



## Research report

Food variety in commercial and homemade complementary meals for infants in Germany. Market survey and dietary practice<sup>☆</sup>

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## ABSTRACT

**Introduction:** Already infants do not meet the recommendations for fruit and vegetable intake although the complementary feeding period offers the possibility to expose the infant to a variety of flavours from fruits and vegetables. The objective of the present analysis was to identify differences in the vegetable variety in commercial vs. homemade complementary meals and to describe fish and meat variety in these meals in dietary practice in Germany. A further objective was to provide an overview of the food variety in commercial complementary vegetable-potato-meat/fish meals available on the German baby food market in 2012. **Methods:** 3-day weighed dietary records from the German Dortmund Nutritional and Anthropometric Longitudinally Designed (DONALD) study were used to describe the fish and meat variety and to compare the vegetable variety in commercial and homemade meals using a vegetable variety score (VegVS). The online data base 'Nutrichild' served to describe the food variety on the market. **Results and conclusion:** The vegetable variety was low in homemade as well as in commercial meals without any differences in total variety at 6 and 9 months of age. At 12 months of age infants fed with commercial meals got a higher vegetable variety than those fed with homemade meals. In homemade and commercial meals most often carrot was used, whereas other vegetables were far below this frequency. In both meals, poultry and beef were most often used whereas fish meals were rarely offered. The market survey showed the same low vegetable variety and low fish offer as the results of the DONALD study. The data show that it is necessary to promote the advantages of a vegetable variety and fish consumption in Germany, already in early infancy.

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## Introduction

As part of a healthy diet, eating high amounts of fruits and vegetables has been promoted worldwide for many years. Despite this uniform recommendation adults as well as children do not meet the recommended intake levels (WHO, 2006). The 2008 US Feeding Infants and Toddlers Study (FITS) in children aged 4–24 months revealed that also infants do not eat enough of these foods, especially (dark green and leafy) vegetables (Fox, Pac, Devaney, & Jankowski, 2004). Similar patterns were found in German toddlers in the 2008 "German Representative Study of Toddler Alimentation" (GRETA) and children in the "Nutrition Study as KiGGS Module" (EsKiMo)

(2003–2006) (Hilbig, Alexy, Drossard, & Kersting, 2011; Mensink, Heseke, Richter, Stahl, & Vohmann, 2007). In toddlers, mean consumption of vegetables was only 70% of the recommended amounts (Hilbig et al., 2011). In childhood and adolescence, only 6–7% in the 6–11 years and 18–29% in the 12–17 years aged group met the age-specific vegetable recommendation (Mensink et al., 2007).

Liking is one important factor for children to eat and accept foods (Domel et al., 1996; Krølner et al., 2011; Rasmussen et al., 2006). Considering the mere exposure effect (Scaglioni, Salvioni, & Galimberti, 2008), it seems therefore obvious to get children in touch with a variety of foods such as vegetables and fruits in order to get familiar to the taste of these foods as early as possible.

The complementary feeding period offers a possibility to expose the infant to a variety of flavours. Complementary food should be introduced between the age of 17 and 26 weeks of life (Agostoni et al., 2008; Koletzko et al., 2010). In Germany, the first meal which is commonly introduced is a vegetable-potato-meat meal (Fig. 1),

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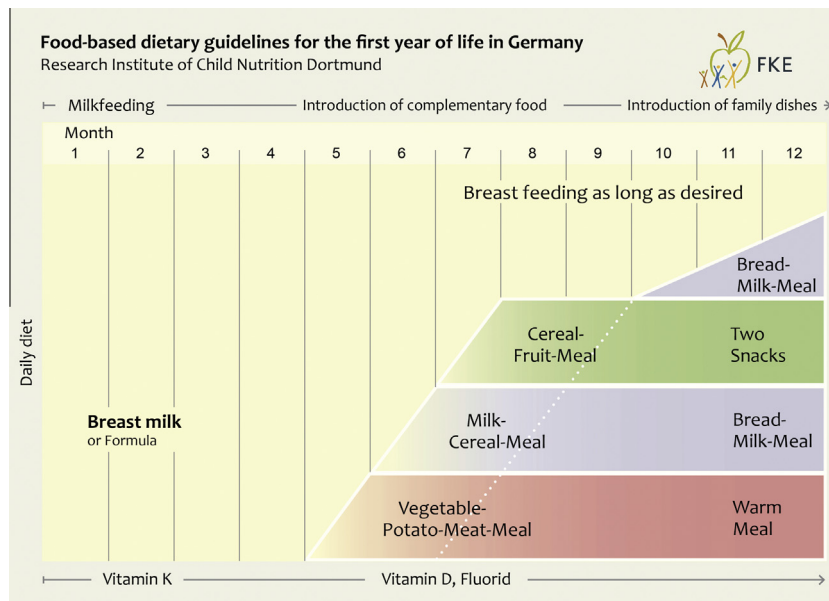


Fig. 1. Schedule of the food-based dietary guidelines for the first year of life in Germany.

which offers a high potential of flavour variety. Accordingly, the latest German guidelines for complementary feeding recommend a wide range of different vegetables and the occasional replacement of meat by fish (Muche-Borowski et al., 2009; Koletzko et al., 2010) as (repeated) exposure of a variety of foods during the complementary feeding period seems to increase the acceptance of novel foods and might contribute to a long-term preference effect (Caton, Ahern, & Hetherington, 2011; Mennella & Trabulsi, 2012; Nicklaus, 2009, 2011).

In Germany, commercial complementary food is common: 55% of 6–12 month old infants eat commercial complementary food instead of homemade meals (Foterek, Hilbig, & Alexy, in press) and 60% consume the vegetable-potato-meat meal in the form of commercial jars (Foterek, unpublished data). However, little is known about food variety in commercial complementary meals in Germany and how it differs from homemade complementary meals. Therefore, the main objective of this analysis was to identify differences in the vegetable variety of commercial vs. homemade 'vegetable-potato-meat meals' with the help of a vegetable variety score (VegVS) and to describe meat and fish variety in dietary practice using data from the German DORTMUND Nutritional and Anthropometric Longitudinally Designed (DONALD) study. Reasons for the differences in food variety between commercial and homemade complementary meals are discussed and how the food variety, especially the vegetable variety, in Germany is comparable with other European countries. The second objective was to provide an overview of the commercial 'vegetable-potato-meat meal' offer on the German baby food market in 2012 with respect to food variety by using the online data base 'Nutrichild'.

## Methods

For this analysis complementary food was defined as all semi-solid, strained or mashed foods fed with a spoon during the complementary feeding period. The meals investigated here were summarised under the term 'vegetable-potato-meat meal' in the German dietary schedule for the first year of life (FKE, 2013) which includes: pure-vegetable, blend of meat, vegetable-potato/pasta/rice, potato/pasta/rice-meat and vegetable-potato/pasta/rice-meat/-fish meals.

Commercial complementary meals were defined as all industrially processed, pre-packaged complementary meals in jars or pots. All home-prepared complementary meals were defined as homemade meals if at least two out of the three components, i.e. meat, vegetables or the starchy component were fresh or frozen and unprocessed. In case of homemade pure vegetable meals or meals with only two components (e.g. vegetables and potatoes), both components had to be fresh or frozen and unprocessed.

## Market survey

Nutrichild (Verbraucherfenster Hessen, 2013) is an online data base for complementary food on the German market that was initialised in the 1990s by the Research Institute of Child Nutrition Dortmund (FKE) and the University of Gießen to support parents and nutrition professionals searching for commercial complementary food and assessing the adequacy of the products. The data base is updated annually by the FKE, based on detailed product information provided directly by food companies to the FKE. The website presents information derived from product labelling and offers the opportunity to compare all labelled ingredients and nutrients within commercial products. In addition, it supports the identification of products and their ingredients, e.g. meat, vegetables or pasta, by age of child, meal type and product brand.

The description of the food variety in commercial complementary meals presented here is based on the market survey for Nutrichild in 2012 and considered products of 14 food companies (15 brands) offered for infants between 5 and 12 months of age.

## Dietary practice

In 1985, the DORTMUND Nutritional and Anthropometric Longitudinally Designed (DONALD) study started as an ongoing, open-cohort study at the FKE in Dortmund, Germany. The aim of the study is to get detailed information on the relationship of nutrition, development, metabolism and hormonal status from infancy to adulthood. Recruitment of healthy newborns takes place in Dortmund and surrounding communities. The study sample includes infants and adolescents between age 3 months and 24 years. In addition to anthropometric and medical examinations, the regular

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