

IJACT 23-9-4

Meal nutritional management status of daycare centers by size

Hye Won Kim*

Prof., Dept. of Food and Nutrition, Anyang Univ., Korea
Research fellow, Inst. of Health and Nutrition, Anyang Univ., Korea
kimhw@anyang.ac.kr

Abstract

In this study, we attempted to analyze the status of meal nutritional management at daycare centers and determine whether the need for improvement varies depending on their size. We divided into two groups based on the size of foodservice facilities. If meals for more than 50 people are provided at a time, they are classified as large-scale facilities (Large-scale group). If they are smaller, they are classified as small-scale facilities (Small-scale group). Dietitians visited each daycare center and checked 5 categories and 14 items. When comparing 5 categories, scores in the Small-scale group scored higher than those in the Large-scale group for 'Menu utilization' category. As a result of comparing the detailed 14 items, the scores of 'Indicate dietary information', 'Use menus suitable for those who are eligible for meals', and 'Posting menus by age in public places at foodservice facilities' were higher in the Small-scale group than in the Large-scale group. As such, there are differences in meal nutritional management according to the size of children's foodservice facilities therefore, it was found that customized education and management were needed according to the facilities' size.

Keywords: *Center for Children's Foodservice Management, Children, Daycare center, Foodservice Facilities, Meal Nutritional Management*

1. INTRODUCTION

The function of childcare at home has weakened due to the expansion of mothers' social activities and the increase in nuclear familyization [1]. As a result, free childcare policies have been implemented since 2012, the use of daycare centers has increased [2], and various problems such as safety accidents and meal-related problems at daycare centers have been revealed [1]. Since children who are enrolled in daycare centers are basically provided with snacks and lunch, the meals provided by daycare centers are of high importance. Eating habits in children have a great influence on the formation of their lifelong eating habits [3], which are directly related to health and can not only affect future national competitiveness but also act as a factor in forming a country's food culture. Therefore, it is necessary to help children form healthy eating habits in various fields, including not only parents but also various institutions, educators, and health managers that raise and care for them.

Recently, inappropriate amounts and quality meals were provided at daycare centers in the local area, as the media reported [4]. Children must comply with appropriate meal distribution according to their age, and failure to comply can lead to nutritional imbalance and a delay in growth and development [5]. Overall matters related to the nutritional management of meals, such as nutritional quality problems and appropriate meal distribution, are one of the unique tasks of dietitians. Therefore, for stable meals at children's

Manuscript received: July 17, 2023 / revised: July 31, 2023 / accepted: August 10, 2023

Corresponding Author: kimhw@anyang.ac.kr

Tel: +*** - **** - ****

Assistant professor, Dept. of Food and Nutrition, Anyang Univ., Korea

Copyright©2023 by The International Promotion Agency of Culture Technology. This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0>)

foodservice facilities, it is necessary to hire dietitians [6]. In this regard, Article 10 of the Enforcement Rule of the Child Care Act stipulates that daycare centers that care for more than 100 children should have one dietitian [7]. In addition, in the case of fewer than 100 children, there is a legal basis for thorough meal management at daycare centers by receiving support from the Center for Children's Foodservice Management (CCFM) under Article 21-2 of the Special Act on Safety Management of Children's Dietary Lifestyle [8].

When managing daycare centers at the CCFM, daycare centers are divided into small-scale foodservice facilities and group foodservice facilities according to the guidelines, and dietitians visit each facility [9]. Group foodservice facility refers to a catering center that provides meals to more than 50 people at a time pursuant to Article 2 of the Enforcement Decree of the Food Sanitation Act [10], and small-scale foodservice facility is the case where meals are provided to a smaller number. Dietitians at the CCFM regularly visit daycare centers to manage overall nutritional matters such as cooking, meal distribution, etc., and guide areas that need to be improved. In this regard, there was a study showing that nutrition-specialized projects for CCFM-managed daycare centers helped to form appropriate salinity in soups [11]. Also, increased menu management and meal diversity at daycare centers supported by the CCFM were reported [12].

However, more accurate analysis and understanding of meal nutritional management in daycare centers should be conducted for each community to which they belong. This is because securing operating expenses and supplying food when operating daycare centers are greatly affected by the regulations and environmental characteristics of the local governments to which daycare centers belong [13]. So far, there has been no research on evaluating the level of nutritional management for meals provided by daycare centers in Anyang-si, making it difficult to come up with an improvement plan for the shortcomings. Therefore, through this study, we tried to analyze the status of meal nutritional management at daycare centers in Anyang-si to see if the need for improvement varies depending on the size of daycare centers.

2. RESEARCH METHODS

2.1 Research Subjects and Management of Children's Foodservice Facilities

This study was conducted on children's foodservice facilities such as daycare centers registered at the CCFM in Anyang-si in 2023. There were a total of 315 facilities, which were divided into two groups based on the size of daycare centers: 230 small-scale foodservice facilities (Small-scale group) and 85 large-scale foodservice facilities (Large-scale group). In this study, Small-scale group was regarded as foodservice facilities except Large-scale group. Large-scale group include places registered with local governments as group foodservice facility, even if the number of children is more than 50 or less. Meal nutritional management was conducted once by dietitians from the CCFM in Anyang-si visiting each institution.

2.2 Meal Nutritional Management Contents and Scores

Dietitians evaluated each facility according to the meal nutritional management guidance items presented in the CCFM's guidelines of the Ministry of Food and Drug Safety [9]. As shown in Table 1, meal nutritional management categories are divided into 'Menu utilization', 'Meal provision', 'Cooking', 'Distribution of meals, and 'Others', and a total of 14 items were identified. A total of 140 points could be obtained by giving 10 points if the items were followed as directed at the foodservice facilities and 0 points if not.

Table 1. Meal nutritional management categories and items

Menu utilization	
1	Use menus prepared by dietitians (license holder)
2	Use menus prepared by dietitians as it is

3	Indicate dietary information (calories, protein contents, allergens, etc.)
4	Use menus suitable for those who are eligible for meals
5	Posting menus by age in public places (bulletin boards, websites, etc.) at foodservice facilities
6	Provide age-appropriate menus information to children's parents
Meal provision	
7	Provide meals and snacks that match menus
8	Prepare guidelines and conduct investigations on food allergies
9	Preparation of countermeasures against food allergies
Cooking	
10	Cooking by referring to the amount of food ingredients, cooking methods, etc.
11	Know recommended salinity of the soup and provide it with the recommended salinity
Distribution of meals	
12	Know appropriate amount of food distribution for children and provide appropriate amount once per person
13	Provide meals and snacks considering the age characteristics of children
Others	
14	Recognition of the quality certification mark of children's favorite food

2.3 Data Analysis

For analysis of the data, SPSS version 18.0 (IBM Corp, Armonk, NY, USA) was used. A comparative analysis of 14 items between small-scale and large-scale foodservice facilities was done by independent sample t-test. For all results, it was considered that the case where the p value was <0.05 was significant.

3. RESULTS

At first, we compared scores in five categories between two types of foodservice facilities. The highest scores in the 'Menu utilization', 'Meal provision', 'Cooking', 'Distribution of meal, and 'Others' were 60, 30, 20, 20, and 10, respectively. As shown in Figure 1, among these 5 categories, only the 'Menu utilization' was differed. At the 'Menu utilization', 56.83 ± 0.51 points were gained in the Small-scale group, and this score was significantly higher than in the Large-scale group (51.88 ± 1.20 , $p < 0.001$). The scores at the 'Meal provision', 'Cooking' and 'Distribution of meals' were higher in the Small-scale group (29.91 ± 0.06 , 19.61 ± 0.13 , and 20.00 ± 0.00 , respectively) than in the Large-scale group (29.88 ± 0.12 , 19.18 ± 0.34 , and 19.88 ± 0.12 , respectively), however, these were not statistically different. In the 'Others' category, both groups received a perfect score of 10.

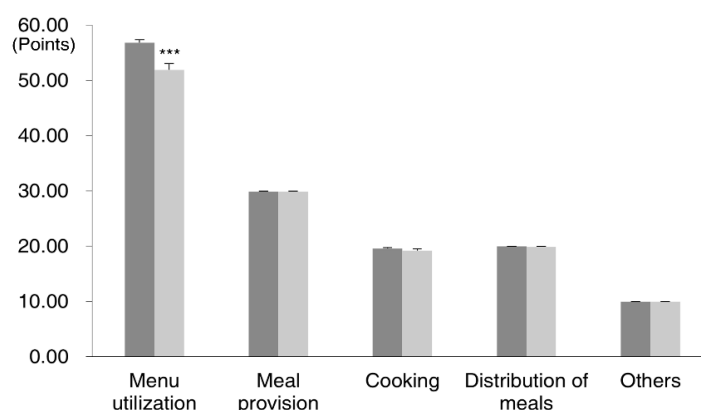


Figure 1. Compare scores by 5 categories between Small-scale and Large-scale groups. Dark gray bar, Small-scale group; Light gray bar, Large-scale group. Values are expressed as means \pm standard error. The highest score for the 'Menu utilization' is 60, 'Meal provision' is 30, 'Cooking' is 20, 'Distribution of meals' is 20, and 'Others' is 10. Significant differences between Small-scale and Large-scale groups were analyzed by independent samples t-test.

***p<0.001

Table 2 shows the results of comparing 14 items from the two groups to find out which items are different. As a result of comparing the scores of 14 items between two types of foodservice facilities, No. 3, 4, 5 items and the total score significantly differed. All scores for these items were higher in the Small-scale group than in the Large-scale group. The score of '3. Indicate dietary information (calories, protein contents, allergens, etc.)' was 9.61 ± 0.13 points in the Small-scale group and 8.59 ± 0.38 in the Large-scale group ($p = 0.012$). And the score of '4. Use menus suitable for those who are eligible for meals' was 9.13 ± 0.19 in the Small-scale group and 7.65 ± 0.46 in the Large-scale group ($p = 0.004$). The score of '5. Posting menus by age in public places (bulletin boards, websites, etc.) at foodservice facilities' in the Small-scale group was 8.91 ± 0.21 and 7.41 ± 0.48 in the Large-scale group ($p = 0.005$). Because of these differences, the total score also differed between the two groups: 136.35 ± 0.54 in the Small-scale group and 130.82 ± 1.25 in the Large-scale group ($p < 0.001$).

Table 2. Compare scores by 14 items between Small-scale and Large-scale groups

Items	Small-scale group (Points) ¹⁾	Large-scale group (Points)	p-value ³⁾
1	9.96 ± 0.04 ²⁾	10.00 ± 0.00	0.544
2	9.61 ± 0.13	9.29 ± 0.28	0.308
3	9.61 ± 0.13	8.59 ± 0.38	0.012
4	9.13 ± 0.19	7.65 ± 0.46	0.004
5	8.91 ± 0.21	7.41 ± 0.48	0.005
6	9.61 ± 0.13	8.94 ± 0.34	0.066
7	9.91 ± 0.06	9.88 ± 0.12	0.804
8	10.00 ± 0.00	10.00 ± 0.00	-
9	10.00 ± 0.00	10.00 ± 0.00	-
10	10.00 ± 0.00	9.88 ± 0.12	0.320
11	9.61 ± 0.13	9.29 ± 0.28	0.308
12	10.00 ± 0.00	10.00 ± 0.00	-
13	10.00 ± 0.00	9.88 ± 0.12	0.320
14	10.00 ± 0.00	10.00 ± 0.00	-
Total	136.35 ± 0.54	130.82 ± 1.25	< 0.001

¹⁾ Number of small-scale and Large-scale groups was 230 and 85, respectively.

²⁾ Values are expressed as means \pm standard error.

³⁾ Significant differences between Small-scale and Large-scale groups were analyzed by independent samples t-test.

4. DISCUSSION

When comparing the scored of the five categories of the two groups, the reason why there was a difference only in the 'Menu utilization' among the five categories is inferred to be that the details of the 'Menu utilization' are more than those of other categories. The 'Menu utilization' category consists of 6 items, but the other categories included 2-3 items, and only 1 item belongs to the 'Others' category. Therefore, for a more detailed comparison, we checked the difference for the items belonging to each category, and the results are shown in Table 2.

One of the reasons for complying with '3. Indicate diary information (calories, protein contents, allergens, etc.)' is to determine how much nutrition needs are met through meals. According to Article 23 of the Enforcement Rule of the Child Care Act, daycare centers must use a diet prepared by dietitians [7], and when preparing menus, the CCFM's dietitians organize the menus based on the nutritional needs of each age set out in the 2020 Dietary Reference Intakes for Koreans [14]. For example, 1-2- and 3-5-year-olds need 900 and 1,400 Estimated Energy Requirements (kcal/day, respectively), thus snacks and meals are decided accordingly. Nutritional values for menus should be indicated so that daycare center employees or parents

know how much nutrition their child is getting through the meals provided by daycare centers.

Also, it is intended to remove health threats to children with food allergies in advance by marking food allergens. Food allergy symptoms can cause anaphylaxis shock and death [15], so children with food allergies should thoroughly avoid allergens. Article 5 of the Enforcement Rule of the Act on Labeling and Advertising of Foods is required to indicate if food contains raw materials that can cause allergies [16], and daycare center employees and parents should instruct children not to eat the food. However, considering that both groups gained 10 points on No. 8 and 9 items related to allergies, the points pointed out in No. 3 item may relate to other indications than allergies. In the present study, all daycare center employees were aware of the risk of food allergies, and they followed the allergy countermeasures and guidelines well. Continuous education is needed so that all foodservice facilities can consistently score points on No. 8 and 9 items.

No. 4 and 5 are items that require the use of menus suitable for the age of the child and post menus classified by the age used. In our results, the Small-scale group scored higher on both items than the Large-scale group. Similarly, to this, in the 2021 National Childcare Survey, the smaller the size of daycare centers, the higher the rate of posting menus [17]. The reason for following No. 4 and No. 5 items can be seen as the need to provide parents with accurate information on daycare center meal nutritional management. Parents' trust in daycare centers can increase by notifying parents that they are using menus suitable for their children's age. D.K. Lee [18] suggested that it is essential to form trust between daycare center employees and parents to promote the healthy growth and development of children through the efficient operation of daycare centers. And there has been a study that collects information using a website that can objectively obtain information when parents choose a daycare center [19]. Accordingly, it seems necessary to make it public so that parents can check menus at any time to reassure their parents about the meals at daycare centers and improve their reliability.

Both 1-2- and 3-5-year-olds are children, but menus should be divided into two types because there are differences in physiological development stages [20]. The nutrient requirements of the two age groups are different, and the foods and recipes available are different, so the two diets can be different. For example, 3-5-year-olds have higher daily energy or protein needs than 1-2-year-olds [14] and are better able to eat seasoned or long-lasting foods. In accordance with Article 25-6 of the Enforcement Decree of the Child Care Act [21], if a daycare center cares for both ages 1-2 and 3-5, both types of menus should be posted on bulletin boards and websites (<https://info.childcare.go.kr/info/main.jsp>). In the case of Large-scale daycare centers that often care for both 1-2- and 3-5-year-olds, more careful attention should be paid to this. However, in our results, the scores of No. 4 and 5 items were lower in the Large-scale group than in the Small-scale group, indicating that related education was needed in the Large-scale group.

All foodservice facilities in this study scored points for No. 12 item, and it can be said that most children at daycare centers in Anyang-si are provided with an appropriate amount of food. In addition, Article 14 of the Special Act on Safety Management of Children's Dietary Lifestyle [8] says quality certification of children's food that meets the quality certification standards announced by the Ministry of Food and Drug Safety can be displayed in shapes or letters on food containers or packages. No. 14 item for quality certification labeling also gained points in all two groups, and all daycare center employees in this study knew what the quality certification labeling of children's favorite foods was and referred to it when purchasing food. Providing safe and enough nutrition during the growth period is a basic factor in development [5], so guidance is needed to ensure that these items are consistently followed.

In this study, as of 2023, we confirmed meal nutritional management status of meals at daycare centers in Anyang-si. When comparing Small-scale and Large-scale groups, meal nutritional management was doing better in the Small-scale group than in the Large-scale group, because there were differences in items in the 'Menu utilization' category. In the 'Menu utilization' category, the items that showed significant differences between the two groups were how accurately they represented the menu, whether they used a menu suitable for daycare center children, and whether all menus were posted by age in public places. All institutions comply with the recognition and management of the importance of food allergies in the 'Meal provision' category, the appropriate amount of food distribution in the 'Distribution of meals' category, and the quality certification of children's food in the 'Others' category. Therefore, we should pay attention to the matter so that all daycare centers can consistently score points in the future.

The limitation of this study is that it is the result of nutritional management once. It is necessary to compare and analyze before and after education to determine whether what is doing well through further investigation is continuing to do well, and whether the deficiencies have been improved. If there are still deficiencies during the re-examination, or if they are doing well but have become insufficient, measures such as strengthening guidance should be prepared.

5. CONCLUSION

In conclusion, the meal nutritional management status of daycare centers in Anyang-si differed depending on the size of daycare centers, and the Small-scale group had higher total scores than the Large-scale group, indicating that they were better at nutrition management in the Small-scale group. Since group foodservice facilities have many children, more children may not receive adequate nutrition without specialized personnel in nutrition management than in small-scale foodservice facilities. Therefore, Anyang-si seems to need to further strengthen education for group foodservice facilities on providing accurate menus by age and disclosing related information.

This study conducted a survey on the meal nutritional management of daycare centers in Anyang-si, and it was confirmed that the areas to be emphasized in meal nutrition management may differ depending on the size of daycare centers. Using the results of this study, we will use them as a basis for preparing customized education and guidance plans for daycare centers by size, and through this, we intend to improve the quality of overall meal nutrition management.

REFERENCES

- [1] K.W. Yun and D.K. Lee, "The Difficulties, Rewards, and Hopes Experienced by Child-Care Teachers in Open Child-Care Center," *Early Childhood Education Research and Review*, Vol. 23, No. 3, pp. 87-113, June 2019. DOI: <http://dx.doi.org/10.32349/ECERR.2019.6.23.3.87>
- [2] J.S. Yun, *46th Childcare Policy Brief: The roles and responsibilities of parents who use daycare centers should be strengthened*, Korea Institute of Child Care and Education, pp. 1-4, 2016.
- [3] S.L. Anzman, B.Y. Rollins and L.L. Birch, "Parental Influence on Children's Early Eating Environments and Obesity Risk: Implications for Prevention," *International Journal of Obesity (Int J Obes)*, Vol. 34, No. 7, pp. 1116-1124. July 2010. DOI: 10.1038/ijo.2010.43
- [4] Controversy over the Sejong City daycare center's 'collective resignation of 10 teachers, suspicion of poor school meals'. https://www.ytn.co.kr/_ln/0103_202306120935011970.
- [5] D.H. Kim, "Growth Retardation," *Endocrinology and Metabolism (Endocrinol Metab)*, Vol. 11, No. 4, pp. 369-376. December 1996.
- [6] N.H. Do, *Current status and improvement plan of facilities and manpower for the operation of meals in daycare centers and kindergartens*, Korea Institute of Child Care and Education, pp. 20-21, 2015.
- [7] Korean Law Information Center, the Enforcement Rule of the Child Care Act. <https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EC%98%81%EC%9C%A0%EC%95%84%EB%B3%B4%EC%9C%A1%EB%B2%95%EC%8B%9C%ED%96%89%EA%B7%9C%EC%B9%99>.
- [8] Korean Law Information Center, the Special Act on Safety Management of Children's Dietary Lifestyle. <https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EC%96%B4%EB%A6%B0%EC%9D%B4%EC%8B%9D%EC%83%9D%ED%99%9C%EC%95%88%EC%A0%84%EA%B4%80%EB%A6%AC%ED%8A%B9%EB%B3%84%EB%B2%95>.
- [9] Ministry of Food and Drug Safety, *2023 Guideline for Center for Children's Foodservice Management*, pp. 96, 2022.
- [10] Korean Law Information Center, the Enforcement Decree of the Food Sanitation Act, <https://law.go.kr/LSW/admRulLsInfoP.do?admRulSeq=2100000204235>.
- [11] H.W. Kim and J.E. Pie, "Comparison of Salinity of Soups on the Use of Bluetooth Salinity Meter at Childcare Centers in Anyang Area," *The Journal of the Convergence on Culture Technology (JCCT)*,

- Vol. 6, No. 4, pp. 435-443, November 2020. DOI: <https://doi.org/10.17703/JCCT.2020.6.4.435>
- [12] H.Y. Kim, I.S. Yang, I.S. Chae, B.S. Yi, M.K. Park, H.Y. Kim, T.S. Kang, D.G. Leem, J.H. Lee, and H.Y. Lee, "Effectiveness of Center for Child-Care Foodservice Management for Menu Management and Dietary Variety," *Korean Journal of Community Nutrition (Korean J Community Nutr)*, Vol. 18, No. 3, pp. 243-256, June 2013. DOI: <https://doi.org/10.5720/kjcn.2013.18.3.243>
- [13] S.Y. Lee and H.C. Chung, "The Limitations of Universal Free Childcare Policy and the Rational Management Strategies of Private Childcare Centers," *Korea Journal of Child Care and Education*, Vol. 100, pp. 249-271. September 2016.
- [14] Ministry of Health and Welfare, *2020 Dietary Reference Intakes for Korean*, pp. x-xi, 2020.
- [15] Y.S. Han, "Management of Food Allergy in the Community," *Food Science and Industry (Food Sci Ind)*, Vol. 48, No. 1, pp. 24-31, March 2015. DOI: <https://doi.org/10.23093/FSI.2015.48.1.24>
- [16] Korean Law Information Center, the Enforcement Rule of the Act on Labeling and Advertising of Foods, <https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EC%8B%9D%ED%92%88%EB%93%B1%EC%9D%98%ED%91%9C%EC%8B%9C%E3%86%8D%EA%B4%91%EA%B3%A0%EC%97%90%EA%B4%80%ED%95%9C%EB%B2%95%EB%A5%A0%EC%8B%9C%ED%96%89%EA%B7%9C%EC%B9%99>.
- [17] Ministry of Health and Welfare, *2021 National Childcare Survey-Daycare Center Survey Report-*, pp. 180, 2021.
- [18] D.K. Lee, *Operation and management of childcare facilities*, Yangseowon, 2010.
- [19] J.H. Kim and D.K. Lee, "Process of Mother's Selecting a Nursery and Process of Forming a Trust," *Journal of Children's Media and Education (JCME)*, Vol. 12, No. 1, pp. 169-202, April 2013.
- [20] Ministry of Health and Welfare, *2020 Dietary Reference Intakes for Korean*, pp. xxiv, 2020.
- [21] Korean Law Information Center, the Enforcement Decree of the Child Care Act. <https://www.law.go.kr/%EB%B2%95%EB%A0%B9/%EC%98%81%EC%9C%A0%EC%95%84%EB%B3%B4%EC%9C%A1%EB%B2%95%EC%8B%9C%ED%96%89%EB%A0%B9>.