Educational Recommendations for Processed Foods for Infant Feeding

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Introduction

There is relatively little systematic evidence on which to base any informed advice about the introduction of foods other than breast milk or breast milk substitutes. Arguably once solids have become the major component of a young child’s diet there is even less evidence about optimum feeding [1]. Typically diversification of an infant’s diet has been very much influenced by parental belief and cultural practice.

It is difficult in such circumstances to give firm evidence-based guidelines on feeding practice for young children, and on the foods involved, and even less easy to conceive defensible regulatory approaches to this issue, although there are, for example, some compositional guidelines for cereal-based weaning products.

Even so, there is considerable interest in the potential for harm that can arise from inappropriate early childhood feeding and strategies to minimize this form the basis of most recognized educational needs in the issues of early childhood feeding.

Here the principal message is that there is key knowledge based on the nutritional needs of young children and practice which should be widely disseminated as part of the societal responsibilities of all concerned in the food chain of young children. Once their diet has become diversified, regardless of whether or not processed foods are used, it is not realistic to regulate for ideal feeding practices. Ideal feeding practices should be seen as a key component of the inter-professional and interagency governance of public health nutrition. This principle, in itself, indicates the nature of the educational needs and the research that in turn is needed to enable these to be met.
This topic should be viewed in the context of the WHO Global Strategy for Infant and Young Children Feeding [2]. Here key points from the World Health Assembly (WHA) agenda are abstracted from its May 2002 meeting. The 55th WHA perceived ‘that complementary feeding practices are frequently ill-timed, inappropriate and unsafe’. It recognized that infant and young child mortality could be reduced by improving the nutritional status of women of reproductive age using nutritionally adequate and safe complementary feeding through the introduction of safe and adequate amounts of indigenous foodstuffs and local foods, while breastfeeding continues until the age of 2 years or beyond.

The WHA was ‘also aware that inappropriate feeding practices and their consequences are major obstacles to sustainable socioeconomic development and poverty reduction’.

As a matter of urgency, the WHA urges member states:

1. to adopt and implement the global strategy, taking into account national circumstances, while respecting positive local traditions and values, as part of their overall nutrition and child health policies and programs, in order to ensure optimal feeding for all infants and young children, and to reduce the risks associated with obesity and other forms of malnutrition;

2. to strengthen existing, or establish new, structures for implementing the global strategy through the health and other concerned sectors, for monitoring and evaluating its effectiveness, and for guiding resource investment and management to improve infant and young child feeding;

3. to define for this purpose, consistent with national circumstances, (a) national goals and objectives, (b) a realistic time line for their achievement and (c) measurable process and output indicators that will permit accurate monitoring and evaluation of action taken and a rapid response to identify needs;

4. to ensure that the introduction of micronutrient interventions and the marketing of nutritional supplements are not in place of or undermine support for the sustainable practice of exclusive breastfeeding and optimal complementary feeding;

5. to mobilize social and economic resources within society and to engage them actively in implementing the global strategy and in achieving its aims and objectives in the spirit of resolution WHA49.15.

The WHA also requests the Codex Alimentarius Commission to continue to give full consideration, within the framework of its operational mandate, to action it might take to improve the quality standards of processed foods for infants and young children and to promote their safe and proper use at an appropriate age, including adequate labeling, consistent with the policy of the WHO, in particular the International Code of Marketing of Breast Milk Substitutes, resolution WHA54.2, and other relevant resolutions of the CAP Health Assembly.

The WHA also requests the Director General:
(1) to provide support to member states, on request, in implementing the strategy, and in monitoring and evaluating its impact;

(2) to continue, in light of the scale and frequency of major emergencies worldwide, to generate specific information and develop training materials aimed at ensuring that the feeding requirements of infants and young children in exceptionally difficult circumstances are met;

(3) to strengthen international cooperation with other organizations of the United Nation’s system and bilateral development agencies in promoting appropriate infant and young child feeding;

(4) to promote continued cooperation between all parties concerned with implementing the global strategy.

**Processed Foods for Early Childhood**

The common reference point is that processed foods should be microbiologically safe, and free of pollutants, contaminants and potential antigens. Regulatory frameworks exist to cover additives, novel foods and processes, packaging, flavorings, hygiene and microbiological safety, contaminants, milk fats, natural mineral waters and foods for particular nutritional purposes, which embrace infant formulas and follow-on formulas, and processed cereal-based foods and baby foods for infants and young children. Some elements of risk assessment in the food chain of children have been considered in an earlier Nestlé Nutrition Workshop [3].

Processed foods offer benefits for the carers and children alike. They offer extended availability of foods free of seasonality, and the opportunity for products to be designed to meet issues relating to convenience, low cost, changing lifestyles and ideals relating to the health and well-being of infants and young children.

There are some possible disadvantages arising from a dependence on commercially produced processed foods. It is conceivable that their availability might compromise existing cultural preferences and practices.

The use of processed foods designed for children responsibly meet the known and current concepts of good nutritional practice for young children but convenient access by carers to processed foods designed for the broader ‘adult’ market could lead to young children being given inappropriate foods.

There is no guarantee that parents and carers will provide their infants and young children with processed foods meeting current nutritional guidelines such as reduced contents of refined carbohydrates, sodium chloride, saturated and trans fatty acids, and calories. Confused messages may, however, also lead to young children having too high intakes of fiber, too low intakes of energy.

A mixed blessing of globalization, or perhaps more accurately the regulatory framework of global trade and food safety, could be that it erodes the traditional base of a locally sustainable and diverse early diet, because
such regulations by enforcing homogeneity will reduce opportunities for commercial and culturally sensitive diversity, and, perhaps paradoxically, create nutritional risk. This illustrates the need for consideration of anthropological and cultural perspectives in the educational background to the feeding of infants and young children with processed foods, particularly if one expects the processed foods to educate the palate of young children for their adult diets. Clearly, it is feasible to do this with processed foods, but it may be necessary to have marketing strategies, and to educate carers on how to use products to do this.

**What Do Infants and Young Children Need?**

There is a universal need for an awareness that the science base for regulation of composition of processed foods is of variable quality. This is due in no small part to the insecurity of the reference values for dietary intakes of children in general [4, 5]. There is a lack of good quality data on the nutrient requirements of children [6]. Reference values for this age group are largely extrapolated from estimates for older and younger age groups. This is a major source of uncertainty as is the need for better insight into any critical windows relating metabolic programming, growth and development, and crucial timing and duration of exposure to nutrients. Coupled with the need for more markers of adequate nutrition [5–7]. An example of these problems is the current uncertainty about the susceptibility of cognitive and psychomotor development to anemia, iron deficiency, other correlated nutritional deficiencies, social factors, or a combination of these [8].

There is an opportunity, however, to refine knowledge about the nutritional needs of young children during the systematic development of processed foods. Some of this opportunity arises from ideas concerning health and lifestyle and the development of ‘functional foods’. These are based on the concept that such foods may provide beneficial effects beyond those seen as critical events from which to derive reference values and the possibility that components other than traditional nutrients might also have beneficial effects [9]. In fact this whole area is so insecure that any such new knowledge can be seen as a key to deriving better qualitative and quantitative reference values for dietary intakes [5]. An additional assumption is that it may be possible to make claims for such processed foods, and that the basis for these claims will be a sound portfolio of evidence using studies based on humans and suitable outcomes [10].

In this scenario it is possible to envisage a confluence of interests that collectively would create an innovation-implementation cycle that would educate, identify knowledge gaps and generate both basic and applied research to provide new information. This cycle is illustrated in figure 1.
The cycle [11] involves firstly the development of a concept that is refined by a sound search of the literature, and then realized and explored by research before being applied via development and involvement of all potential stakeholders (e.g. regulators and expert appraisal, users, carers amongst others as the case may be) and, after consideration of intellectual property issues, finally being launched and appraised after use. The latter evaluation could lead to new concepts and further development. All stages of the cycle need a suitable education to prepare them for their particular role in the cycle, and in the context of this meeting to enable them to share in the effective generation and dissemination of new knowledge, information and practice, as well as new processed foods.

**Processed Foods and the Market and Claims**

A ‘health claim’ has been defined as any claim that states, suggests or implies that a relationship exists between the food category, a food or one of its constituents and health. Claims can relate to nutrient function claim; enhanced function claim, or a reduction of disease risk. Claims are seen to have potential in education in that they can achieve a high level of consumer protection and facilitate consumer choice, improve the free movement of goods within the internal market, increase legal security for economic operators, ensure fair competition in the area of foods, and promote and protect innovation in the area of foods (COM (2003) 424 final: Article 2) [5, 12].

Thus claims are seen as a means of educating consumers and encouraging processors to think about their products, for example, in the innovation model described above. It would be reassuring if one could feel confident that claims or the process involved in their derivation and justification could be translated to
Processed Foods

**Table 1.** Food components and modifications of interest in processed foods for infants and young children

<table>
<thead>
<tr>
<th>Nutrients</th>
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<tbody>
<tr>
<td>Lipids: saturated fatty acids, poly- and monounsaturated fatty acids, cholesterol</td>
<td></td>
</tr>
<tr>
<td>Carbohydrates: fructose, glycemic indices, complex carbohydrates</td>
<td></td>
</tr>
<tr>
<td>Minerals: calcium, iodine, iron, zinc</td>
<td></td>
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<tr>
<td>Electrolytes: sodium, potassium</td>
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<tr>
<td>Vitamins: vitamin D, vitamin C, vitamin A, folic acid</td>
<td></td>
</tr>
<tr>
<td>Energy and nitrogen requirements</td>
<td></td>
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<tr>
<td>Nucleotides</td>
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**Non-nutrients with possible functional food benefits**

Non-digestible carbohydrates
Phytostanols and phytosterols
Breast milk bioactive factors
Bovine milk bio-active components
Organosulfurs
Polyphenols
Cryptoxanthines
Fat replacers

**Components that could be reduced in content**

Phytate, allergenic epitopes, sodium, energy and total fat and trans fatty acids

Derived from Aggett [5], Koletzko et al. [7] and Diplock et al. [9].

Processed foods for infants and young children and the related aspects of public health. As is evident from the elements described in the previous paragraph, claims are intended to operate in a commercial environment, but one would hope that given the WHA’s exhortation mentioned initially, an ethos will emerge that will favor an evidence-based approach to their use in infant feeding.

This meeting has addressed needs relating to energy metabolism, obesity and the metabolic syndrome, disturbed intermediate metabolism, immune function and avoidance of allergy, and gastrointestinal function. Additionally there are other important endpoints relevant to monitoring both the short- and long-term impact of early childhood nutrition. For example, a recent European Union concerted action discussed functional endpoints relevant to development, growth and body composition, bone health, cognitive and psychomotor development, and responses to effects induced by environmental hazards, and oxidative damage [7, 9]. A variety of food components and modifications were considered in this exercise (table 1), one important outcome of which was the appreciation that there is a need for new markers and methodologies for assessment of exposure and of outcomes relevant to homeostasis, function and safety which will enable the determination of more accurate reference intakes and secure guidelines on feeding young children. Increasingly it is appreciated that post-genomic molecular biology will provide opportunities for such markers.
Nutritional Safety

The nutritional safety of early feeding addresses the longer term outcomes of early feeding and the possibility that, despite the best metabolic and dietary logic, there can be unexpected effects.

There may be a need to develop an approach analogous to the guidelines that have been proposed for the long-term nutritional assessment of infant formulas. These contained groups of recommendations relating to the standardization of quality control and benchmark reference data based on outcomes in breastfed children; the use of standard study designs and harmonized protocols, and the means of handling data such that they could be aggregated and pooled to form a repository of reference data and to facilitate long-term follow-up [13, 14].

Recommendations and Opportunities

This scenario demonstrates many educational needs concerning the use of processed foods for young children, and a need for an interdisciplinary or interprofessional approach to developing an appropriate ethos to deliver safe and adequate nutrition to these children regardless of whether they are fed processed or unprocessed foods. The latter is a less formal approach and not open to as easy regulation as are processed foods, but the overall feeding of young children has to be seen as an informal exercise. Within this, key competencies in nutrition and food safety as part of public health, need to be conveyed to all involved in caring directly or indirectly for children.

This includes the agriculture, food and fishery industries, farmers, small and medium enterprises and large companies, as well as regulators, legislators and economists and others who are stakeholders in a broader investment in child health.

This indicates the needs for cross-cutting competencies as well as more specific nutritional and industrial food skills; amongst these I would include risk management, communication as well as knowledge and information management, anthropology and cultural sensitivity, and consideration of economics of health and sustainability. The latter can be seen as a means of ensuring that processed products can address local issues.

References

Processed Foods

6 ESPGHAN Committee on Nutrition: Recommended dietary allowances (RDAs), recommended daily intakes (RDIs), reference nutrient intakes (RNIs) and population reference intakes (PRIs) are not 'recommended intakes'. J Pediatr Gastroenterol Nutr 1997;28:236–241.

Discussion

Dr. Leathwood: I would like to raise the issue of consumer understanding of the health claims. It is easy to say that consumers ought to be able to understand claims. But normal people are not nutritionists and interpret claims in unexpected ways.

Dr. Aggett: You were telling me earlier about the example of dairy products. Do you want to explain that as an illustration?

Dr. Leathwood: The example that I gave was where the recommendation that, to ensure adequate calcium intake, children should be given ‘dairy products’. This was interpreted by many mothers as meaning that the best thing to give was full cream dairy milk (the perfect ‘dairy product’) and the further one moved away from this, the less calcium the food would contain so that skimmed milk would have less calcium, cheese would have less calcium, and yogurt would have less calcium. This is not quite what the dieticians intended and underlines the importance of checking how the message is received.

Dr. Aggett: One of the points that has certainly been developed in the European guidelines is that these claims must be tried so that consumer understanding can really be tested, and that is not very easy.

Dr. Waterland: You stated that in your opinion optimal nutrition doesn’t really exist. I am just wondering what you really mean by that?

Dr. Aggett: At the moment from my point of view, optimal nutrition is the promotion of products, it isn’t strongly evidence based. The point is that many of the existing recommendations for reference intakes are based on the avoidance of deficiency, and the point about optimal nutrition is that if one recommends and provides intakes over and above reference intakes then it will almost certainly be beneficial. These benefits
are not necessarily that well defined, and then they lead up to these difficulties of getting to limits which may be super-physiological and psychological.

Dr. Waterland: But we nutritionists have moved beyond just avoiding deficiency and are looking for ranges of nutrient intakes that can benefit in many ways, such as the Mediterranean diet as an example of perhaps being protective against cancer. What term would you propose for that if not optimal nutrition?

Dr. Aggett: What I am objecting to is the fact that people call this optimal nutrition rather than calling it adequate nutrition, which in itself should be optimal.

Mrs. Gailing: I have two questions. One is about claims. You probably know that in the future, following CODEX, new guideline claims will be allowed in a lot of countries on normal food but will be banned or not authorized for food specifically designed for infants and young children. So here there is unfair competition and mothers are encouraged to use normal food for their babies. As Dr. Leathwood just said, dairy products make health claims, with high protein levels, saturated fat, and discourage the use of food specifically designed for infants and young children. How do you see the application of guidelines compared to consumer taste? A lot of experiments or trials have been made, and when the sugar level is reduced or sugar is deleted in some baby foods the consumers don't buy them because the competitors' products are sweeter or appear more tasty to the mother due to sugar or salt levels. Unfortunately here we are not much supported by pediatricians in advising products without sugar or salt in their daily practice. So when mothers buy the products for their babies they buy according to their own taste, and they don't have strong recommendations from pediatricians.

Dr. Aggett: I don't really know if I can actually say much except to sympathize. In terms of the claims and whether or not claims can be made, I think this is going to depend on whether or not there is a demonstrable base, whether we can actually say this is an evidence-based claim, and some of these points have been made. The other point about the lack of support or the unfair advantage of people producing what you call sweet products and you are not getting support from pediatricians: I think these are some of the key educational needs, whether they could be seen to be educational needs for the carers, I certainly think you can educate consumers through carers of children through some of these guidelines. I think in terms of educating professionals that is sometimes more difficult, and I think it is sad that there is probably not great engagement by many pediatricians in these sort of community issues.

Dr. Schmitz: Following the line just raised by Mrs. Gailing, there was a very nice paper in Acta Paediatrica a few months ago concerning the introduction of solids [1]. It was the result of an inquiry of about 500 parents and the questionnaire concerned breastfeeding, formula feeding, and the time of introduction of weaning food. It appeared that compliance to guidelines and particularly the timing of diverse foods (gluten, fish, eggs) was low (less than 50% of the parents following the recommendations). This raises questions regarding the recommendations that we can make because if the industry follows recommendations and the parents do not follow them, it is very difficult to modify the trends in alimentation.

Dr. Aggett: That study was similar to one done in north-east Scotland. It is amazing that they have strong local traditions, some of them analogous to those in Scandinavia, of adding cereal mixes to formulas at an early age, 3–4 weeks. In some cases we come across parents who add marshmallows to formulas. It is very sad that one does find these recommendations. Products are produced according to the regulations, but we then find that many of the health professionals, who are involved with the care, are themselves not that familiar with the regulations in the first place, let alone have any great sense of motivation to implement them.
Dr. Kleinman: Just a brief comment to follow up on Mrs. Gailing’s observation. In the United States several companies that focus on complementary foods for infants and young children have in fact used recommendations about sugar and salt to gain a competitive advantage. They have pointed out that their competitor’s foods contain added sugar, salt, or thickeners for example, and have used that to try to create a competitive advantage. The point that I am trying to make is that if we are raising health consciousness among parents, care providers and journalists (because they clearly have a huge influence over what parents do), then that creates a kind of counter-pressure against the advantage of adding a sweetener or a thickener. I think that the diagram Dr. Leathwood created is excellent because it shows the role we have to play there and how it can counter the pressures to yield to perhaps some inherent taste preferences or beliefs that parents have about foods.

Dr. Aggett: And does it work?

Dr. Kleinman: Yes, absolutely, there are many examples.

Dr. Exl-Preysch: I just wanted to add something to what was discussed before between Dr. Schmitz and Mrs. Gailing. We should really make a difference between products that are specifically made for small children up to the age of 3 years and fall under the EU regulation, and I think those producers are following all the recommendations quite fairly. What they have to be careful about is that the products are tasty, because if they do not taste good enough for the mothers they will not buy them. But I think what we really should be a little bit worried about is all those products that are not specifically designed for infants or small children. I don’t want to give names but everybody knows them, they are full of sugar, full of fat, and they are not processed specifically for these children. But if you look at their labeling, their appearance and advertising, you know exactly that they are used from the age of 1 year, and these are the products we are really concerned about, and I think that this is the most important problem we should deal with.

Dr. Aggett: I agree, and I think now that regulatory authorities, certainly food standardization and several organizations, are being set up in member countries of the European Union. There are now opportunities to discuss this and also to try to see what can be done to counteract it. But I don’t know how it can be done systematically yet.

Dr. Lafeber: When you see all the legislation now in Europe, things have changed over the last 8–10 years. In America there is the Food and Drug Administration that has strict rules, and I have the feeling that the rules in Europe are now going much more in the direction of the American system, especially regarding health claims. For instance, companies are trying to imitate breastfeeding as much as possible with so-called functional components, i.e. lactoferrin, prebiotics, probiotics, all sorts of long-chain polyunsaturated fatty acids and oil mixtures. In order to get their health claim they have to supply a portfolio on a phase-1, a phase-2 study, etc., like a drug, and as a result they will try to get most of the products that they make patented, which of course makes it more difficult for other companies to imitate, so it is going more into a sort of drug organization. Do you have that feeling and do you like the way it is going?

Dr. Aggett: It may well be that there are vulnerable sectors that do need to be protected in some way like this. When we first started to suggest some of these ways of increasing knowledge and taking a systematic approach to the nutritional assessment of formulas, there certainly were times when some issues arose about safety assessment and the justification of claims for new products, this has been called the pharmaceuticalization of the food industry. I think that is almost one for the politicians and society to decide, and those of us who are concerned with good sound evidence-based nutrition would like to feel that there are good quality guidelines for the data to substantiate a claim. That is one of the exercises currently in progress in the EU, looking at the process for assessing scientific evidence to support a claim for a food stuff, with
the view that once a company has provided a portfolio to be accepted by an appropriate advisory review body, it will be able to make a claim. It will be expensive. So what will certainly be needed before one can evocate any way in there, the pharmacy or the type of approach you are talking about, is that there has got to be some protection of intellectual property. But as you know that doesn’t even exist for infant formulas or anything of that nature yet. It is a problem. I think the larger food companies regard this responsibly and have ways of being able to cope with it, but it does mean that smaller innovative companies may well not have an opportunity to join the market.

References
