

Catering in nurseries (VeKiTa): nutritional situation, awareness and implementation of the specific German Nutrition Society's Quality Standard¹

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Summary

As part of the Catering in Nurseries Study (VeKiTa), the basic conditions, the quality of nursery catering and the implementation of the specific German Nutrition Society's (DGE) quality standard were examined throughout Germany. The results of the study showed that the catering is orientated to target groups and is linked to activities on nutritional socialisation and education. However, the demands for rooms, equipment, personnel and financial support are not fulfilled everywhere. The requirements for planning meals, as laid down in the specific DGE Quality Standard, are only partially followed. Vegetables should be available every day, but meat and sausages more rarely. Calculation of nutritional values of recipes shows as principal problem levels of calcium content were inadequate. Certified nurseries had a favourable opinion of the DGE Quality Standard, particularly as it encouraged them to provide more healthy meals. On the basis of these results, recommendations were derived for improvements in the provision of meals and the organisation of catering in nurseries.

Keywords: nurseries, communal catering, catering situation, DGE Quality Standard

antwortlichen und gemeinschaftsfähigen Persönlichkeit [zu] fördern" [to promote the child's development into a responsible social personality], as laid down in § 22 of the Social Security Code (SGB) VIII.

The *Ernährungsbericht 2000* (Nutrition Report) contained the results of a study on the nutritional situation in nurseries throughout Germany (KESS study) [2]. This recognised the possibility of further improvements; one consequence was that in 2002 the German Nutrition Society (DGE) established the project "FIT KID – Die Gesund-Essen-Aktion für Kitas" (Campaign for Healthy Food Provision in Nurseries). The first issue of the "German Nutrition Society's Quality Standard for Nursery Catering" was released in 2009; this was part of the national action plan "IN FORM – Deutschlands Initiative für gesunde Ernährung und mehr Bewegung" (national initiative to promote healthy diets and physical activity). The specific DGE Quality Standard makes situational prevention possible. It specifies requirements for the selection and quality of food. It also gives recommendations for the frequency of food groups within a catering period of 20 days, as well as laying down the principles for preparing foods. Moreover, it describes general requirements for the

Introduction

As a consequence of the increase in full day care, there has been major growth in recent years in the number of children who have lunch in nurseries. In 2015, 2.01 million children aged less than 7 years were provided with lunch there [1]. Given the longer periods of care at the nurseries, the need to offer a balanced diet gained importance, as this can enhance children's mental and physical performance and fosters proper nutritional behaviour from the start. Moreover, this also supports the obligation of the nurseries to "die Entwicklung des Kindes zu einer eigenver-

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basic conditions of catering, including hygiene, interface management, sustainability, eating times, eating atmosphere and nutritional education.

The German Health Interview and Examination Survey for Children and Adolescents (KiGGS: Basic Survey 2003–2006) has already made it clear how important it is to provide healthy nutrition early: about 15% of children and adolescents are overweight and 6% are obese [3]. The results of the EsKiMo module showed that partly unfavourable foods are selected. Thus, some children and adolescents eat too little food derived from plants (vegetables, fruit, bread and potatoes), and, with increasing age, excessive levels of fatty animal products [4]. The results of KiGGS Wave 1 (2009–2012) support these findings: According to this, only 61.1% of children and adolescents eat fruit and 43.5% vegetables every day. However, the intake of fruit and vegetables depends on gender and the social status of the family. While 12.2% of girls eat five or more portions of fruit or vegetables each day, the corresponding value for boys is only 9.4%. Overall 49.3% of children and adolescents from families of low social status eat fruit every day, in contrast to 75.3% of the same age group in families of high social status [5].

Within the setting of nursery, it is possible to reconcile situational and behavioural prevention, independently of the parents' status. This can be achieved with a balanced and varied menu offer, in combination with appropriate nutritional education, as also recommended by the Advisory Council on the Assessment of Development in Health Care Systems [6]. It must however be admitted that the obligation to provide catering has been regarded as rather secondary in laws on nurseries and federal educational plans.

The last study on nursery catering throughout Germany was commis-

sioned by the Bertelsmann Foundation. This surveyed the status quo of nursery catering and performed a model calculation on costs and cost structures [7].

The study supported by the Federal Ministry of Food and Agriculture (BMEL) for the 2016 Nutrition Report was intended to map the current catering situation in nurseries. It was also planned to investigate the awareness and implementation of the DGE Quality Standard and to derive recommendations to improve the catering situation and the acceptance of the standard.

Methods

The study is based on three investigation areas, for each of which appropriate test instruments were developed (♦ Figure 1). Area 1 covers a written survey of the nurseries and the evaluation of the four-week menu plans. Area 2 covers the recipes, the analysis of levels of selected nutrients and the chemical analysis of meals. This is not reported in the present article. Area 3 covers the telephonic survey of facilities with the "FIT KID" certificate. The com-

plete study is reported in the 2016 Nutrition Report.

Written survey

The written survey was based on a stratified random sample of 7,000 nurseries taken from a cross-institutional list of over 53,000 addresses. The questionnaire was in a hybrid form and could be completed electronically or on paper. This was addressed to the persons responsible for catering. The questionnaire predominantly contained closed questions. These covered general structural data on the size of the facility, the type of nursery provider and the number of children who take lunch. The questionnaire also focused on complexes of questions about the organisation of catering, its equipment, quality and its incorporation in a food policy, or proof of certification. This included specific questions about the offer of drinks and specific aspects of meal planning. There were also questions about nutritional education and there was a final question as to what the nurseries regarded as the greatest challenges in catering.

The nurseries were also requested to include a menu plan for four weeks,

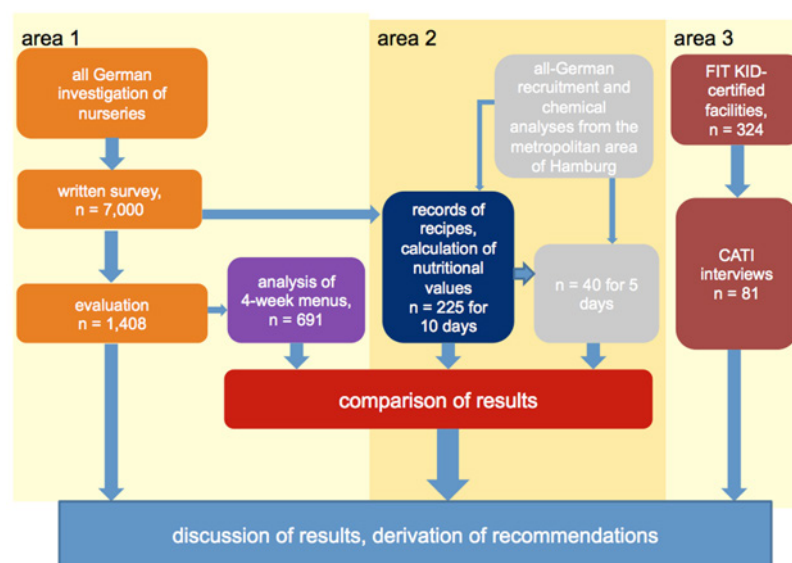


Fig. 1: Study design: catering in nurseries (VeKiTa) (VeKiTa) (© DGE)
CATI = computer assisted telephone interview

and they were asked whether they agree providing the recipes for their lunch menus for 14 days and to have them assessed by calculating the nutritional value. The survey was performed from September to December 2013. The data were processed with the statistics program IBM SPSS Statistics Version 22.

Analysis of lunch menu plans

The analysis of the menu plans was restricted to those that covered at least four weeks. Data was processed with MS Excel 2013. The evaluation was based on the "German Nutrition Society's Quality Standard for Catering in Nurseries", as published in the fifth edition in 2014 [8]. Some categories – such as the provision of natural rice, whole grain noodles, fruit, milk, milk products and salt-water fish – could not be unambiguously identified from the menu plans; these were excluded from the evaluation.

Calculations of nutritional values from lunch recipes

In the course of the written survey, 287 nurseries stated that they were prepared to help record recipes. In order to provide additional data for the calculation of nutritional values, another letter was sent to the recipients of the written survey. In addition, participation was encouraged through the federal association of the non-profit nursery providers, as well as federal nutrition experts and federal networking center for nursery catering.

Nurseries which declared they were ready to participate were sent lists in which they could enter their recipes. They also received instructions as to how they were to specify the individual foods (e.g. the fruit content of jams, whether vegetables were fresh or deep frozen, the size of eggs, etc.). The recipes were recorded from February to September 2014.

The submitted recipes were evaluated with the program DGExpert Version 1.6.4.1, on the basis of German Food Database (BLS) 3.02. The calculations apply to lunch for children from age four to less than seven years. The results were compared with the reference values in the specific DGE Quality Standard. If a nursery only submitted recipes for eight catering days, only a single week (5 days) was considered.

Computer assisted telephone interviews

The guideline for the computer assisted telephone interviews (CATI) was based on a preliminary study with structured interviews. A randomised sample of 81 nurseries – stratified by region – was drawn from the 324 addresses provided by the German Nutrition Society for nurseries that possessed the FIT KID certification in 2014. The structured interview guideline contains not only general information on the size and provider of each nursery, but also groups of questions about the organisation of catering and about equipment. In particular, the questions covered experience related to certification – in the phase of preparation, implementation of the quality standard and during the performance of the audit. In addition, the experience with the report and the award of the certificate were recorded, together with an assessment of the changes perceived after successful certification. The survey took place from June to August 2014.

The computer assisted telephone interviews were evaluated with the programs SPSS, MAXQDA and MS Excel 2013. The evaluation of the free statements, as well as their grouping and allocation, were performed in accordance with MAYRING'S qualitative content analysis, using summarising analytical technology [9].

Results

Results of the written survey

The national average for the **response rate** of the written questionnaire was 20.1% (n = 1,408). The size of the nurseries is approximately in accordance with the characteristics of the overall population, as appears in the data of the Federal Statistical Office [1]. Nurseries with up to 75 children are predominant: 64.9% in the sample versus 67.7% in the total population. Facilities with up to 25 children are rarer in the sample (12.4%) than in the total population (16.7%), whereas nurseries with 76 to 100 children are more common (19.0% vs. 16.3% in the total population). The characteristic type of "provider" is also about the same as in the total population. Thus 30.6% are funded publicly and 54.7% independently run by non-profit organisations. Nurseries with private-commercial funding make up 5.6% of the sample and those supported by parent initiatives 6.6%. In comparison, somewhat fewer nurseries are funded by public or independent sources or parent initiatives and rather more from private-commercial sources.

The nurseries surveyed mostly cared for children **aged** between one and six years. In almost all nurseries, they were provided with at least one meal. 1.8% of nurseries did not answer this question. 46.0% of nurseries offered breakfast and 28.0% a morning snack. Almost all nurseries (96.1%) provided lunch. 56.4% of nurseries provided an afternoon snack and 1.5% an evening meal. If breakfast is available, this was taken by a mean of 79.0% of nursery children, while lunch was taken by a mean of 73.6% of children. In 64.5% of nurseries, fewer than 50 children took lunch in the facility.

In response to the closed question about the **catering system**, 55.4% of nurseries answered that they receive hot hold food, while, in 30.3% of nurseries, the meals were

prepared on site (cook & serve). The cook & freeze system was in third place (7.3%); in this system, all components of the meal to be heated are purchased deep frozen from a supplier and regenerated in the nursery. In contrast, the cook & chill system was used by only 2.7% of nurseries. In this system, the dishes are prepared and rapidly cooled, delivered by a supplier and then regenerated on site in the nursery. In addition, 4.2% of nurseries employed a mixture of delivery and on-site production, in which finished components are supplied on specified days, but all dishes are prepared fresh in the kitchen on other days. In 90.2% of nurseries, the hot main meal was supplemented by additional components, such as salad, raw vegetables, fruit or dessert. This applied to all but 9.8% of nurseries. In 48.0% of nurseries, these components were supplied and in 42.2% prepared on site.

The **kitchen equipment** varied from nursery to nursery. Whereas 59.8% of the surveyed nurseries had a domestic kitchen, 20.1% had a kitchen with a few pieces of commercial kitchen equipment to heat up dishes. 16.2% of the nurseries had a fully equipped commercial kitchen. In 3.4% of nurseries, there was only a single room, in which the food supplied was stored until use and the dishes were washed. 0.4% of nurseries had no kitchen of any sort. A domestic kitchen was available in 76.3% of the nurseries with cook and hold system and 66.7% of the nurseries with cook & chill system. A kitchen with some professional equipment was available to 73.4% of nurseries with cook & freeze system. 47.1% of the nurseries with cook & serve had a fully equipped commercial kitchen and 39.7% a domestic kitchen.

Different **groups of people** were involved in preparing the meals. In 66.4% of nurseries, these were the suppliers and employment insti-

tutions, in 40.1% also the nursery staff, in 2.8% the parents and in 0.1% the tenants. Only 38.4% of the surveyed nurseries employed specialists with relevant training, such as housekeepers, home economists, operation managers in home economics, home and nutrition scientists [applied nutritionists] or cooks. The group of persons involved depends on the catering system. For example, for cook & serve, 95.5% of those involved in producing the meal belonged to nursery staff and only 3.8% were suppliers. In contrast, with the cook & freeze system, 83.2% of those preparing lunch worked for the suppliers.

The **price** that the parents pay for the daily lunch was between 0.45 € and 5.00 €, with a mean value of 2.42 €. There are regional differences in this price. For example, the mean values for the states of Brandenburg (1.75 €) and Saxony-Anhalt (1.85 €) were much lower than those for Hesse (2.88 €) and Baden-Württemberg (2.78 €).

The most frequent answers to the closed question on the three greatest **challenges** in catering were cost management (42.8%), the children's satisfaction with the catering (34.0%), inadequate space or no extra room for eating (29.7%), menu and recipe planning (28.1%) and quality assurance (20.5%). Issues related to the nursery staff were less often reported, but include staff qualification (10.5%), training (12.3%) and staff size (19.3%).

Most of the questions on **nutritional training and socialisation** were closed. 75.8% of the nurseries reported that the educators and children ate lunch together, although this was not the case in 16.8% of nurseries. 7.4% of nurseries provided no information. 98.2% of nurseries reported that regulations and rituals were observed during meals. 78.7% of nurseries stated that they practised estimating and topping up the right portion. In 52.8% of nurseries, the dishes were also discus-

sed with the children and it was explained which foods they were eating. In 30.0% of the nurseries, the children were also regularly involved in preparing the meals – depending on their abilities. Only 0.1% of nurseries stated that they had no activities related to nutritional socialisation or nutritional education at meal times. On the other hand, 92.3% of nurseries had activities related to nutritional education outside mealtimes. For example, most nurseries (95.7%) reported baking or cooking with the children, followed by nutrition and exercise projects (75.1%), as well as projects and excursions to farms and food producers (65.4%). In 4.4% of nurseries, there were no activities related to nutritional education and 3.3% provided no information.

In answer to the closed question as to what the nurseries considered most important when planning the **food provided**, the nurseries most often stated (72.3%) that they considered the healthiness of the food, as in the recommendations of the German Nutrition Society. In second place came the seasonality (64.2%) and in third place the children's preferences (60.4%). There was an additional question about specific wishes and needs; this showed that the children's individual and cultural needs were borne in mind in catering. For example, allergies and food intolerance were given by 86.3% of nurseries and Muslim dietary rules by 79.8%.

Only 35.1% of nurseries had a **documented catering concept** which described the quality and scope of the meals, as well as the underlying structural conditions. 10.4% were in the process of developing such a concept and 6.0% were planning it. However, 42.3% of nurseries had no catering concept and 6.2% provided no information. It was similar in relation to the HACCP² concept, which should be implemented in every nursery as part of hygiene management. Only 42.1% of nurseries

stated that it is implemented, while 34.1% were unaware of the concept and 15.0% had no HACCP concept. Almost half of the nurseries (47.2%) **were aware of external standards** for nursery catering. 45.8% had no knowledge of such standards and 7.0% provided no information. 29.6% of the nurseries stated that they applied the DGE Quality Standard as a basis for catering. 3.3% of the nurseries employed the Optimix® concept of the Research Institute of Child Nutrition (FKE) as a basis and 4.0% the Bremen checklist. 4.1% of nurseries used other standards, 33.0% no external standard and 26.0% provided no information.

Analysis of lunch menu plans

The analysis of menus considered 691 plans, each of which covered a period of four weeks. In comparison with the specific DGE Quality Standard, these were rated as “completely fulfilled” (100% compliance), “mostly fulfilled” (75% to less than 100% compliance) and not fulfilled (< 75% compliance).

◆ Figure 2 shows the extent to which the different requirements of the DGE Quality Standard are fulfilled.

Calculations of nutritional value

The recipe forms from 225 nurseries were used to calculate nutritional values. For 8 nurseries, the two weeks were not complete, so that the calculations were based on only five days. In this sub study, the distribution of the catering systems deviated from that in the written survey: Most nurseries prepared their lunch freshly on-site (cook & serve, 76.4%). 16.0% of these nurseries were supplied with hot hold meals by a caterer (hold & serve) and 7.6% used the system of cook & freeze. There were also differences in the extent

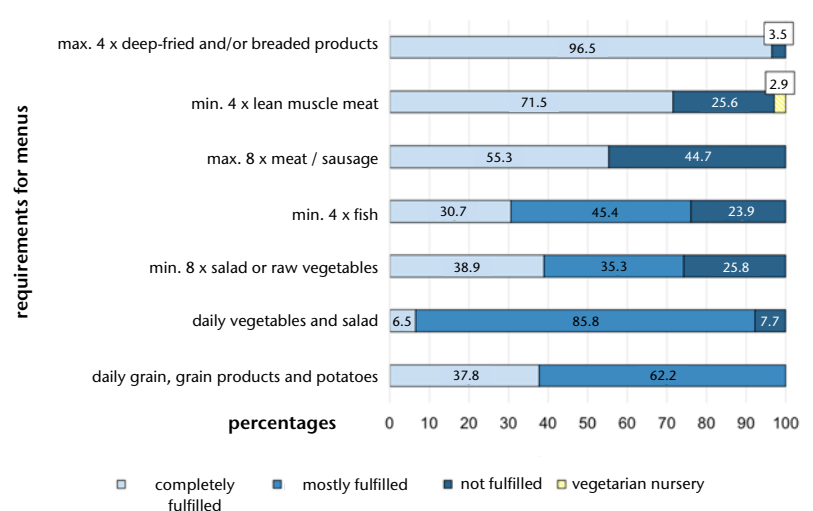


Fig. 2: Menu planning: fulfilment of the requirements of the specific DGE Quality Standard (n = 691 nurseries which provided menus for 20 catering days or 4 weeks) (© DGE)

to which the nurseries fulfilled the requirements for the frequencies of different foods, as given in the DGE Quality Standard. Thus 92.9% of the nurseries in this sub study fulfilled the requirement to provide one carbohydrate component daily; 55.1% fulfilled the requirement to provide vegetables and salad daily. The requirements for fish (55.8%) and meat or sausages (65.8%) were also more frequently implemented (◆ Figure 3). Lunch should contain 25% of the daily recommended quantities of nutrients [8]. The evaluation was

based on a comparison between the mean nutritional values in the lunch provided during a week (5 days) and the corresponding reference values in the specific DGE Quality Standard (PAL value of 1.6) [8, 10].

In most cases, the reference values for calcium, vitamin E and protein were not reached in the meals provided over a week. In contrast, the reference values for iron, magnesium, vitamin C, vitamin B₁, folate and fibre were reached or exceeded by most meals provided over a week (◆ Figure 4). Relative to the reference

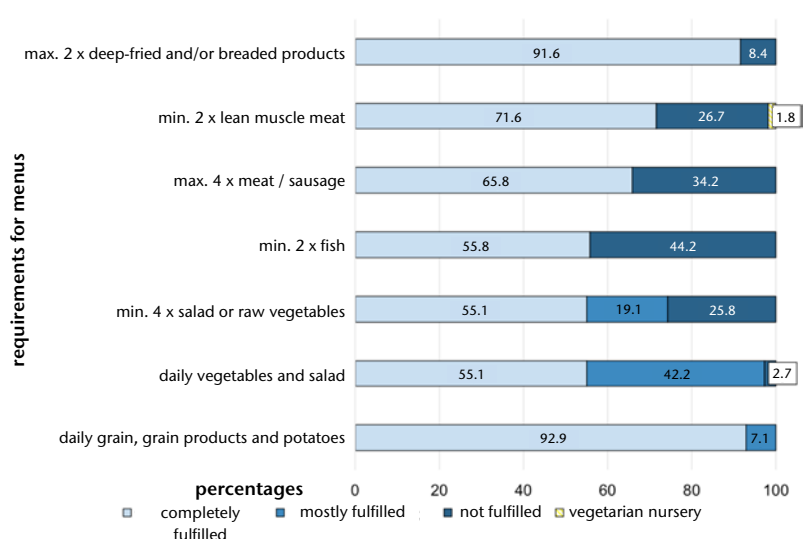


Fig. 3: Menu planning: fulfilment of the requirements of the specific DGE Quality Standard (n = 225 nurseries which provided recipes for 10 catering days or 2 weeks) (© DGE)

² Hazard Analysis and Critical Control Points

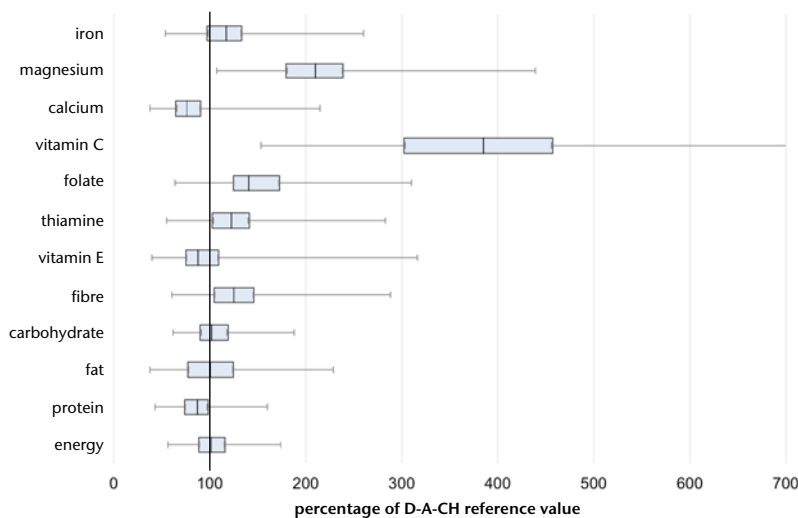


Fig. 4: Nutrient provision in comparison to reference values (= 100%) as weekly mean per nursery (n = 225 nurseries which had provided the recipes of 10 catering days/2 weeks) (© DGE) (median, interquartile range and minimum-maximum values shown)

values (100%), the median carbohydrate, energy and fat content of the lunch offers were 102%, 101% and 100%, respectively.

Computer assisted telephone interviews (CATI)

The study also focused on the nurseries' experience during the introduction of the DGE Quality Standard and the certification process [11]. At the time of the interview, 81.2% of the nurseries had already been certified for one to three years, 13.8% for less than one year and 5.0% for more than three years. 81 persons responsible for catering were interviewed. Of these, 48.2% had relevant training in home economics and nutrition. 38.3% had educational training and 13.5% were untrained or trained on the job.

In comparison to the composition of the sample for the written interviews and the overall population, the certified nurseries cared for a higher mean number of children: 79.0% of the nurseries cared for more than 75 children. The children were mostly between one and six years of age. In the certified nurseries, a mean of 92.2% of the children

took the available lunch. In 79.0% of the nurseries, lunch was prepared on-site (cook & serve) and in 16.0% delivered hot (hold & serve). 3.7% used the cook & freeze system and 1.2% the cook & chill system.

The main change since the introduction of the DGE Quality Standard has been the frequency with which specific foods or groups of foods are provided.

In response to the closed questions about different food groups, 66.7% of nurseries stated that they had modified their provision of meat. 83.3% of these nurseries had reduced their provision of meat products and 81.5% their overall provision of meat. 80.2% of the nurseries had modified their provision of fish during the certification process. 56.9% of these nurseries provided fish more frequently and 92.3% now strove not to purchase saltwater fish from overfished stocks. In addition, the provision of milk products had changed in 70.4% of nurseries. 98.2% of these nurseries now used more low-fat products. As regards the provision of vegetables, 48.1% of the nurseries had made some changes and now more frequently provided vegetables or salad. The situ-

ation was similar for the provision of fruit. 45.7% of the nurseries had made changes here and 88.9% of these nurseries now provided their children with more fruit.

When asked about the effect of the FIT KID certification, 93.8% of those interviewed agreed that it ensured the provision of healthy catering, 91.4% agreed that it increased the value assigned to catering and 92.6% considered that the FIT KID certification was good advertising for their institution. Moreover, certification enhanced the parents' confidence (77.8% agreement) and improved communication with them (64.2%). The internal effects were also evaluated: 79% considered that certification confirmed the work of the staff responsible for the food service and half (50.6%) thought that it had improved team work within the nursery. 82.7% would therefore recommend certification to others, but 17.3% would not do this, due to the additional work, expenses, time or uncertainties which they thought occurred during the certification process.

In answer to the question about the necessity for further support, individual nurseries thought that it would be desirable to have more services or information on the implementation of the quality standard, the preparation of the audit, nutritional education, planning breakfast and snacks, as well as on improving cooperation with parents and between educators and catering staff.

Discussion

Influence of the methods

With respect to the values of the size of the nursery and its type of provider, the sample of the written interview corresponds approximately to the overall population and thus effectively maps the situation of nurseries in Germany. In contrast, this is not the case in the sub studies on

the calculation of nutritional value or the interviews in certified nurseries. In both these sub studies, there are disproportionate numbers of large nurseries that care for comparatively large numbers of children. There are also differences between these sub studies with respect to the catering systems. Thus, cook & serve is more common in the sample of nurseries for the calculation of nutritional value (76.4%) and in the certified nurseries (79.0%) than in the sample of the written interview (30.3%). The evaluation of the food frequencies in the sub study on the calculation of nutritional values also gives a more favourable picture than, for example, the analysis of the menus, which was submitted in parallel to the written interview. As more work was required to participate in the calculation of the nutritional value, it can be assumed that nurseries were more likely to participate if they were particularly interested in nutrition and catering and could themselves readily influence catering quality. This was generally evident in the favourable results for the nutrient levels of the lunches.

Strengths and weaknesses of nursery catering

The results of the written interview show that there is wide diversity in the organisation and quality of catering, due to differences in the basic conditions and resources. In this respect, the results hardly differ from those of the Bertelsmann study [7]. In contrast, comparison with the results of the KESS study is difficult, as the latter study selected other categories in the questions and the increase in all-day child care has clearly brought significant changes, particularly with respect to catering [2]. What is clearly favourable is the strong orientation towards the **target group**. This is clear, for example, in the way in which the children's satisfaction, their taste preferences and individual and cultural

requirements are considered in meal planning. Moreover, most of the nurseries carry out activities on nutritional socialisation and education and teachers predominantly take lunch together with the children.

On the other hand, a critical point is that far from all nurseries fulfil the requirements for **space, equipment, personnel** and an appropriate financial budget. For example, more than half of all nurseries only have a kitchen equipped with normal domestic equipment and which is therefore designed for the cook & serve catering system for maximal 25–35 lunches. Moreover, only 38.4% of nurseries have staff with appropriate training, who can guarantee compliance with the specific requirements for the quality of the dishes for different age groups, together with the hygiene for all processes involved in the preparation and distribution of meals as well as disposal. There is no general key number for catering staff in nurseries. Moreover, the spectrum of tasks has now been greatly extended by the inclusion of children aged less than one year. Furthermore, the relevant hygiene regulations demand basic knowledge for their implementation. Even if lunches are provided by a single external supplier, at least one qualified employee is needed for several facilities.

The DGE Quality Standards' requirements for the **composition of the menu plan** were fulfilled to different extents by the nurseries. Thus, an analysis of the four-week menu plans shows that many nurseries only "mostly fulfilled" the recommendation for the provision of salad and raw vegetables, whereas the requirement for moderate provision of meat and sausage was "completely fulfilled" by more than the half (55.3%). At the moment, children do not consume enough vegetables [12]. If this is to be increased in the long-term, vegetables and raw vegetables must be provided more often. This is achieved by the implementa-

tion of the DGE Quality Standard in the nursery. English and American studies with kindergarten children have shown that, when raw vegetables are eaten as starter, more vegetables are eaten in the main course. Moreover, more vegetables are eaten when vegetables are provided more often [13, 14].

The results of the **calculation of nutritional value** are generally positive. This shows that when vegetables are provided daily, as required in the DGE Quality Standard, it is easy to reach the mean reference values for lunch, except for calcium and vitamin E. It would therefore be desirable to increase the provision of high calcium foods and to use more oils that are rich in vitamin E when preparing lunch. On the other hand, it may be assumed that those nurseries that provided their recipes for the calculation of nutritional values had already made a positive selection and that these results therefore cannot be applied to the overall situation in German nurseries.

It is also desirable that catering and educational staff should work closely together. For example, they should agree on measures to improve nutritional education and communication relating to food. They should also immediately discuss any comments about the meals and much more. This is evidently not optimally performed in all nurseries, as, for example, 65.4% of those interviewed in certified nurseries desired more information and support about the collaboration between catering and teaching staff.

The efforts to support a healthy eating style will only be successful if the structures for the provision of a balanced diet are created. In addition, the nursery staff must regard themselves as members of a multidisciplinary team, who work together to provide children with a balanced and varied diet.

On the basis of this study, the following recommendations were made:

- Publicity for the importance of healthy nutrition should be provided from the very start. It is particularly important to address this to the parents;
- The nursery providers should provide support in the form of relevant materials and additional training on child nutrition, hygiene and labelling menus;
- Each nursery provider should set up a special central office for nutrition and catering;
- There should be binding implementation of the specific DGE Quality Standard in all nurseries;
- An abbreviated version of the specific DGE Quality Standard should be developed for a rapid overview;
- The processes of certification and audit should be transparent and the evaluations should be clear and comprehensible.

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Conflict of Interest

Prof. ARENS-AZEVEDO is Vice-President of the Scientific Council of the German Nutrition Society (DGE).

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The authors declare that there are no other conflicts of interest.

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