FOOD-CT-2005-007036

EARNEST

EARly Nutrition programming- long term follow up of Efficacy and Safety Trials and integrated epidemiological, genetic, animal, consumer and economic research

Instrument: Integrated Project

Thematic Priority 5.4.3.1: Food Quality and Safety

Final public report on activity 1.2.3

Long term follow up of existing cohorts of infants in several European countries randomised to hypoallergenic formulas with reference to allergies, overweight and food preferences

Period covered from 15.04.2005 to 14.10.2010

Start date of project: 15.04.2005 Duration: 5,5 Years

Organisation Name of Lead Contractor for this report:

Helmholtz Zentrum München (former GSF), Institute of Epidemiology, Dr. Joachim Heinrich

Background:

Impact of infant nutrition on allergies: Observational data suggest that early life factors influence the development of allergy and asthma beyond childhood. Diet is of particular interest as this factor can be modified. Breast-feeding is considered the ideal form of nutrition for healthy infants, but its protective effect against development of allergies remains controversial. For non breast-fed infants, the choice of formula, especially for children with a family history of allergies, also remains a challenge.
Impact of infant nutrition on later obesity: Observational data indicate long term effects of infant nutrition on the prevalence of later obesity, with lower rates in children previously breast-fed. How different infant formulas effect weight gain and whether there are long-term effects on body mass index is not clear.
Impact of infant nutrition on later food preferences: There is some evidence that the type of infant formula received in early infancy has an influence on food preferences in later childhood. Previous studies demonstrated that regular exposure to hydrolysed infant formula resulted in a greater acceptance of this formula at a later age than if it was first offered to infants who were never fed hydrolysed formula before. How long potential effects of taste programming persist is not yet clear.

Objectives:

To test the hypotheses that infant nutrition (infant formulae +/- breast milk) influences at age 10 years

(1) allergies (asthma, allergic rhinitis, atopic dermatitis),
(2) overweight and obesity,
(3) food preferences.

Methods:

Study population:
The GINI (German Infant Nutritional Intervention) study is a prospective birth cohort study that comprises the GINI intervention study (I) and the GINI non-intervention study (NI) and was initiated to investigate the influence of nutritional intervention during infancy. In brief, between September 1995 and June 1998, a total of 5991 healthy full-term newborns were recruited in obstetric clinics in two regions of Germany (urban Munich and rural Wesel). Group I (N = 2252) included infants with a family history of allergy. In this prospective, double-blind intervention trial, newborns were randomized at birth to one of three hydrolysed formulas (partially hydrolysed whey formula [pHF-W], extensively hydrolyzed whey formula [eHF-W], or extensively hydrolysed casein formula [eHF-C]) or a conventional cow's milk formula (CMF). The formulas were only provided if the recommended exclusive breastfeeding for the first 4 months was not feasible or wanted. Infants with no family history of allergy (N = 2507) or a positive family history but from parents who denied participation in the intervention trial (N = 1232) were allocated to the NI group. This group was sent the yearly questionnaires only and did not receive any of the additional intervention procedures.
All children (I and NI group) were followed with identical questionnaires at the ages of 1, 2, 3, 4, 6 and 10 years to collect information on health outcomes, children's nutrition and other lifestyle factors. 3317 children (55.4%) of the original study population participated in the 10-year follow-up.

Outcome measures*:*

Asthma prevalence and allergies:
Parents were asked whether a physician had diagnosed an atopic disease since the last follow-up. The question was this: ‘‘Did a physician diagnose any of the following diseases during the 1st/2nd/3rd/4th/5th/6th/7th/8th/9th/10th year of life: . asthma, hay fever or allergic rhinitis, allergic or atopic eczema/dermatitis, urticaria or quincke edema, food allergy or intolerance?.’’
The definition of atopic manifestation (AM) included physician’s diagnosis of eczema, food allergy/intolerance, and allergic urticaria. Asthma was added to the definition of AM from 3 years and hay fever/allergic rhinitis from 4 years onward.
Overweight and Obesity:
Anthropometric measurements of weight and height were collected by pediatricians in physical examinations of each child at the preventive medical check-ups recorded in the well-baby check–up books ("U-Untersuchungen").
Food preference:
We assessed the acceptance of infant formula at 10 years of age to determine potential programming effects of early taste experiences. The companies therefore provided their adequate infant formulas with an almost identical composition to the formulas used during the intervention period 10 years before. To measure preferences of infant formulas, we used a continuous line-scale ranging from “extremely bad” to “extremely good”. Subjects were instructed to taste the blinded samples in a given order and to mark the line according to how much they like or dislike the taste of each sample.

Results:

Infant nutrition and allergies at age 10 years:
The relative risk of a physician’s diagnosis of allergic manifestation (AM) compared with CMF was 0.87 (95% CI: 0.77-0.99) for partially hydrolyzed whey formula, 0.94 (95% CI: 0.83-1.07) for extensively hydrolyzed whey formula, and 0.83 (95% CI: 0.72-0.95) for extensively hydrolyzed casein formula. The corresponding figures for atopic eczema were 0.82 (95% CI: 0.68-.99), 0.91 (95% CI: 0.76-1.10), and 0.72 (95% CI, 0.58-0.88), respectively.
Infant nutrition and overweight at age 6 years
No significant differences in BMI-trajectories were found between the pHF-W, eHF-W, CMF and breastfed groups during the 6 year follow-up. However, in the eHF-C group a significantly slower BMI-gain through the first year of life was observed, but not beyond.
Infant nutrition and food preferences
Feeding with any kind of hydrolysed formula in infancy was positively associated with a higher acceptance of extensively hydrolysed casein formula (aOR: 1·88; 95% CI 1·08, 3·29) after adjusting for sex and study centre. This effect was in particular due to higher liking scores given by children fed with partially hydrolysed whey formula.

Conclusions:

1) The data confirm a long-term allergy-preventive effect of hydrolyzed infant formulas on AM and atopic eczema until 10 years of age.

2) Infants fed with extensively-hydrolyzed-casein formula show a lower BMI-gain in the first year of life than those fed with hydrolyzed-whey and cow’s-milk formula. However, no long-term effect on BMI up to age 6 was found for the eHF-C or any other formula groups. In any case, further studies should investigate the potential programming effect of infant nutrition on later obesity.

3) A general programming effect of early infant feeding on food preference later in life could not be detected by this study. However, it might be worthwhile to design a study for this specific purpose that might have a better chance to verify whether there is any influence of early infant nutrition on food preferences and diet variety later in life.