Martin-Bautista E, Campoy C, Decsi T, Bokor S, von Rosen-von Hoewel J, Laitinen K, Schmid MA, Morgan J, Gage H, Koletzko B, Raats M (2009) Obesity related programming statements in infant feeding policies in five European countries. *Advances in Experimental Medicine and Biology* 646, 169-174. (Oral presentation at “Early Nutritional Programming and Health Outcome in Later Life: Obesity and Beyond”, Budapest, Hungary, 20-21 April 2007)

ABSTRACT

Aim: To know how the early nutrition programming concept and its relation with long-term diseases as obesity is reflected in policy recommendations on infant nutrition in five European countries (Finland, Germany, Hungary, Spain and England).

Methods: After collating and evaluating infant nutrition policy documents, statements about early nutrition programming, as origin of some diseases, such as obesity, were analysed.

Results: The number of policy documents analysed were 38 (England: 10, Finland: 2, Germany: 11, Hungary: 8, Spain: 7) with a total of 455 statements identified and categorized into 53 different health outcomes. Obesity was mentioned in 5.5% (n=25) of the statements, the third frequent outcome after allergy (14.1%, n=64) and health in general (5.7%, n=26). The 26% (n=6) of the obesity concerning statements referred to short-term duration of the effects, the 48% (n=12) to medium-term, the 24% (n=6) to long-term effects and the rest was not identified. Only the 22% of the obesity statements were evidence supporting.

Conclusions: The link between infant feeding and obesity is integrated into policy documents, but most of the statements did not fully specify the short, medium and long term health implications. Action may be required to keep documents up to date as new evidence emerges and to ensure the evidence base is properly recorded.

1. INTRODUCTION

Evidence is accumulating that the nutrition of women during pregnancy (Decsi et al. 2005), breastfeeding (BF) (Koletzko 2006) and complementary feeding of infants can have implications for child development and long-term health (Lucas 2005; Demmelmair 2006). In certain circumstances the early nutrition environment may alter or ‘programme’ a baby’s metabolism in a way that increases the risks of disease later in life (Lucas 1991, 1994). Programming has been linked to a range of short, medium and long term health outcomes including obesity. The World Health Organization-WHO (WHO 2002) considers obesity to be one of the most serious chronic diseases. The current prevalence of obesity has already reached unprecedented levels and the rate at which it is annually increasing in most developed regions is substantial (Brug 2006, Kelishadi 2007). This study presents an overview of the information reflected about early nutrition programming relation to long-term diseases, as obesity, in policies infant nutrition documents in five member states of the European Union.

2. MATERIALS AND METHODS

A search for current publicly available national policy documents was carried out from July to October 2005 within five European countries: England, Finland, Germany, Hungary and Spain. All recommendations or guidelines about breastfeeding (BF), introduction of solid foods and beverages and infant feeding in the first year of life were included. The documents were screened for statements on the relationship between infant feeding and health outcomes. Particular emphasis was placed on coverage of the relationship between early nutrition and obesity. Statements were translated into English by local researchers and classified according

to: the nutrition behaviour each referred to (BF in general, exclusively BF for 4 or 6 months and complementary feeding); the health outcome for the offspring (for example, obesity, infections, diabetes, allergy, cardiovascular disease, cancer, etc); the duration of this health outcome (short – to five years, medium - five to fifteen years, or long term – more than fifteen years). The evidence and citations used in the statements were recorded and categorized according to the Cochrane Library type of strength of evidence. Data were entered into SPSS version 14.0 (SPSS Chicago, IL, USA) and descriptive statistical analysis was undertaken.

3. RESULTS

The number policy documents analysed were 38 (England: 10, Finland: 2, Germany: 11, Hungary: 8, Spain: 7) with a total of 455 statements identified and categorized into 53 different health outcomes. Of the total statements, 184 (40.4%) concerned the effect of BF in general, 47 (10.3%) emphasized the exclusivity of BF and 34 (7.5%) targeted the introduction of complementary food. Only 24 (5.3%) of the statements mentioned the potential long-term benefits of exclusive BF in the first 6 months of life.

Most statements $n=269$ (59.1%) were not supported by reference to evidence. Where the evidence base was cited, 39.2% were expert committees, 23.1% were non randomized trials, 14.5% were randomized controlled trials (RCT)s, 13.4% were uncontrolled observational studies and 3.2% were reviews of RCTs. In the case of the obesity, only the 22% of the statements had evidence supporting. This disease was mentioned in $n=25$ (5.5%) of the statements, and was the third most frequently reported outcome after allergy (14.1%, $n=64$) and health in general (5.7%, $n=26$). Obesity was ranked differently among countries, being the second most frequently cited health outcome in Hungary, fourth in Germany and Spain and ninth in England and Finland. The 26% ($n=6$) of the obesity concerning statements referred to short-term duration of the effects, the 48% ($n=12$) to medium-term, the 24% ($n=6$) to long-term effects and the rest was not identified.

4. DISCUSSION

This review of current policy documents of five EU countries found that they contained many statements that linked infant feeding to health outcomes. The concept of early nutrition programming purports that diet in the first stages of life is important in the development of diseases in later life (*Lucas 2005*) such as diabetes (*Steyn 2004*), cardiovascular diseases (*Reddy & Katan 2004*), certain types of cancer (*Key 2004*) and for neurological development (*Dijk-Brouwer 2005*). The WHO aims to avoid a pandemic of chronic disease (*WHO 2003*) and is conscious of early life nutritional influences on the genesis of non-transmissible diseases in later adult life (*Yach 2004*). Programming effects may be triggered by the intra uterine nutritional environment as well as in the perinatal period. This paper shows that obesity is featured highly amongst outcomes covered in the policy documents of the study countries. In the last years a lot of studies have been published regarding the potential protective effect of breast-feeding on childhood obesity (*Koletzko 2006*). There is increasingly strong evidence suggesting that a lower risk of developing obesity (*Gillman 2000; von Kries 1999*) may be directly related to duration of exclusive BF although the effects may not become evident until later in childhood. Promoting BF has many benefits, the prevention of childhood obesity probably being one of them. But, only in the 5.3% of recruited statements of the study the potential effects of exclusively BF for 6 months appeared, whereas the 40.4% only talked about the BF in general, without specification. More than half of the statements that were identified in policy documents were not linked to evidence, and, in the case of obesity, only the 22% of them. The absence of evidence is perhaps surprising as policy documents that fully

show the rationale for their recommendations and the basis for statements may carry more credibility and be more effective in promoting appropriate infant nutrition behaviour.

In summary, the link between infant feeding and obesity is integrated into policy documents, but most of the statements did not fully specify the short, medium and long term health implications. Moreover, action may be required to keep documents up to date as new evidence emerges and to ensure the evidence base is properly recorded.

ACKNOWLEDGEMENTS

This study was supported as a part of the European Project “Early Nutrition Programming-EARNEST” within the 6th Framework Programme. N° FOOD-CT-2005-007036

REFERENCES

- Barker D (1994). “Mothers, babies and diseases in later life.” London, *BMJ Publishing Group*.
- Brug J. (2007) “The European charter for counteracting obesity: A late but important step towards action. Observations on the WHO-Europe ministerial conference.” Istanbul, November 15-17, 2006. *Int J Behav Nutr Phys Act*. **Apr** 5;4:11.
- Decsi T, Campoy C, Koletzko B (2005). “Effect of N-3 polyunsaturated fatty acid supplementation in pregnancy: the Nuheal trial.” *Adv Exp Med Biol* **569**: 109-13
- Demmelair H, von Rosen J, Koletzko B (2006). “Long-term consequences of early nutrition.” *Early Hum Dev* **Aug**; 82(8):567-574.
- Dijck-Brouwer DA, Hadders-Algra M, Bouwstra H, Decsi T, Boehm G, Martini IA, Boersma ER, Muskiet FA (2005). “Lower fetal status of docosahexaenoic acid, arachidonic acid and essential fatty acids is associated with less favorable neonatal neurological condition.” *Prostaglandins LeEnglandot Essent Fatty Acids* **Jan**; 72(1):21-8.
- Dörner G (1975). “Perinatal hormone levels and brain organization.” In: Stumpf WE, Grant LD (eds) *Anatomical neuroendocrinology*. Basel, Karger 245-52.
- Gillman MW et al. (2001). “Risk of overweight among adolescents who were breastfed as infants.” *Journal of the American Medical Association* **285**:2461-2467.
- Kelishadi R (2007). “Childhood Overweight, Obesity, and the Metabolic Syndrome in Developing Countries.” *Epidemiol Rev*. **May** 3; [Epub ahead of print]
- Key YJ, Schatzkin A, Willett WC, Allen NE, Spencer EA, Travis RC (2004). “Diet, nutrition and the prevention of cancer.” *Public Health Nutrition* **7(1A)**: 187–200
- Koletzko B (2006). “Long-term consequences of early feeding on later obesity risk.” *Nestle Nutr Workshop Ser Pediatr Program* **58**:1-18.
- Lucas A (1991). “Programming by early nutrition in man.” In: Bock GR, Whelan J Eds. *The childhood environment and adult disease*. (CIBA Foundation Symposium 156). Wiley, Chichester, United Kingdom. 38-55.
- Lucas A (1994). “Role of nutritional programming in determining adult morbidity.” *Arch Dis Child* **Oct**; 71(4):288-90.
- Lucas A (2005). “Long-term programming effects of early nutrition -- implications for the preterm infant.” *J Perinatol* **May**; 25 Suppl 2:S2-6.
- Reddy KS, Katan MB (2004). “Diet, nutrition and the prevention of hypertension and cardiovascular diseases.” *Public Health Nutrition* **7(1A)**: 167–86.

Steyn NP, Mann J, Bennet PH, Temple N, Zimmer P, Tuomilehto J, et al. (2004). "Diet, nutrition and the prevention of type 2 diabetes." *Public Health Nutrition* **7(1A)**: 147–65.

von Kries, Koletzko B, Sauerwald T, von ME, Barnert D, Grunert V, von Voss H (1999). "Breast feeding and obesity: cross sectional study." *BMJ* **Jul 17**; 319(7203):147-50.

Widdowson EM, McCance RA (1963). "The effect of finite periods of undernutrition at different ages on the composition and subsequent development of the rat." *Proc RoySoc Lon* **158**: 329-342.

WHO-World Health Organization Expert Consultation (2002). "The optimal duration of exclusive breastfeeding." Geneva, Switzerland: World Health Organization.

WHO- World Health Organization. Report of the Joint WHO/FAO Expert (2003). "Consultation on Diet, Nutrition and Prevention of Chronic Diseases." WHO Technical Report Series 916.

Yach D, Hawkes C, Gould CL and Hofman KJ (2004). "The global burden of chronic diseases: Overcoming impediments to prevention and control (Special Communication)." *JAMA* **291**: 2616–2622.