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IS BREAST BEST?

Beyond the immediate impassioned responses

“Outrageous!!!!”...”Arrogance of man”...”Tempest in a teacup”...”Breastfeeding promotion undermined yet again”...”Another breastfeeding obstacle”...No article in a serious medical journal has matched the uproar sparked by a study published in BMJ about “Duration of breast feeding and arterial distensibility in early adult life”(1). 38 electronic responses appeared suddenly on the BMJ web site. A record! As a reference I looked at the number of electronic responses inspired by the previous paper published in the same issue of BMJ (2 responses) and by the following one (0 response). All over the world the media mentioned the results of this study in a sensational mode. It makes me think of “The Satanic Verses” by Salman Rushdie, which has been dubbed “the most famous book most people will never read”. Several of our subscribers asked me to comment on this paper, because they heard or read about it, without understanding exactly what it was about. In order to avoid a repeat of the Rushdie phenomenon our first step must be to reproduce in its entirety the abstract as it was published in BMJ on March 17, 2001. I even recommend to look at the full text: go to bmj.com in order to reach Pubmed/Medline. By typing the name of the first author (Leeson CPM) you’ll have access to the full text. The researchers belong to “The Medical Council Childhood Nutrition Research Centre, Institute of child health” (London) and to “The Vascular Physiology Unit, Great Ormond Street Hospital for Children” (London).

ABSTRACT

Objectives: To test the hypothesis that duration of breast feeding is related to changes in vascular function relevant to the development of cardiovascular disease.

Design: Population based observational study.

Setting: Cambridge.

Participants: 331 adults (171 women, 160 men) aged between 20 and 28 years, born in Cambridge Maternity Hospital.

Main outcome measures: Distensibility of brachial artery, type and duration of infant feeding, current lipid profile, and other cardiovascular risk factors.

Results: The longer the period of breast feeding the less distensible the artery wall in early adult life, with no sex differences (regression coefficient = $3.93 \mu\text{m}/\text{month}$, 95% confidence interval 7.29 to 0.57, $P=0.02$). However, in those breast fed for less than four months, arterial distensibility was not significantly reduced compared with an exclusively formula fed group. The vascular changes observed were not explained by alterations in plasma cholesterol concentration in adult life.

Conclusions: Breast feeding in infancy is related to reduced arterial function 20 years later. These data should not alter current recommendations in favour of breast-feeding, which has several benefits for infant health. Further work is needed, however, to explore the optimal duration of breast feeding in relation to cardiovascular outcomes.

History

A certain number of facts regarding the history of infant feeding must be emphasised before interpreting the results:

- All the men and women participating in the study were born between 1969 and 1974. This period preceded the widespread use of "humanised formula", that is to say the introduction of vegetable fats in artificial milk. We must assume that the artificial milk consumed by most of the participants contained 100% cow's milk fats; it was therefore rich in saturated fat and contained a certain amount of trans fatty acids.
- In the early 1970s it was common practice to discreetly top up breastfed newborn babies with artificial formula during the first days following birth.
- In the early 1970s human milk pollution with polychlorinated chemicals had probably reached its maximum: PCBs had not yet been banned. All these synthetic chemicals are associated with lipoproteins and interact with lipid metabolism.

Weak points

Some of the limitations and several weak points of this study appear when reading the full text.

The authors sent invitations to 1526 people. 229 of them declined and 877 did not reply. Finally full details of vascular function, risk factors and infant feeding practice were available for only 331 subjects (21.7 % of those who were originally invited to participate). A retrospective study of small sample of self-selected volunteers cannot be authoritative.

There are contradictions between the two parts of "Results". In the first part we read that there was an inverse relation between duration of breast feeding and arterial distensibility and also that, "as expected", reduced distensibility was related, in particular, to systolic blood pressure. In the second part we read that duration of breast-feeding was unrelated to blood pressure. If there is a relation between duration of breast feeding and arterial distensibility and between

arterial distensibility and blood pressure, it is difficult to believe that there is no relation between duration of breastfeeding and blood pressure.

Arterial distensibility is not a well-established risk factor for cardiovascular diseases, although it appears to have biological plausibility. Its measurement implies sophisticated methods which use high resolution ultrasound. It has been experimented by only a tiny number of researchers. High blood pressure, on the other hand, is a well established risk factor. That is why I find it surprising that the authors did not mention and discuss the contradictions between their results and the results of three studies which are included in the Primal Health Research data bank. According to these studies blood pressure is raised among children and adults who were bottle fed.

If you type 'Wilson AC' in the index by authors, you'll find the Dundee study, suggesting that blood pressure at the age of seven is significantly raised in those children who have been exclusively formula fed for the first 15 weeks of life compared to those who had received any breast milk (2). If you type 'Taittonen L' you'll find the results of a Finnish study suggesting that the blood pressure of post pubertal male and female subjects is reduced among those who were breastfed more than 3 months (3). If you type 'Singhal A' you'll find a unique prospective randomised control study of 216 premature babies who were given either donated banked breastmilk or formula (preterm formula or standard formula). Arterial blood pressure at age 13-16 years was lower in the 66 children assigned banked breastmilk (alone or in addition to mother's milk) than in the 64 assigned preterm formula. The proportion of intake as human milk in the neonatal period was inversely related to later arterial pressure. No differences were found between those who had term formula and those who had standard formula. The authors could conclude that their data "provide experimental evidence of programming of a cardiovascular risk factor by early diet and further support the long-term beneficial effects of breastmilk" (4). It is worth underlying that Professor A Lucas participated in both the banked breastmilk study and the arterial distensibility study. It is obvious that if such contradictions – which could not be ignored by the authors - had been highlighted and discussed in the report of the "distensibility study", the results of this study would not have been presented by the media as a sensational breakthrough and would not have sparked such an uproar.

Despite that ...

Despite the many weak points of the study, its counterintuitive results, and the way it has been reported, however we must take into account the content of this paper. It suggests that, at least in industrialized countries, prolonged breastfeeding may lead to adverse cardiovascular outcomes later on in life. This is not the first study in the Primal Health Research data bank leading to such conclusions. Go to the authors index and type 'Fall CH'. You'll find a study about men born in Hertfordshire at the beginning of this century (5). Those who had still been breastfed aged 1 year had higher rates of coronary heart disease 60-70 years later compared with the expected rate for men of that age. If you type 'Mott GC' you'll find the report of one in a series of experimental studies with baboons by researchers in San Antonio, Texas (6). Exclusive breastfeeding throughout infancy, followed by a diet high in saturated fats, was associated with an abnormal lipid profile and more arterial fatty streaks in mature animals. The concordant conclusions of these studies from complementary perspectives must be looked at seriously. They are not implausible. One can hypothesize that prolonged breastfeeding tends to programme the metabolism of lipids in a way that is not an adaptation to the current dominant western diet, high in saturated fatty acids and trans fatty acids. Homo was originally adapted to a diet rich in long chain polyunsaturated fatty acids, with a high ratio of omega 3 to omega 6 and a certain balance between food from the land and food from the sea.

Comparable conclusions may be inspired by another study included in our data bank. This study also reveals possible negative effects of breastfeeding on a particular aspect of human health in wealthy industrialised countries. The researchers collected data regarding 3856 three-year old children participating in health check up programmes in 60 Japanese municipalities between October to December 1997 (7). They divided the children in three groups according to the mode of infant feeding (breast milk, artificial milk and mixed feeding). The rate of atopic dermatitis was slightly higher in the breastfed group (odds ratio 1.16). Once more, in order to interpret the results, we must remember to which environment Homo was originally adapted to. In a tropical wild environment one of the main roles of the human immune system is to adapt to a real symbiosis with a great variety of parasites, particularly intestinal worms. This implies the development of a family of antibodies called IgE. These IgE are more or less redundant in wealthy industrialized countries. However their levels may remain too high for the main role they are originally supposed to play. They tend to over react in the presence of certain antigens. It is well known that atopy is associated with high levels of IgE.

We should not overlook the positive aspect of all these studies. Even if they are not always authoritative they help realising that Homo Sapiens is not perfectly adapted to the 21st century dominant western lifestyle.

The other side of the coin

The bright side of the coin cannot be tarnished by a small number of data provided by retrospective studies difficult to interpret. It would take volumes to report a great variety of published studies confirming the positive effects of breastfeeding on vital aspects of health. Everybody knows about the spectacular positive effects of breastfeeding in third world countries where the rates of child survival can be used as criteria of health. There are countless references regarding the effects of breastfeeding on the risks of infections, particularly gastrointestinal infections (8, 9, 10, 11), ear infections (12, 13, 14), lower respiratory tract infections (15, 16, 17, 18), meningitis (19, 20), and necrotising enterocolitis (21). In the field of paediatric surgery, breastfeeding has a positive effect on the incidence of acute appendicitis (22), inguinal hernia (23), undescended testicles (24), and hypertrophic pyloric stenosis (25). The preventive effects of breastfeeding have been demonstrated in common chronic illnesses such as multiple sclerosis (26), rheumatoid arthritis (27) and insulin dependent diabetes (28, 29, 30). All these studies can be found in our data bank.

When considering the long-term effects of breastfeeding, we must not think only in terms of disease prevention and even of health promotion, but also in terms of human development in general. A well-known study assessed the I.Q. at 7 1/2 to 8 years of 300 children born preterm (31). All of them were fed by a tube passed through the nose to the stomach. Those who were fed mother's milk had an 8.3 point advantage in IQ, even after adjustment for differences between groups in mother's education and social class. There have been many other studies demonstrating the benefits of human milk on intelligence quotient, speech abilities (32, 33) and different aspects of cognitive development (34, 35).

In the context of the year 2001, we must give a special importance to a series of Dutch studies whose objectives were to evaluate the effects on neurological, mental and psychomotor development of early exposure to polychlorinated chemicals (36, 37, 38). No negative effects of exposure to PCBs and dioxin through breast milk could be detected until the age of six years. Today, in spite of human milk pollution, the well known benefits of breastfeeding outweigh and even counteract the adverse developmental effects of PCBs and dioxins during fetal life. Intrauterine pollution is the main preoccupation. Similar conclusions were provided by an American study regarding women who consume fish from the lake of Michigan, highly polluted with PCBs (39). The children were followed up to age 11.

A whole newsletter would be needed to summarize the known effects of breastfeeding on maternal health. There is strong evidence that women who breastfeed are at lower risk of breast cancer before menopause (40, 41, 42).

A whole book has been necessary to evaluate the importance, regarding the development of the capacity to love, of the short critical period when birth physiology connects with the physiology of lactation (43).

Lactation starts before the baby is born.

One of the most common reactions to the BMJ article is the fear that it might undermine breastfeeding promotion. There is still a tendency to focus on the role of promotion and to overlook more important issues. Today the main obstacle is not the failure of breastfeeding promotion. Talk to your hairdresser or your taxi driver and you'll realise that everybody knows that "breast is best". Today the main preoccupation is that most women who stop breastfeeding before two or three months would have liked to have continued for longer. Our understanding of the connections between birth physiology and the physiology of lactation helps understanding the current difficulties. We have at our disposal a sufficient amount of data to claim that the duration of breastfeeding is to a great extent determined during the period surrounding birth. In order to interpret a Swedish study, published in 1996, let us first recall that to be effective the hormone oxytocin must be released by fast pulsations rather than on a continuous mode. This study demonstrated that 2 days after birth, during a breastfeeding session, women who gave birth vaginally release oxytocin in a "pulsatile" way, compared with women who gave birth by emergency caesarean section(44). Furthermore there is a correlation between the "pulsatility" of oxytocin release and what the duration of exclusive breastfeeding will be. An Italian team demonstrated that beta-endorphin concentrations in the milk of mothers who delivered vaginally are significantly higher four days after birth than levels of mothers who underwent caesarean section(45). It is probable that one of the effects of milk opiates is to induce a sort of addiction to mother's milk. The authors of this study are now evaluating the links between beta endorphin concentrations in colostrum milk and the duration of breastfeeding. Physiological data are supported by clinical observation. A survey in Warwickshire (UK) indicates that women who had put their own babies to the breast for the first feed were more likely to be still breastfeeding (71%) at around six weeks than those who had someone else put the baby on for them (38%) (46). It is obvious that when women give birth in physiological conditions and the first contact between mother and baby is not disturbed, there is no need for somebody else putting the baby at the breast. If the duration of breastfeeding is to a great extent determined in the period surrounding birth it would be surprising that the current situation can easily be improved. We are at a turning point in the history of childbirth. Until recently, in order to have a baby, a woman was obliged to release a complex cocktail of hormones that play a key role in the initiation of lactation. Today, in many industrialised countries, for the first time in the history of mankind, most women give birth without releasing such hormones. Either they rely on substitutes for natural hormones (drip of synthetic oxytocin plus epidural anaesthesia) or they give birth by caesarean section. The issue of breastfeeding cannot be dissociated from the issue of childbirth.

Michel Odent

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