Analysis on Dietary Behavior and Dietary Intake of Children in Chongqing City, China by SPSS Statistical Software

Fang Tan¹², Xin Zhao³, Qianqian Huang⁴ and Jiaqiong Zhang¹⁴*  
¹ Family Education Guidance Center for 0-6 Years Old, Chongqing University of Education, Chongqing 400067, China  
² Department of Public Health, Our Lady of Fatima University, Valenzuela 838, Philippines  
³ Chongqing Collaborative Innovation Center for Functional Food, Chongqing University of Education, Chongqing 400067, China  
⁴ College of Pre-school Education, Chongqing University of Education, Chongqing 400067, China  
*Corresponding author’s e-mail: zhangjq@cque.edu.cn

Abstract. In order to understand the current situation of children's dietary behavior and its influencing factors in Chongqing City, China, this study investigated the dietary behavior of children in Chongqing City by random sampling of 2200 parents of children in the main urban area of Chongqing City by questionnaires. Through SPSS statistical software analysis, it was found that children's dietary behavior problems were prominent, 83.5% of children had food concentration problems, 57% of children had selective eating behavior. In addition, children's dietary preferences are also uneven. It can be seen from this that families, kindergartens and all sectors of society work together to carry out the education of infants’ dietary behavior, so as to cultivate infants’ scientific and healthy dietary behavior.

1. Introduction
Children aged 3-6 years old, the body is in a rapid development stage, the further development of various tissues and organs, these changes need adequate nutrients as a guarantee [1]. At this stage, children are active, active and consume a lot of energy and nutrients. The effect of nutrition supply on children's physical and mental health and intellectual development is irreversible at this stage. The dietary habits laid down in early childhood may also affect people's life. Therefore, it is urgent to pay attention to children's dietary behavior. Nurturing healthy dietary behavior can meet the intake requirements of various nutrients and promote the normal physical and intellectual development of children [2].

Kindergartens usually provide lunch and snacks. Some kindergartens provide three meals and two points. Kindergartens usually take in nutrients from kindergarten meals every day. Therefore, the dietary supply of kindergartens is particularly important [3]. Kindergartens are mainly responsible for children's dietary nutrition. Whether they can provide sufficient nutrients to meet the energy and nutrients required by children's daily activities is related to their growth. But in practice, studies show that most kindergartens in China need to improve their dietary nutrition supply [4].
The purpose of this study was to understand the dietary behavior and dietary intake of preschool children in Chongqing, and to analyze whether the frequency of dietary intake of preschool children conformed to the standard of dietary nutrient reference intake of preschool children in China. It is hoped that the results of this study can provide reference data for the formulation of nutrition and health related programs for young children in Chongqing. At the same time, it provides the basis for the kindergartens and parents in Chongqing to formulate a balanced diet for children, and helps to improve their dietary behavior, so as to lay a good foundation for the healthy growth of children.

2. Research design
The subjects were parents of infants in four main districts of Chongqing, China. Five kindergartens were randomly selected from Jiangbei District, four kindergartens from Banan District, five kindergartens from Nanan District and four kindergartens from Shapingba District. A total of 2200 parents of infants from 18 kindergartens were selected as samples for this study. A total of 1895 valid questionnaires were collected from these 25 kindergartens, with an effective rate of 83.2%. Invalid data were first removed from the survey, and then SPSS software was used to analyze children's dietary behavior and dietary intake, in order to understand the status of children's dietary behavior and dietary intake. There are 28 small questions in the questionnaire. The questionnaire is designed from several dimensions, such as basic information of children, basic information of families and children's dietary behavior. The questionnaire can fully understand children's dietary habits, dietary preferences, dietary intake and the factors causing children's dietary behavior. The data are processed after recovery, and feasible suggestions are put forward.

3. Research results and analysis
3.1. Survey of children's dietary habits
The results showed that 67.7% of the children could finish their meals in half an hour (Time 1), but 15% of the children ate too fast or too slowly. Children's meal time is best 10-20 minutes, not more than 30 minutes at most, and with the increase of age, the shortening of meal time tends to be fixed. Watching TV during meals can make children eat longer and affect their appetite and food intake. In the long run, children will be picky, procrastinate and even malnourished.

| Time          | Frequency | Percentage (%) |
|---------------|-----------|----------------|
| Within 10 minutes | 212       | 11.2           |
| 10-30 minutes  | 1283      | 67.7           |
| More than 30 minutes | 77        | 4.1            |

As shown in Table 2, among the six choices in the question set, "What behaviors did your child have during meals?", the choices of "watching TV" and "losing temper" were selected more frequently, 923 and 403, respectively, with the percentage of cases being 48.71% and 21.27%. Among the 1895 respondents, 48.7% of the children had the habit of watching TV while eating, and 21.27% of the children would lose temper when eating food they did not like. The number of checks for "disturbing or losing temper" was 294, accounting for 15.51% of the total checks; the number of checks for "no interest in eating" was 315, accounting for 16.62% of the total checks. "Playing with toys and being dazed" was checked out 317 times, accounting for 16.73% of the total checked out times. The option "Never happened" accounted for 20.21% of the total number of checks. It can be seen that some children have developed good eating habits, but most of them still have a lot of room to improve their eating habits. It is of great significance for children's physical and mental health to strengthen the cultivation of healthy eating habits in peacetime.
Table 2. Children's behavior during meals.

| Behavior                                | Frequency | Percentage (%) | Case percentage (%) |
|----------------------------------------|-----------|----------------|---------------------|
| Disruption or temper                   | 294       | 11.16%         | 15.51%              |
| No interest in eating                  | 315       | 11.95%         | 16.62%              |
| Watch TV                               | 923       | 35.03%         | 48.71%              |
| Playing with toys, stunned             | 317       | 12.03%         | 16.73%              |
| Getting angry with disliked food       | 403       | 15.29%         | 21.27%              |
| Never happened                         | 383       | 14.54%         | 20.21%              |
| Total                                  | 2635      | 100.00%        | 139.05%             |

As shown in Table 3, among the six choices of "Do Your Children Have Special Preferences for Food", "Sweetness" was the most frequently checked item, with a percentage of 63.85%. 10% of the children preferred spicy food, and the number of choices "sour food" was 172, accounting for 9% of the total number of choices. The number of checks for the option "Other" was 400, accounting for 21.1% of all checks. It can be seen that most children like sweet food, a small number of children like spicy food, and very few children like bitter food.

Table 3. Children’s preference for food.

| Preference | Frequency | Percentage (%) | Case percentage (%) |
|------------|-----------|----------------|---------------------|
| Sweet taste| 1210      | 56.83%         | 63.85%              |
| Pungent taste| 193     | 9.07%          | 10.18%              |
| Sour taste | 172       | 8.08%          | 9.08%               |
| Salty taste| 142       | 6.67%          | 7.49%               |
| Bitterness | 12        | 0.56%          | 0.63%               |
| Other      | 400       | 18.79%         | 21.11%              |
| Total      | 2129      | 100.00%        | 112.35%             |

3.2. Survey of children’s dietary intake

At present, the vegetable intake of Chinese residents is gradually declining, while the intake of fruits, soybeans and dairy products is still at a low level. In the Dietary Guidelines for Chinese Residents, vegetables are recommended for meals. Fruits, dairy products, soybean products and nuts are recommended daily. Suitable amount of fish, poultry, eggs and lean meat is recommended [5]. From Table 4, we can see that 91.6% of the children insist on eating breakfast every day to ensure their nutritional intake. Only 0.7% of the children eat breakfast less than once a week, which shows that parents are aware of the significance of their children's breakfast. As for fruit intake, 53.5% of the children reached the recommended times in the Dietary Guidelines for Chinese Residents, and 4.8% of the children even took fruits less than once a week, which was far from the recommended index of the Dietary Guidelines. In terms of milk and dairy products intake, 56.3% of the children met the dietary guidelines, guaranteed daily milk intake, and 7.5% of the children still had little milk intake. The dietary guidelines for Chinese residents suggest that fish, poultry, eggs and lean meat should be eaten in moderation. To meet the needs of meat can ensure the healthy growth of young children. From the results, it can be seen that 57.6% of the children have meat intake every day, and 3.9% of the children still have meat intake frequency less than once a week. The intake of carbonated beverage, western fast food and fried food can be seen from the results that most parents are aware of the unhealthy of carbonated beverage and fried food, which can control the intake frequency of children and indirectly reduce the possibility of obesity in children.
Table 4. Survey of food intake (frequency).

| Food                                         | Every day / almost every day | 4-5 times / week | 2-3 times / week | Less than 1 times / week |
|----------------------------------------------|------------------------------|------------------|------------------|--------------------------|
| Breakfast                                    | 91.6                         | 5.4              | 2.1              | 0.7                      |
| Eggs                                         | 34.9                         | 20.6             | 29.7             | 11.8                     |
| Bean products                                | 17                           | 14.7             | 40.4             | 23.8                     |
| Fruits                                       | 53.5                         | 22.6             | 15.7             | 4.8                      |
| Nuts                                         | 12.2                         | 15.6             | 38.7             | 29.6                     |
| Fish and shrimp and other aquatic products   | 8.7                          | 13.1             | 38.9             | 35.4                     |
| Meat                                         | 57.6                         | 22.3             | 12.9             | 3.9                      |
| Dairy and its products                       | 56.3                         | 18.8             | 14.2             | 7.3                      |
| Carbonated drinks                            | 4.2                          | 5.4              | 9.4              | 73                       |
| Western-style fast food                      | 2.1                          | 2.0              | 5.1              | 84.3                     |
| Fried food                                   | 2.4                          | 5.1              | 11.8             | 74.7                     |

3.3. Analysis on the causes of children's dietary behavior

The causes of infant's dietary behavior and its causes are discussed in terms of parents, kindergartens, infants themselves and social factors. Questionnaires were designed to investigate the family economic situation, the main caregivers of children and the educational level of parents. This study shows that family economic situation, parents' nutritional knowledge, dietary attitude, dietary habits, family upbringing, parents' educational level and so on play a key role in the development of children's dietary behavior. From the survey results, we can see that 86% of parents will teach their children about healthy diet, indicating that parents still attach great importance to children's healthy diet (Table 5). In addition, the results show that family members' dietary attitudes can play a model role for young children. The results show that 64.2% of parents take care of their children by themselves, which provides a favorable environment for the healthy eating behavior of young children.

Table 5. Information sheet for parents to teach their children about healthy diet.

| Situation     | Frequency | Percentage (%) | Effective percentage (%) |
|---------------|-----------|----------------|--------------------------|
| Always        | 152       | 8.0            | 8.0                      |
| Often         | 797       | 42.1           | 42.1                     |
| Occasionally  | 685       | 36.1           | 36.1                     |
| Very seldom   | 229       | 12.1           | 12.1                     |
| Never         | 22        | 1.2            | 1.2                      |

Kindergarten is the most important place for children to live besides their families, and kindergarten teachers become the most people accompanying children in a day. Therefore, kindergarten teachers also have a significant impact on children's dietary behavior. The results showed that there was a significant correlation between the nutritional knowledge and dietary behavior of kindergarten teachers except parents and children's dietary behavior. From the results, we can see that 59.7% of kindergarten teachers emphasize on the cultivation of healthy eating habits for their parents, but 20% of teachers pay little attention to the importance of healthy eating behavior for children (Table 6). Children communicate with their peers most in kindergartens. Everyone's eating habits and eating behavior will affect each other. If a child sees that his companion is procrastinating and picky, he will unconsciously develop these bad habits. On the contrary, if his companion is a child with healthy dietary behavior, he will set an example and develop healthy dietary behavior himself.
Table 6. Investigation on teachers’ emphasis on children's healthy dietary habits at parent meetings.

| Situation       | Frequency | Percentage (%) | Effective percentage (%) |
|-----------------|-----------|----------------|--------------------------|
| Always          | 282       | 14.9           | 14.9                     |
| Often           | 799       | 42.2           | 42.2                     |
| Occasionally    | 380       | 20.1           | 20.1                     |
| Very seldom     | 120       | 6.3            | 6.3                      |
| Never           | 29        | 1.5            | 1.5                      |
| Unknown         | 233       | 12.3           | 12.3                     |

4. Conclusion
According to the survey, most children in Chongqing have dietary problems such as picky eating, partial eating, overeating and so on. These dietary behavior problems will affect the growth and development of children. Parents and teachers must pay attention to them. The age of 3-6 is the best time to correct children's bad dietary behavior. Kindergartens should shoulder this responsibility, provide sufficient nutrients for children, and ensure the needs of children's activities. At the same time, parents must insist on using kindergartens to urge their children to keep healthy habits at all times. Finally, strengthen contact with kindergartens to create conditions for healthy eating behavior of children. In addition, the relevant social departments have intensified efforts to publicize the importance of healthy eating behavior of young children, using the media to disseminate favorable news, and jointly create a healthy and harmonious social environment.

Acknowledgments
This research was funded by the Program for Innovation Team Building at Institutions of Higher Education in Chongqing (CXTDX201601040), China.

References
[1] Ou, X.M. (2002) Evaluation on kindergarten health education. J. Educ. Sci. Hunan Normal Univ., 1: 29–31.
[2] Lin, Z.P., Zhang, J.Y., Liao, H.Z., Pan, B.J. (2003) The investigation on child dietary behaviors and its influence factors in Fuzhou, China. Strait J. Prev. Med., 9: 21–23.
[3] Jiang, P.H., Yu, X.H., Nie, Y.K. (2018) Analysis on child dietary behavior problems and family factors. J. Mod. Med. Health, 34: 2466–2468.
[4] Shi, Z., Mo, B.Q. (2013) Study of the malnutrition status of pre-school children and related influence factors in Nanjing, 2012. Jiangsu J. Prev. Med., 24: 20–22.
[5] Liu, Y., Geng, Y.M., Zhu, Y.C. (2017) Chinese “Dietary Guideline for Residents” evolution and enlightenments. Sichuan Sports Sci., 36: 21-25.