Status quo on dealing with processed food, salt, sugar and fat in daycare centres

Jan Engelskirchen, Isabelle Preuss, Jo-Ann Fromm, Astrid Klingshirn, Andrea Maier-Nöth, Stefan Pfeuffer, Kristin Heidenreich, Julia Seydlitz, Meike Ernestine Tecklenburg

Abstract

More and more children are eating meals in daycare centres. It´s known that this often contains too much sugar, salt and fat. In order to record how food providers, e. g. caterers (FP) and daycare centres that prepare their own lunches (DC), handle salt, sugar and fat in meal planning, preparation and serving and which highly processed foods (HPF) are used in daycare centre catering, 83 FP and 46 DC were surveyed using an online questionnaire. Target group-specific trainings are developed based on the results.

Mainly fish products, meat products, bread/biscuits, desserts, meat substitutes, vegetable products, pasta and sauces are used as HPF. 76 % of FPs (n = 64) and 57 % of DCs (n = 26; p = 0.020) use recipes.

There are some differences between FP and DC that need to be taken into account during training. Further, the extent to which the identified products contribute to salt, sugar and fat intake must be clarified.

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Jan Engelskirchen, B.Sc.
Dipl. oec. troph. Isabelle Preuß
Jo-Ann Fromm, M.Sc.
Prof. Dr. Astrid Klingshirn
Prof. Dr. Andrea Maier-Nöth
Steffen Pfeuffer
Kristin Heidenreich
Julia Seydlitz
Dr. Meike Ernestine Tecklenburg[1]
Deutsche Gesellschaft für Ernährung e. V.
Godesberger Allee 136
53175 Bonn
[1] tecklenburg@dge.de

Introduction

According to current data, 13.2 % of girls and 8.3 % of boys aged 3–6 years are overweight or obese in Germany [1]. The prevention of overweight and obesity is of great importance in childhood, as they have a higher risk of cardiovascular disease, lipid metabolism disorders and glucose metabolism disorders compared to normal-weight children at the same age [2]. In addition to the physical risk factors, the risk of stigmatization and bullying also increases [3].

As part of mass catering, daycare centre catering is becoming increasingly important in children's diets. Currently, almost three million children in Germany eat lunch at daycare centres [4]. In addition to catering, it is also important to understand the children's needs. At daycare centres, children learn more about how to handle food and meals, they get in contact with new foods and establish new eating habits. These can have both positive and negative effects on nutrition [5]. The *DGE quality standard for meals in daycare centres* provides a good basis for designing meals that are based on nutritional requirements, health-promoting and sustainable [6]. The VeKiTa study from 2016 provides the most up-to-date insight into the catering situation in daycare centres [7]. Among other things, this study recorded the average macronutrients contained in each lunch meal offered. A comparison of the results with the D-A-CH reference values for children aged between 4 and 7 years [8] shows that the average energy per lunchtime meal is 110 % of the guideline value, the amount of fat is 130 %, the amount of sugar is 165 % and the salt intake is 333 % [7]. There is currently very limited data on the composition of the fat used in daycare meals. As part of the KITZ project, a proportion of saturated fatty acids (SFA) of 14.9 % of energy and trans fatty acids (TFAs) of 0.3 % of energy per meal was determined for lunchtime meals [9]. The content of SFA exceeds the guideline value of 7–10 % of energy in the above-mentioned study [8]. The use of highly processed foods (HPF) was not recorded in the above-mentioned studies [7, 9]. After 2016, no nationwide survey was carried out to record the salt, sugar and fat content of daycare meals, which is why the data from the VeKiTa study represents the current state of research. In recent years, food providers have often focussed

on other factors, such as temporary closures, the migration of specialist staff and rising costs, as well as a limited product range [10]. Their influence on the salt, sugar and fat content or on quality cannot currently be assessed.

Catering for daycare centres is provided by a heterogeneous market, which differs not only in type (e. g. caterer, restaurant, butcher) and size, but also in the foodservice organisation used. In Germany, decentralised service with hot held meals is the most frequently in daycare centres, followed by production on site. Cook-freeze systems and cook-chill systems play a subordinate role in daycare catering [7, 11].

As part of the National Reduction and Innovation Strategy in Germany, the salt, sugar and fat content of ready-made products is to be reduced and people are to be supported in eating a healthy diet [12]. The "Start Low project" was initiated to develop measures for reducing salt, sugar and fat in daycare meals.

The aim of the project was to record which highly processed foods are used as standard in daycare centre catering and additional the use of salt, sugar and fat in daycare catering was recorded. For this purpose, a survey was conducted with food providers and self-cooking daycare centres. The findings will be incorporated into training materials for food providers and daycare centres and used to derive recommendations for policymakers and industry.

Methodology

Data collection and questionnaire

Food providers in the area of daycare centre catering (FP) and self-cooking daycare centres (DC) were asked about the following topics: Operational characteristics, food purchasing (focus on HPF), menu planning and food production as well as salt, sugar and fat reduction potential in daycare centre catering. The survey was conducted in the third quarter of 2021 (21.07.2021–06.09.2021) anonymised online, using Limesurvey software. In order to rule out bias due to current and locally varying corona measures, respondents were asked to relate their answers to the period before corona pandemy.

At the onset, it was asked whether FP and DC produce lunchtime meals for daycare centers. If this was not the case, they were excluded. With regard to the characteristics of the business, questions were asked, for example, about the food system organisation used, the catering offer and the number of lunchtime meals produced per day. In addition, it was asked in which federal states the FP offer daycare catering. With regard to food purchasing, FPs and daycare centers were requested to state which attributes they use to select HPF, whether the salt, sugar and fat content is taken into account in the selection process and which fats are used for hot and cold meals. They were also asked which highly processed foods they buy as standard. Standard use was defined as more than 50 % of the food from the relevant product group being highly processed. In the questionnaire (eSupplement → www.ernaehrungs-umschau.de/fachzeitschrift/heftarchiv/ ed. 7/2024 at this paper) HPF were defined based on the NOVA levels. With regard to menu planning, it was determined whether FPs use external quality standards or guidelines for daycare catering, whether recipes are used and whether the amount of salt, sugar and fat is defined in these recipes. Portion quantities were also surveyed. With regard to production practice, the FPs provided information on the sensory control of the meals. Finally, the FPs and DCs were asked to state how they perceive the need to reduce salt, sugar and fat and how they could be supported in reducing these.

Definition of highly processed foods

In the questionnaire, highly processed foods were defined as follows: "Highly processed products are industrially manufactured and consist of several ingredients. In addition to natural raw materials, they usually contain modified ingredients, additives and/or extracts, which sets them apart from other products. Thanks to the use of industrial techniques, these products have a standardized taste, a long shelf life and are easy to prepare. The necessary work steps are limited to heating, regenerating, defrosting, mixing and/or portioning." (Definition based on NOVA level 4 "Ultra-processed food") [13]. The NOVA system is widely used in scientific studies and enables good comparability [14]. For the present survey, the aim was to assess the use of HPF, an assessment of the nutritional quality should not be made at this step.

Study sample

A structured online search was carried out throughout Germany to find FPs in the area of daycare centre catering. A total of 734 FPs were included in the sample. No further selection was made apart from the daycare center catering service. At the same time, 2789 daycare centres were randomly selected from a total of 58500 daycare centres nationwide, stratified by federal state [15]. FPs and DC were invited to take part in the survey by email on 21.07.2021. In addition, a call for participation was made on the social media platforms of the German Society for Nutrition e. V. (05.08.21; 25.08.21; 30.08.21; 03.09.21) and in the magazine gvpraxis (03.08.21). In order to ensure that the surveyed topics were answered correctly, the survey was aimed at people from the purchasing and food production departments. Participants did not receive any benefits at the end of the survey. The aim was to recruit a total of 200 participants (food providers + daycare centers) for the survey.

Statistical analysis

The descriptive analysis of the results was carried out using Microsoft Excel. The minimum, maximum, mean and median were calculated. The explorative analysis was carried out using IBM SPSS 26. The chi-square test was used to assess significant correlations in ordinal scales, or the exact Fisher's test for cell frequencies below 5. Significance level was set at $p < 0.05$.

Results

Sample characteristics

A total of 83 FPs and 140 daycare centers completed the survey. Of the 140 daycare centres, 46 daycare centres (DC) cooked their own meals and these were included in the further analysis. On average, the FPs supplied 24 daycare centers (min. 1; max. 600) and produced an average of 858 lunchtime meals per day (min. 13; max. 9999). In DCs, an average of 71.5 lunchtime meals per day are produced (min. 10; max. 320). DCs exclusively have complete production on site. In FPs, a decentralised service with hot held meals (78 %) is the most frequently used method, followed by centralised foodservice with kitchens on site (39 %), ready prepared foodservices with cook-chill system (20 %) and cook-freeze system (2 %). The federal states of Bremen, Mecklenburg-Western Pomerania and Saarland are not represented in our sample in the FP group, and the federal states of Brandenburg, Mecklenburg-Western Pomerania and Saxony are not represented in the DC group. Companies/daycare centers from other German federal states participated.

Highly Processed foods (HPF)

Participants were asked in which product groups more than 50 % of the items came from the HPF category (Nova level 4). The most frequently mentioned product groups were fish products, meat and poultry products and bread and rolls (◆ Figure 1).

When selecting HPFs, the most important criteria for FPs are the price-performance ratio of the products (82 %), product availability (82 %) and ingredients from the region (76 %). The following selection criteria dominated for daycare centers: Ingredients from the region (83 %), price-performance ratio (72 %) and organic products (72 %). A low salt content was stated as very important/important by 67 % (n = 56, n = 31) of FPS and DCs respectively ($p = 0.721$, chi-square test), low sugar content by 72 % (n = 60) and 70 % (n = 32; $p = 0.326$) and good fat quality by 65 % (n = 54) and 63 % (n = 29; $p = 0.881$, chi-square test). These characteristics did not differ significantly between FPs and DCs. Food providers stated significantly more frequently that the availability of HPF was very important/important than daycare centres (n = 68

[1] Editor's note: According to the authors, no statistical data on the provision of lunchtime meals in daycare centers in Germany was available at the time of submission.

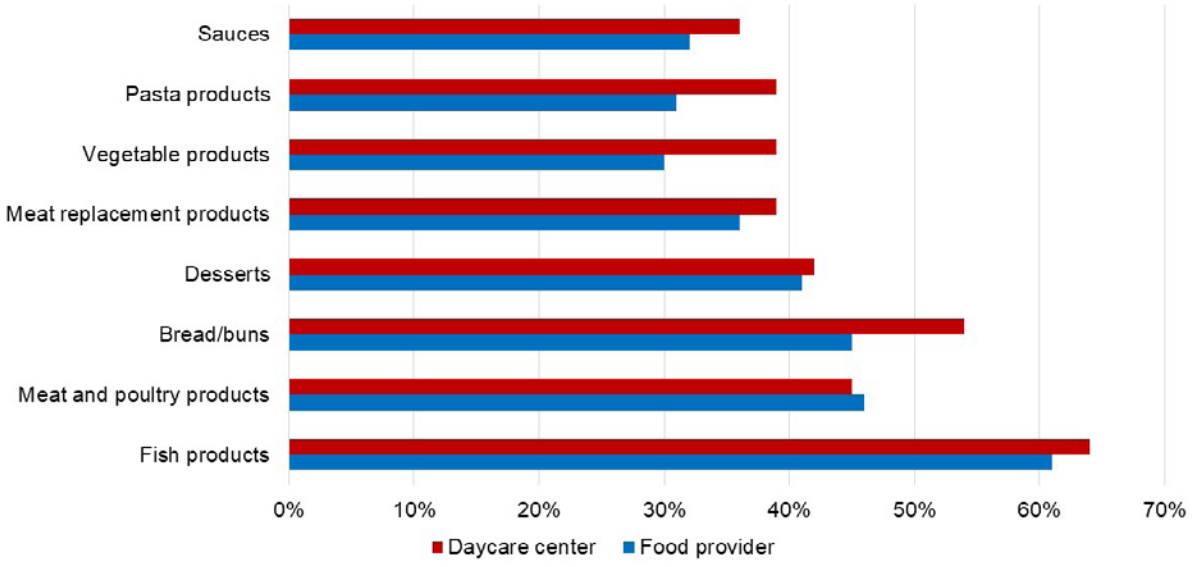

Fig. 1: **Percentage frequency in which product groups food providers and self-catering daycare centers use more than 50 % HPFs**

vs. n = 30; p = 0.001, chi-square test). Quick preparation (n = 42 vs. n = 16; p = 0.008, chi-square test) and preparation that is sure to succeed (n = 49 vs. n = 14; p = 0.019) were also significantly more often very important/important for FPs than for DCs. In addition to the characteristics for product selection, FPs and DCs were asked about the sources from which they obtain nutritional information on the highly processed products. On average, daycare centers mentioned 1.2 sources and food providers 2.1 sources from which they obtain information (◆ Table 1).

Planning and recipes

In the survey, food providers (n = 64, 76 %) stated significantly more frequently that they used recipes for preparing lunch than DCs (n = 26; 57 %; p = 0.020, chi-square test). On average, the recipes of FPs and DCs come from 1.7 and 2.9 different sources. Own creations are most frequently used as the recipe basis (◆ Table 2). Of the recipes used, 29 % (n = 24) of the FPs recipes

Used sources for nutritional information	FP n (%)	DC n (%)
Product packaging	49 (59 %)	37 (80 %)
Product specification	54 (65 %)	-
Consultation with the producer/supplier	37 (45 %)	11 (24 %)
Operational management software	42 (27 %)	-
Other	9 (11 %)	2 (4 %)
I don't know	2 (2 %)	3 (7 %)

Tab. 1: **Sources for nutritional information (multiple answers) FP n = 83 and DC n = 46**
DC: daycare centers; FP: caterers

contained specific quantities for salt, 34 % (n = 28) for sugar and 27 % (n = 22) for fat. 62 % (n = 16) of DC recipes contained specific quantities for salt, 69 % (n = 18) for sugar and 73 % (n = 19) for fat. In DCs that use recipes (n = 26), 40 % (n = 10) of the recipes contain a nutritional value calculation, in FPs 32 % (n = 20).

When asked about existing portion sizes in lunchtime catering, 79 % (n = 33) of the DCs and 12 % (n = 10) of the FPs stated that they did not use defined portion sizes for children (p = 0.022, chi-square test). 82 % of the FPs stated that they defined portion sizes, 2 % (n = 2) stated that they used the same portion sizes for all customers and 12 % (n = 10) stated that they did not define portion sizes. The FPs portion calculation is primarily influenced by the wishes of the daycare centre 79 % (n = 54), orientation values from the DGE quality standard 77 % (n = 52) and empirical values 69 % (n = 47).

Barriers and support factors for the implementation of salt, sugar and fat optimized daycare catering

The majority of FPs (82 %, n = 68) record the need to use less salt, sugar and fat in daycare catering.

Self-catering daycare centres and FPs cite various reasons that prevent them from reducing the amount of salt, sugar and fat in their daycare catering. Daycare centres cite a lack of training and insufficient knowledge during implementation (52 %, n = 24) in first place, followed by insufficient time and staff (30 %, n = 14) and insufficient budget (26 %, n = 12). Insufficient kitchen equipment is also perceived as a barrier in 22 % of cases (n = 10). For FPs (n = 57), the most frequently cited barrier is the acceptance of the food or the change in flavour (32 %, n = 20), followed by a limited range of healthy, highly processed foods (14 %, n = 9) and the lack of (specialist) staff (13 %, n = 8). Insufficient knowledge and a lack of budget were only mentioned by 5 % (n = 3) and 10 % (n = 6) of FPs.

Adjustment screws

67 % (n = 57) of SPs rated the flavouring and seasoning of food as very important for training materials when implementing low-salt, low-sugar and low-fat daycare catering, followed by measuring/weighing ingredients (58 %), purchasing goods (55 %, n = 46) and selecting the best cooking method (47 %, n = 39).

Answer options	FP n (%)	DC n (%)	Significance (p)
Recipes are own creations	53 (64 %)	21 (81 %)	0,771[b]
The recipes come from projects of the German Nutrition Society	25 (30 %)	17 (65 %)	0,052[a]
The recipes are taken from standard cookery training books	22 (27 %)	16 (62 %)	0,168[b]
The recipes come from various websites	18 (22 %)	13 (50 %)	0,001[a]
The origin of the recipes is unknown	8 (10 %)	5 (19 %)	0,604[b]
Recipe database of the operational management system/supplier	8 (10 %)	3 (12 %)	0,438[b]
Other	6 (7 %)	1 (4 %)	0,438[b]

Tab. 2: **Origin of recipes used in daycare catering** (multiple answers) FP n = 83, DC n = 26
[a] Chi Quadrat-Test
[b] Exact test according to Fischer
DC: daycare centers; FP: caterers

Discussion

The use of HPFs is common practice in the gastronomy sector and therefore also in the daycare centre environment. Many HPFs contain an unfavourable nutrient ratio with high amounts of salt, sugar and saturated fatty acids [16, 17, 18]. They do not comply with current recommendations of the Health Claims Regulation or the WHO [19, 20]. Regular use of HPFs can significantly increase the salt, sugar and fat intake in daycare catering. In the studies known to us, the use of highly processed foods in daycare catering was not recorded; there is currently a research gap in this area. The food groups identified are highly relevant for daycare catering and, based on the NOVA classification, are mainly highly ultra processed foods [21]. In addition to the optimization of HPFs and a targeted selection, recipes and portion sizes are an important factor for controlling the salt, sugar and fat intake. Large portions are associated with an increased risk of obesity and associated diseases in children [22]. As a consequence, suitable portion sizes should be offered for energy-rich foods [23–25]. At this point, both the food industry and Daycare centres need to question portion sizes.

The proportion of facilities that do not use recipes is high in both FPs and daycare centres. The use of good quality recipes that are adapted to the target group guarantees that daycare centre catering meets their demand [6]. Recipes that were developed as part of the IN FORM project FIT KID fit the requirements, take into account the national recommendations on nutrient intake and are available to food providers as open access [26]. In addition, networking centres for daycare catering offer support for FPs and DCs in many federal states (including recipe collections).

Following to the selection of relevant recipes, the optimization of existing recipes is also an important measure for reducing salt, sugar and fat in daycare meals. The reduction potential is difficult to assess and depends heavily on the original recipe. In order to identify and assess reduction options and their acceptance, recipe optimisation and acceptance tests are currently being carried out in the "Start Low" project and recommendations for action are being developed [27]. In addition to barrier-free access to recipes and training materials for optimizing recipes, it is important to increase recipe loyalty and to communicate the importance of a recipe and its correct implementation to employees.

In the survey, food providers cited the taste and acceptance of the sugar-, salt- and fat-optimized dishes as the first barrier. However, this point hardly plays a role for the DCs. There are several possible reasons for this. Firstly, different target groups of the FPs can have an influence. From an operational point of view, it is often not possible to produce separate menu lines for each customer group. Compared to adults, children are often accepting less salty and sugary foods [28]. FPs may have unconsciously transferred feedback from other customer groups to the daycare catering. Another explanation may be the physical proximity of DCs to the children and the ability to respond more flexibly to their wishes and needs. On the other hand, catering staff in DCs sometimes seem to feel restricted by inadequate kitchen equipment, which in turn affects their flexibility. With regard to the barrier of food acceptance, study results show that a reduction in salt, sugar and fat can be implemented without any loss of acceptance [28, 29, 30, 31, 32, 33]. In most cases, however, the reduction initially means additional work for FPs and catering staff. This is where information campaigns, training and political measures must inform and support FPs and self-catering daycare centres. One example with regard to salt is a catalogue of measures from a Swiss project. The FP is shown effective measures for reducing salt in mass catering and is supported from planning to implementation, expected effect and evaluation [34].

Food provider named seasoning and flavouring food, weighing ingredients and purchasing goods as important training topics. The first two topics are very practice-orientated and training courses should take this into account wherever possible and include practical exercises and impart practical knowledge. The topic of purchasing goods is also relevant for the reduction of salt, sugar and fat, as optimizations and changes can be implemented quickly here. In addition to the topics rated as important by the participants, the survey and discussion also revealed other training topics that are relevant for optimizing daycare catering. These are recipe utilisation/recipe revision, meal planning and communication with the daycare centre.

The majority of food service providers (82 %) stated that they see a need to reduce salt, sugar and fat. It can therefore be assumed that food service providers are aware of the problem. The survey of food providers and daycare centres was conducted when regular operations were affected by the coronavirus pandemic. In addition, since 2022, rising inflation, staff migration and disruptions to supply chains have placed further burdens on food service providers [10]. In order to minimize the influence of these effects, we sometimes asked for pre-pandemic figures, e. g. when it came to estimating the size of the business. Many other questions about purchasing goods, handling recipes and portions, barriers and hurdles are largely unaffected by the situation. This can be explained by the fact that, for example, the recipes are already used before or after corona, and the same applies, for example, to the operational management systems used for purchasing and production planning. It can be assumed that the results from our survey represent the current status of handling HPFs, recipes, hurdles and barriers.

In addition to practical aspects, further research questions also arise. For example, how critical are the regularly used HPFs in terms

of their nutrient composition? How much do HPFs differ in retail and wholesale trade? The definition of child-friendly portion sizes could also be another focus of research.

Discussion of methods

It is not known throughout Germany how many providers and daycare-center are active in the area of daycare centre catering, which is why an open, self-selective sample was drawn. One reason for this is that the total number of daycare centres offering lunch is not known [4, 7]. The statistics of the Federal Statistical Office only show the total number of daycare centres and the number of children who eat lunch at the daycare centre, but not the number of daycare centres that offer lunch [4, 7]. However, the VeKiTa study and the Is(s)t KiTa gut? study showed that not all daycare centres offer lunch [11, 15]. More recent nationwide studies on this are not available. Another reason is that various providers such as caterers, butchers, restaurants and educational institutions are active in this market and providers are not fully organised in interest groups such as the Association of German School and Daycare Caterers (VDSKC), PROFITreffen Schulverpflegung [11, 15, 35, 36]. The aim was to gain 200 FPs for the survey. With 83 FPs and 46 DCs, this target was not achieved. However, the sample is comparable with other studies such as the VeKiTa study or the Is(s)t Kita gut study [7, 11] in terms of the basic characteristics, e. g. the food service organisation used. Due to the recruitment in a self-selecting sample, a positive or negative bias in the results cannot be ruled out; the lack of comparative data with regard to the use of HPF makes the assessment even more difficult.

Conclusion

The current study represents one of the first steps towards the structured recording of the status quo regarding the situation of self-cooking daycare centres and food providers in the daycare centre environment, especially with regard to the regular use of HPF. It provides promising starting points for the design of training courses in this area and has identified important points in the production process that influence the salt, sugar and fat content. In addition to the training topics categorized as important, the training courses must also take into account other aspects such as the hurdles mentioned. For food providers, the maintenance of food acceptance must be taken into account and for day-care centres, the teaching of the implementation of a needs-based diet.

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Disclosures on Conflicts of Interest and the use of AI
The authors declare no conflicts of interest. An AI application was used to create and check the English translation.

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