies, although there is conflicting evidence for this.⁸

Prevalence

It is not clear how many babies are affected. A systematic review found widely varying prevalences, but concluded that many results were affected by poor methodologies.¹¹ Furthermore, even in the best two studies identified, the prevalence of colic varied from 5% to 19%. Another measure is that as many as one in six families (17%) may consult a health professional about problem crying.

The prevalence of colic varies between different cultures. A survey in a multi-ethnic community in the Netherlands found that rates of colic were lowest among babies of Surinamese origin, who were reported to have approximately half as much excessive crying as babies of Dutch origin (Odds Ratio 0.42).¹² A study of 160 Korean babies found no cases of colic at all.¹³ This study also found that Korean babies generally cry less than Western babies overall, and that they do not exhibit the same peak of crying in the evening. In both studies, the authors suggest that the lower prevalence of colic in non-Western cultures may be explained by different patterns of feeding and caring for babies. Mothers in non-Western countries often carry their babies more and feed them more frequently than Western mothers, and excessive crying may therefore be 'a response to the (Western) care giving style'.¹²

Causes of colic

More than 50 years of research have failed to find a definitive cause of infantile colic. The following are the main areas that have been explored:

Crying not caused by 'colic'

One explanation for excessive crying is that it is a normal phenomenon resulting from 'neuro-developmental changes that normally take place in early infancy, as regulation of behaviour passes from reflexive to more voluntary, cortical, systems'.¹⁴ As has already been suggested, from this perspective 'colic' may be crying which is at the extreme end of the normal continuum.

Another possibility is that babies with 'colic' may be crying because of feeding difficulties. One study examined babies' oral motor skills while they were being bottle fed, and found that those who had colic had more disorganised feeding, with less rhythmic nutritive and non-nutritive sucking, and showed more discomfort after feeds.¹⁵ This study did not prove

a causal relation between feeding difficulties and colic and it is possible that underlying problems regulating behaviour caused both the feeding problems and the crying.

Some have maintained that colic as a distinct phenomenon does not exist and that babies who cry excessively are simply hungry, in pain, hot, cold or itchy.⁷ Conversely, when a baby presents with excessive crying, it is important to rule out medical causes. For example, the baby may have gastro-oesophageal reflux disease, which can cause excessive crying, although this is accompanied by other symptoms such as visible regurgitation.⁷ 'Colicky' crying may also be present in an baby suffering from an acute intestinal condition.⁷

Gastrointestinal factors

A number of gastrointestinal factors have been suggested as causes of colic. However, it has been suggested that such 'organic disturbances' are only implicated in one in 10 babies who see a health professional about their crying, and one in 100 babies overall.¹⁴

According to Gupta,⁸ the following gastrointestinal factors have been linked to colic:

- + An 'excessive intragastric air load', which may be caused by 'altered (increased) intestinal bacterial load, mal-absorbed carbohydrates (lactose), or both'. However, there is little evidence to support this theory and X-rays of babies taken before, during and after crying, showed that gas accumulated during crying, implying the wind was a result of crying rather than the cause.¹⁶
- + An allergic response to proteins in human and cow's milk. Again, however, attempts to prove or treat this have not been consistent.
- + 'Altered intestinal motility' may cause 'abdominal cramping and colicky behaviour'. There is some evidence that colic may be explained by 'colonic hyperperistalsis and increased rectal pressure'.
- + Motilin is a prostaglandin present in the gastrointestinal tract. Basal motilin levels are raised in colicky babies, and are higher at birth in babies who later develop colic. It is possible that this may lead to faster gastric emptying, causing intestinal pain.¹⁷

Non-gastrointestinal factors

Psychosocial issues

Many researchers have sought to investigate the impact of different psychosocial factors on the incidence of colic. These factors include maternal distress in pregnancy,^{18,19} adversi-

ties during childbirth,¹⁴ mothers' postpartum psychological adjustment,¹⁹ anxiety and depression.²⁰ However, while many of these studies have found that adversities during pregnancy and the postpartum period do increase the risk of colic, others have not.⁸ Furthermore, it has been argued that the methodologies used in these studies have often been weak, and that the results cannot always be replicated.¹⁴

It has been suggested that a child's own temperament could be a factor in colic. A child with a sensitive, irritable temperament may be more likely to suffer from colic.²¹ Equally, a baby's difficult temperament could explain why its parents might interact with it in a 'less than optimal' way; such interactions have themselves been linked with colic.³

Parental-child attachment

Research suggests that there may be an interactions between the quality of parent-baby relationships, colic and measures of well-being, though once again it is not clear how these factors interact or whether there is a casual effect. One prospective study involving 78 mothers found colic, defined according to Wessel criteria, in 17 (22%) of babies. Mothers of babies with colic had significantly higher Edinburgh Postpartum Depression Scores (EPDS) than mothers of babies without colic. Of the babies with colic, 63% had mothers with an insecure attachment style, measured using the Adult Attachment Scale, whereas only 31% of mothers were regarded as having insecure attachment when the baby did not have colic ($p=0.02$).²¹ Although babies were assessed at one week, one month and four to six months, it is unclear from the study which came first, the insecure attachment style, the colic or the depression.

In one Finnish study, parent-baby interaction was compared using the Parent Child Early Relational Assessment Scale, in 32 families with a colicky baby and 30 control families. According to this scale, both parents of colicky babies had less optimal parent-child interaction compared with the control parents. The problems in the interaction were most pronounced between the fathers and babies in the group with most severe colic. Severely colicky babies were also 'less competent' in interacting with their parents. In addition, interaction between the parents was more often dysfunctional in the severe colic group.²²

Despite these recent findings, there is limited evidence on the relationship between postpartum parental psychological state and colic. Unless studies are started well before the baby's symptoms of colic begin, research

investigating a possible relationship between 'less optimal' parental interaction is unable to determine which came first, or whether one behaviour has a causal influence on the other. It is feasible that some parents may have 'less optimal' interaction with their baby because their baby cries regularly and is difficult to console, rather than poorer parental interaction influencing the development of colic. If there is a causal relationship, there may be a complex spiralling in which the parent's behaviour affects the baby and the baby's behaviour affects the parent.

Risk factors for colic

A wide variety of risk factors have been proposed as being linked with an increased risk of colic. For example, a large community study in Sheffield found that the incidence of colic was higher with increasing parental age and years in full time education, lower parity, and more affluent homes and districts of residence.¹⁸ However, colic was not predefined, rather parents described their babies as having colic. A systematic review of 15 community based surveys found no overall association with gender, socio-economic class, type of feeding, or family history of atopy.¹¹

These 'risk factors' may be affected by reporting bias, and researchers often admit that they cannot explain why a particular factor would increase the incidence of colic. St James-Roberts and Conroy therefore advise that parents of colicky babies, who are often already distressed, should not be made to feel that they are responsible for their baby's crying because of particular 'adverse environmental circumstances before or during birth'.¹⁴

The following possible risk factors may be of particular interest to those working with parents during pregnancy and postnatally.

Smoking

A number of studies have investigated the link between smoking and colic, with some conflicting results.^{19,23,24} This may be because of methodological flaws in the studies. For example, many studies did not investigate whether mothers smoked during pregnancy as well as postpartum.²³ St James-Roberts and Conroy question why researchers set arbitrary cut-off points with respect to the number of cigarettes smoked, rather than just comparing smokers with non-smokers; they argue that these cut-offs can be manipulated to achieve the desired results.¹⁴ In a review of six studies, Shenassa et al, concluded that there is an independent association between colic and current maternal smoking.¹⁷ However, it is possible that babies' crying may

prompt mothers to smoke more.²⁴

It should also be noted that even if smoking does increase the risk of colic, the incidence of smoking means that many babies with colic do not come from smoking households¹⁴. In 2005, 17% of mothers smoked throughout their pregnancy, and in 2000, 39% of babies around a month old lived in households where someone smoked²⁵.

Method of feeding

There is some evidence to suggest that positioning and attachment of the baby during breastfeeding may be contributory factors to the incidence of colic.²⁶ In particular, ensuring the baby is well positioned may lead to a reduction of colic.²⁷ If the baby is not well attached, they are less likely to reach the higher fat milk as the feed progresses. Fat in the diet slows gastric emptying and provides more energy, so lower fat feeds mean babies are hungry earlier. Over several feeds, babies who are not well attached may take a greater volume of milk. The lactose content of breastmilk is fairly constant so the baby receives more lactose and it is more rapidly passed into the small bowel. According to this hypothesis, this can temporarily exceed the amount of lactase enzyme the baby can produce. It also draws water into the small bowel. Bacteria in the gut act on the undigested lactose to produce gases such as hydrogen, methane and carbon dioxide. The resulting distension may cause cramps and looser bowel movements. Babies who are affected may also have increased wind and greener faeces, caused by bile salts that have not been broken down in the gut.²⁶

In support of this theory, two studies have found an association between elevated breath hydrogen and colic in babies, but the range of values was wide and there was overlap between babies with and without colic.⁸ In contrast, the X-ray studies referred to earlier do not support gas in the intestine as a cause.¹⁶ In addition, lactase enzyme supplements and low lactose formula milk have not been shown to be effective interventions for the reduction of colic in systematic reviews.^{3,4}

Treatment

Much of the research conducted into treatments and interventions to relieve colic has been criticised for its lack of methodological rigor. As this section highlights, there is a need for high quality experimental studies to demonstrate whether any treatments are effective.

Baby feeding

Formula fed babies

Systematic reviews of the evidence indicate that there may be some benefit in changing to a modified formula for formula fed babies. Low allergen milks – which are based on whey hydrolysates or casein hydrolysates – and soy formula milk have been tested; although studies are small, blinding may be in doubt in some cases, and most studies are funded by manufacturers.

One RCT found that soya formula reduced the duration of crying in babies with colic compared with standard cows' milk formula. However, this study was very small and reliable conclusions cannot be drawn. The Chief Medical Officer has recommended that soy formula should not be used as preferred treatment in healthy babies as it has a high phyto-oestrogen content 'which could pose a risk to long term reproductive health'.²⁸

One double blind RCT including 43 babies found that a whey hydrolysate formula significantly reduced the time that babies cried each day compared with standard cows' milk formula, measured by a validated parental diary (crying reduced by 63 minutes/day, 95% CI 1 minute/day to 127 minutes/day; $P=0.05$).²⁹ This RCT has wide confidence intervals and blinding may have been unmasked. According to Wade and Kilgour there is insufficient evidence to warrant changing milks in a baby who is thriving on a standard formula milk.⁶

In spite of advertising to the contrary, the only trial of sufficient quality examining a fibre-enriched formula milk found no difference in crying time between the group receiving the fibre-enriched formula and the group receiving the standard formula.³⁰

Feeding a bottle fed baby in an upright position can help prevent aerophagia, and using the appropriate hole size in the teat for the baby's sucking speed has also been shown to help reduce colic symptoms.^{31,32}

Breastfed babies

There is some evidence to suggest that making sure the baby is well positioned during breastfeeding, so that they can reach the higher fat milk and air is not swallowed during the feed, may lead to a reduction in colic.²⁷ There is also evidence for allowing the baby to finish feeding on the first breast before offering them the second breast. Mothers in one study were randomised to either prolonged feeding on one breast at each feed ($n = 150$) or to feed equally on both breasts at each feed ($n = 152$) and both groups were followed prospectively to six months of age. The main-

ly one breast group had a lower incidence of breast engorgement in the first week and colic over the first six months (12% vs 23.4%; $p < 0.02$). There was no significant difference between the two groups in the length of breastfeeding.³³ This strategy, which is now considered standard good practice, may therefore help to prevent or reduce symptoms of colic in some babies.^{27,34}

Maternal diet

Research evidence indicates that some breastfed babies with colic may respond to the mother adopting a cow's milk-free or 'low allergen' diet. Several small studies indicate a positive impact of removing cow's milk and other common antigens from the mother's diet whereas others have shown no effect.^{3,29,35,36} In a more recent randomised, controlled trial (RCT), 107 mothers were asked to exclude cow's milk, eggs, peanuts, tree nuts, wheat, soy and fish from their diet; or to include these foods and take a soya/cow's milk mixture. After six to seven days on the diets, which also excluded food preservatives, colours and additives, 30 of 47 babies in the low-allergen group still had colic, defined as a cry/fuss duration of more than 360 minutes in 48 hours, and 31 of 43 babies in the control group (NS), and mothers' observations indicated little difference between the groups.³⁷

It may be that there is a subset of babies who react to allergens in the mother's diet. In one blinded, randomised trial, with 20 mothers who consumed either a soya and cow's milk mixture or soya milk while on a cow's milk free diet, it was observed that on days when chocolate or fruit were included in the mother's diet, symptoms of colic were more frequent in both groups. The authors concluded that colic may be related to a combination of foods.³⁸ Although rates of colic were higher in babies when mothers, who themselves had atopic disorders, such as eczema, asthma or allergic rhinitis, stopped taking cow's milk products, the study was small and the difference was not statistically significant.³⁸ It is recommended that if mothers do try a cow's milk free or low allergen diet it should be maintained for at least two weeks to allow symptoms to subside.³⁷

There is one small study indicating that a herbal tea containing chamomile, fennel, vervain, liquorice and balm-mint may be beneficial in the treatment of colic.³⁹ However, full consideration needs to be given to potential problems and side-effects of such treatments, including possible reduced intake of milk and disruption of exclusive breastfeeding, if that is how the baby is fed.⁴

Increased carrying

Evidence suggests that increased carrying for up to three hours per day, whether or not the baby cried, did not result in a decrease in colicky symptoms.^{6,40,41} Barr et al. randomised 66 mothers with babies of four weeks of age or less complaining of colic to standard paediatric advice or standard advice, plus a recommendation to increase carrying by 50%. Overall, the increased carrying group carried their babies 2.2 hours/d (56%) more than the control group. There was no difference between groups in the duration or frequency of crying or fussing at any time throughout the intervention period.⁴¹ Unfortunately, the reporting of findings did not take into consideration the views of the parents, and whether they found the additional carrying helpful overall. In a comparative, observational study of parenting styles and baby's crying behaviour, babies who had more physical contact with their parents and were carried for longer, cried about half as much as other babies. However, there was no difference in unsoothable crying bouts or in colicky crying at five weeks of age.⁴²

Mechanical means of soothing

Although anecdotal reports suggest that babies can sometimes be soothed by the motion and, perhaps, sound of a car engine, an experimental study including 38 families of whom one-third were randomised to use a car ride simulator showed no significant improvement in the incidence of colic or reduction in maternal anxiety.⁴³

Chiropractic and osteopathic treatment

There have been two randomised trials addressing the effectiveness of chiropractic treatments on the alleviation of colic. In one, unblinded study, babies receiving chiropractic manipulation over two weeks were compared with babies receiving simethicone (see below). On days 8-11, crying was reduced by one hour in the simethicone group, and by 2.7 hours in the manipulation group ($P = .004$).⁴⁴ In the second study 86 babies received three sessions of either spinal palpation or holding by the nurse over a period of ten days. Neither doctor nor parents knew which group the babies were in. There was no significant difference in the two groups with 60-70% of babies showing a reduction in crying.⁴⁵

One small, open study randomised 28 babies with colic to either cranial osteopathic manipulation or no treatment once weekly for four weeks. The same practitioner adminis-

tered treatment, and the control group visited the osteopath according to the same schedule but were aware their babies were not receiving treatment. Parents recorded time spent crying, sleeping and being held/rocked on a 24-hour diary. A progressive, significant reduction in crying was detected in the treated babies. Overall decline in crying was 63% and 23%, respectively, for treated and control babies.⁴⁶ However this result needs to be subjected to a double blind study.

Pharmaceutical treatments

Medical and pharmaceutical treatments are not usually prescribed to alleviate colic, either because they have not been shown to be effective or because they have too many side effects. However, one recent study in the UK found 13% of babies were given gripe water and 16% Simethicone (activated dimeticone), which are available over the counter.⁴⁷ No studies were found evaluating the use of gripe water. Until 1992, this contained alcohol and sucrose. Although sucrose, and other sweeteners, have a temporary effect on crying, this is of short duration and therefore not a significant benefit for colic.⁴

Simethicone (e.g. Infacol®) aims to reduce the surface tension of bubbles in the intestinal tract, enabling gas to be expelled more easily. Several studies have examined the use of simethicone in the reduction of colic, however they have predominantly not supported its use.^{48,49,50} One double blind, crossover, trial randomised 83 babies aged two to eight weeks to 0.3 ml of simethicone or placebo for one week before feeds.⁴⁸ There was no significant difference in colic between groups, when rated by carers; 28% improved with simethicone vs. 37% with placebo vs. 20% with both. The second double blind, crossover RCT including 27 babies again found no significant difference between simethicone and placebo as rated by parental interview, 24-hour diary, or behavioural observation.⁴⁹ A third, poor quality, RCT included 26 babies but no details on the definition of colic. It found that simethicone significantly reduced the number of crying attacks on days four to seven of treatment compared with placebo.⁵⁰

Behavioural modification and counselling

Behavioural modification interventions have, on the whole, not been effective in reducing both colic and parental anxiety, although some studies have reported a positive effect on parents' ability to cope.

A reduction of stimulation in the baby's environment – by not patting, lifting, or jiggling

the baby, or by reducing auditory stimulation – was reported to be effective in the lessening symptoms of colic (after seven days: 14/15 [93%] improved with advice vs. 6/12 [50%] with control). However, mothers given advice to reduce stimulation were also given permission to leave their babies if they felt they could no longer tolerate the crying. It is unclear whether the improvement reported represents a true change in the hours that the baby cried, or altered maternal perception.⁵¹

One RCT, including 22 families, found no significant difference between advising mothers about specific responses to their baby's crying (including a gentle soothing motion, avoiding over stimulation, using a pacifier, and prophylactic carrying) plus reassurance; or reassurance alone, in terms of maternal anxiety or hours of infant crying over two weeks.⁴³ Another small RCT (20 babies) found that advising parents to respond to their baby's cries by feeding, holding, offering a pacifier, stimulating, or putting the baby down to sleep decreased the duration of crying compared with giving a casein hydrolysate formula.⁶ In common with most other studies, parents were not blind to the interventions and recorded the babies' colic episodes themselves.

Counselling has been shown to be an effective method of reducing mothers' concern about fussing and crying behaviour in babies.⁹ A study of CRYISIS counsellors who offer support to mothers found no effect of the treatment on babies' difficult temperament and crying, but mothers of colicky babies evaluated counsellors as sympathetic, knowledgeable and understanding, and they felt they had been supported in trying methods of reducing the problem crying, coping with the baby, and improving their relationship with their baby.⁹

Health visitor support

In reviewing the psychological support and interventions that may be used to support parents of babies with colic, Long and Johnson found that colic disrupts family life, and creates feelings of guilt and loss of control. Positive findings concerned the role health visitors played by regularly staying for extended periods and showing genuine understanding of the parents' difficulties. This style of intervention was perceived by participants very positively, and enabled them to feel more able to cope with the situation.¹

Long also found consistent evidence in support of an additional health visitor programme, which included counselling and behaviour management techniques, as an

intervention strategy for parents of colicky babies. Mothers who took part in the programme improved their feelings of coping compared with those who received the normal health visitor service. Health visitors felt positively about the programme, as they felt the training they had received empowered them with more confidence that they were able to help a family through a difficult time.⁵²

Overview of treatments

The findings of numerous studies suggest a range of measures that may be helpful in the reduction of colic, although no interventions appear to provide an effective cure.

There is some evidence to suggest that some of the following may be helpful in some circumstances: improving feeding position, dietary changes, reducing the level of stimulation in the babies' environment and support from a counsellor or health visitor. Parents should be aware that weaning a baby from breastmilk may increase the problem and mothers should be supported to continue breastfeeding for as long as they wish. If mothers do try a cow's milk free or low allergen diet, it should continue for at least two weeks to allow symptoms to subside.

In summary

- + Babies' distress and inconsolable crying can have a profound impact on parents who experience guilt, loss of confidence and control, as well as sleep deprivation, which may affect family relationships.
- + Estimates of prevalence vary from 5-19%.
- + Research into the causes and treatment of colic is characterised by poor definitions, inadequate sample sizes, lack of blinding and independent assessment
- + Existing data does not demonstrate conclusive benefits for pharmaceutical treatments.
- + Ensuring the baby is well positioned at the breast, and 'finishes' the first breast first is good practice in the prevention and possible remedy of colic.
- + Research into low allergen diets for breastfeeding mothers are inconclusive, although there may be therapeutic benefits for a limited number of babies.
- + So called 'hypoallergenic' formula may lead to an improvement in colic for some bottle fed babies, although more independent research is needed.
- + Increased carrying of the baby is associated with reduced crying time in healthy babies but not less colicky crying.
- + There is unclear evidence on the reduction of stimulation in the baby's environ-

ment, but this intervention may be an appropriate suggestion for parents to try.

- + Counselling and empathetic support can help parents to cope.

Conclusion

There is very limited evidence to guide parents or health professionals on which interventions, if any, are worth trying for colicky babies who are well-positioned at the breast and 'finish the first breast first' or who are growing well on formula milk. However, it is known that parents' ability to cope with the extended crying can be strengthened by support from suitably trained counsellors or health visitors.

Prospective studies are needed to show the developmental pathways to colic and whether any association with other factors, such as poorer parent-child interaction, smoking or depression in mothers, tends to precede colic or be a consequence of caring for an unhappy, demanding baby.

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NCT Journal Club

Breastfeeding counsellor Patricia Wise summarises the Journal Club's critical appraisal of the research article:

Effect of breast feeding on intelligence in children: prospective study, sibling pairs analysis, and meta-analysis. Der, G., Batty, G.D., Deary, I.J. (2006) *British Medical Journal*, doi:10.1136/bmj.38978.699583.55 (published 4 October 2006).

As the title indicates, this paper reports on three studies. The cohort for the prospective study was more than 12,000 young Americans who were first interviewed in 1979 for a longitudinal study covering a wide range of outcomes. However, the information about breastfeeding was obtained retrospectively, within a year of the birth. The women were asked whether they breastfed at all. In a good quality study, data on exclusivity would be collected. We therefore had doubts about the validity of this study.

The authors concluded that the most significant effect on the child's IQ was the mother's IQ. Mothers in the study with a higher IQ were more likely to breastfeed, so it appears breastfeeding is linked to higher IQ in the child unless the influence of maternal IQ is allowed for.

The researchers considered a dozen different factors that might have influenced the results. They treated these variables as independent whereas we thought it likely that mother's IQ, mother's education and home cognitive stimulation were related variables. This could mean that the statistics overcompensated for the variables.

The median duration of any breastfeeding was 13 weeks. After controlling for mother's IQ, babies breastfed for 29 weeks or more had higher average IQ. In fact, the conclusion says 'breastfeeding has little or no effect on intelligence in children'.

The sibling pairs analysis is a case-control study. Because the siblings have the same mother, most of the factors that might influence a child's intelligence (such as the home environment) are presumed to be the same. There were around 800 pairs of siblings who received different amounts of breastfeeding from each other and no significant difference in IQ was found, but again there was no information about how much breastfeeding actually occurred.

A meta-analysis is a review of similar studies that are sufficiently high quality to be included. Out of 73 possible studies, the authors selected eight (all from developed countries) that met their criteria. The results of these studies were quite variable, but six seemed to show some positive effect of breastfeeding on intelligence. However, the authors of the meta-analysis made adjustments for variables not considered in the original studies. The advantage of breastfeeding was then found to be too small to be significant.

As we had reservations on a number of aspects of this study, we were surprised that it had been published without further revision.

The full article is available to download free from the BMJ Online at: <http://bmj.bmjournals.com/cgi/rapidpdf/bmj.38978.699583.55v1>

Why not join the Journal Club?

NCT Policy Research Department facilitates a monthly telephone journal club for specialist workers, reps, research networkers and other volunteers who would like to develop their confidence and skills in using research, without travelling to a training session or even leaving their living room. This project is part of our work to make sure services and information for new parents are informed by the best available evidence, drawing on both quantitative and qualitative research.

If you would like to participate, please contact Sarah Fisher via email at: s_fisher@nct.org.uk or call 020 8752 2328