Cross-Sectional Exploration on Feeding Practices of Feeders towards Preschoolers’ Picky Eating Behaviors

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Abstract

Background: Picky eating is quite common among preschoolers, which may lead to imbalanced diet. Picky eating behavior among preschoolers was found associated with feeding style. With the complex family structure of 2-career parents in Hong Kong and unique authoritarian Chinese feeding style, this study aimed to explore the differences in feeding practices among different preschoolers’ feeding persons and to investigate if preschoolers’ picky eating showed differences if they are fed by different feeding persons.

Methods: A cross-sectional survey was conducted in five Hong Kong kindergartens. Feeding persons of the preschoolers were asked to complete questionnaires with responses in different feeding styles and 2-day dietary records of the preschoolers. The dietary review was conducted to evaluate if the preschoolers were picky eaters if they missed any one of the five food groups or they did not consume sufficient amount of any food groups at their age. Descriptive statistics and chi-squared tests were analyzed to explore the chance of picky eating occurrence regarding the types of feeding persons and the feeding practices.

Results: 240 preschoolers aged 2 to 7 were recruited. 57.5% preschoolers were found picky eating. There was no significant difference in preschoolers’ picky eating behaviors among different types of feeding person. Significantly more picky eaters were found fed by carers with lower education levels.

Conclusion: Preschoolers fed by feeders with lower education may have limited skill and knowledge in food choices that preschoolers may have higher chance in developing picky eating problems.

Keywords: Picky eating, Feeding practice, Preschoolers, Feeding persons, Cross-sectional study

Introduction

Picky eating is a common feeding problem among preschoolers which may lead to poor diet and result on poor growth and development. Picky eating has a wide definition in literature. Some studies found that parents described their children ‘picky’ when the children consuming a limited quantity of food [1]. Picky in some extent could be referred to food neophobia when the children were unwilling to try unfamiliar food [2]. When the children are found to refuse the intake of some food groups [3], especially vegetables, picky eating, selective eating or choosy eating were frequently described in these eating problems. Picky eating sometimes is used when the children are described as having strong food preferences [4-5]. Literature found that the prevalence of picky eating among preschoolers varied from 8% to 54% in different population [1,2,6,7]. According to a local survey conducted in Hong Kong with 7,057 kindergartners aged 2 to 7, more than 40% of parents indicated that their children had picky eating [8]. About 56% of preschoolers consumed less than one serving of fruits each day and approximately 66% of them had less than a bowl of cooked vegetables each day [8]. It was found that only 12% of preschoolers consumed enough daily amounts of vegetables and fruits [8].

There are many factors causing picky eating among preschoolers and parents’ influential role is a crucial point. Some studies revealed that parental perception of children's weight status, attitude on how to feed their children, family dietary style and caring pressure would affect preschoolers’ picky eating behavior [9,10]. Preschoolers’ food preference was found associated with their parents’ food choices and feeding practices that could lead to less variety of food intake [11,12]. It was found that mother's eating habits and whether the mother viewed her children as a ‘picky eater’ had a great influence on the children's actual consumption of vegetables and fruits [13]. It was evident that preschoolers’ picky eating behavior was aggravated when their parents used unhealthy snacks, like sweets, chocolates and chips, as rewards to encourage parents’ desired good behavior [14,15]. In addition, high controlling practices, such as pressure to eat and food restriction, could have adverse effect on the preschoolers’ picky eating behavior [16]. Preschoolers were less likely to consume unfamiliar food when their parents forced them to try under pressure [17]. Theory of classical conditioning determines children have bad experience in feeding unfamiliar food; they are prone to refuse that food. In some cases, children were found less likely to be picky-eating and consumed more vegetables and fruits if their mothers consumed more vegetables and fruits [18]. Therefore, parental feeding styles were heavily studied to play a crucial role in children's eating behavior [19].

Chinese parenting style has been described as authoritarian that
the parents used to exert controlling power over their children. This type of parenting style involved varieties of daily concern, caring and feeding would be one of them [20]. In Hong Kong, 45.3% of families were the type of 2-career family. Most of preschoolers’ feeding person was their grandparents or domestic helpers, instead of their parent who needed to work for a long period of time every day. Survey resulted that 10.6% of preschoolers are fed by domestic helpers and 5.9% of them were fed by grandparents [15]. Since many studies focus on the relationship between maternal feeding and children’s picky eating, there are a limited number of studies investigating the roles of feeders and their feeding practice in preschoolers’ picky eating problems. However, the complex family structure in preschoolers’ caring responsibility and the unique parenting style in Hong Kong may affect the eating behavior, particularly picky eating among preschoolers. Therefore, this study aimed to explore the feeding practices among different feeders and to investigate if any significant differences in the occurrence of picky eating among preschoolers’ with different feeders.

Methodology

Design

This was a cross-sectional study using a self-administered questionnaire and a 2-days food diary completed by the feeding persons of the preschoolers.

Settings

The dietary records and feeding practice questionnaires were distributed and collected in five governments-subsidized kindergartens in Hong Kong.

Samples and Samplings

Preschoolers and their parents were recruited by convenience in five kindergartens in Hong Kong. Inclusion criteria were: the preschoolers aged 3 to 6 years and studying in kindergarten 1 to 3 were invited. In recent years, it has been common for children living in Mainland China to come study in Hong Kong. Taking consideration of the varied eating cultures and food choices, the preschoolers recruited must be a permanent resident living in Hong Kong. Exclusion criteria: the preschoolers of cross-boundary students were excluded to avoid different feeding practice affected by other cultures. Teachers in the kindergartens helped to distribute information sheets to the parents of the preschoolers.

Instrument

A questionnaire consisted of 3 parts and it was designed to collect demographic data and feeding practices of the feeders. First part included 12 questions about the demographic data of preschoolers and their feeders. Second part included 3 questions about feeding practices of feeding person. And the last part was a set of 2-day dietary record to assess the eating habits of preschoolers. Feeders were asked to record all the details of food items, corresponding portion size and condiments added to the food. The feeders were asked to record each food consumed by, not cooked for the preschoolers in 2 consecutive full days.

Procedure

This study was approved by the ethics review committee of the Hong Kong Institute of Education. After getting the ethical approval, information letters were distributed to eligible preschoolers and their parents, explaining the objective, procedures, method of the study. After returning the consent forms, each participant received the questionnaire with demographic data and a set of 2-day dietary record form from the kindergartens in January 2014. The demographic data could be completed by the parents or feeding person. The 2-day dietary record should be completed by the feeding person on the same day. Teachers of the kindergartens also helped to measure the body height and body weight of the preschoolers. Body height was measured in a standing scale and the unit was in centimeters (cm). Body weight was measured in a standing balance and the unit was in kilograms (kg).

Data analysis

For the dietary records, two independent researchers evaluated the records according to the Dietary Guidelines [21]. According to the Dietary Guidelines, children should consume all the food groups of carbohydrates, fruits, vegetables, protein and dairy products. Therefore, these five food groups were used as criteria to assess the 2 days dietary records. If there was any missing food group or the amount of consumption was found not sufficient for the age of preschoolers in the 2 days dietary records, the preschoolers would be classified as picky eaters. If all the five food groups were found and the corresponding amounts of consumption were sufficient for the age of preschoolers in the 2 days dietary records, the preschoolers would be classified as non-picky eaters. The results of the dietary review from the two independent researchers were compared to ensure results were in consistent.

All data collected were coded and analyzed using IBM SPSS version 21. Descriptive statistics were used to analyze the demographic data, such as age, height, and weight. Chi-square tests used to explore if the types of feeders (parents, grandparents and maids), their education level and their feeding practices showed significant differences in the occurrence of picky eating preschoolers.

Results

In total, 240 questionnaires were collected from the parents of the recruited preschoolers. Among the preschoolers, 55.4% were male (n = 133) and 44.6% were female (n = 107) (Table 1). Only 1.3% preschoolers (n = 3) had food avoidance due to religion. Only 0.8% preschoolers (n = 2) were vegetarians. The participants who had food avoidance due to religion and vegetarian diet were excluded in data analysis because their eating habits were affected by factors other than feeding practices. The mean age of male and female was 4.1 and 4.0 respectively (p > 0.05). The mean height of male was 104.3 cm with standard deviation of 10.25cm and the mean height of female was 101.3 cm and the standard deviation of 11.38 cm. The mean weight of male was 18.1 kg with standard deviation of 4.20 kg while the mean weight of female was 17.2 kg and the standard deviation was 4.45 kg.

Characteristics of feeding persons

In the questionnaire, there were 3 types of feeding person found: Parents, Grandparents, Maid/Others. Responses reported 146 parents (60.8%), 52 grandparents (21.7%) and 42 maids/others (17.5%) were the key responsible feeding persons of the preschoolers (Table 2). Among the feeding persons, most of them obtained secondary education (63.3%) and around one-fifth (22.1%) obtained tertiary education. Fewer than half of the feeding persons were born in Hong Kong and 14.2% of the responded feeding persons perceived themselves picky eaters (Table 2).

Responses found that around one third (36.7%) of the feeding persons do nothing in regards to children's picky eating problems. There were one-fourth (25.4%) of them try to replace another foods the amount that the preschooler had. If participants had any queries, the kindergartners could answer their questions. After finishing the questionnaires, preschoolers should return it to the kindergartners.

Table 1: Demographic characteristics of preschoolers.

|          | Male       | Female      |
|----------|------------|-------------|
| n (%)    | n (%)      |             |
| Sex      | 133 (55.4) | 107 (44.6)  |
| Mean (S.D.) | Mean (S.D.) |             |
| Age (year) | 4.1 (1.11)  | 4.0 (1.10)  |
| Height (cm) | 104.3 (10.25) | 101.3 (11.38) |
| Weight (kg) | 18.07 (4.20) | 17.22 (4.45) |
that those preschoolers who were not allowed to watch TV during meal time were picky eaters if they were allowed to watch TV during meals than watching during meal time. The results showed that more preschoolers showed negative association between picky eating in preschoolers and their TV-watching hours during meal time (Table 5). The difference was not significant (p > 0.05). If the preschoolers refused to eat, feeding persons were asked to respond their feeding practices in one of the seven choices, they were: 1) let their children not eat, 2) force their children to eat, 3) give their children alternative food choice, 4) give their children snacks as rewards, 5) take away the food provided, 6) allow their children to watch TV during meal time. We group the responses of feeding practice into 3 categories. For responses that feeding persons show encouragement in getting their preschoolers to eat, they were grouped as positive responses such as give their children alternative food choice, give their children snacks as rewards and allow their children to watch TV during meal time. For responses that feeding persons show no encouragement in getting their preschoolers to eat, they were grouped as neutral responses such as let their children not eat and take away the provided food. For responses that the feeding persons show threat to force their preschoolers to finish their food, they were grouped as negative responses such as let their children not eat or force their children to eat. With chi-squared analysis it was found no difference between the feeding practice types and picky eating problems (p > 0.05) (Table 5).

### Discussion

In this study, the prevalence of picky eater in preschoolers was 57.5%, which was deemed higher than the reported prevalence (up to 50%) in other countries [3,5,6]. This higher prevalence might be caused by the lack of agreement on the definition in studies and different cultural acceptance of picky eating worldwide [22].

In the current study, it was significant that preschoolers’ picky eating problems were shown significantly different with feeding persons’ educational level. Picky eating was of higher chance to be occurred in the group of preschoolers who were fed by feeding persons with secondary and primary education. This could be because the feeding persons with tertiary education had better concepts in healthy eating and they may pay more attention in food choices to make sure their children obtain sufficient nutrition for growth and development. For those feeding persons having primary education and secondary education, they may not have sufficient knowledge and skills in choosing nourished diet for their children, particularly to those preschoolers who were cared by maids or nannies. Studies indicated lower education level was associated with food quality and this resulted less knowledge in healthy food choices [23]. Misconceptions of preschoolers’ nutrition requirements and improper snacks categorization [24-27] were also found possible reasons in poor food choices for the children. A local survey revealed that 73% to 88% students had foods high in sugar, salt and fats, but 71% of parents believed their sons/daughters’ eating habits were “healthy” [15].

### Picky eating assessed by 2-days food diary

After assessing the food diary of preschoolers’ 2-days food intake, 53.4% (n = 71) male and 62.6% (n = 67) female preschoolers were classified as picky eaters. Girls were in higher percentage in picky eating compared with boys, although the difference was not significant (p > 0.05) (Table 4). Although there was no statistical association between picky eating in preschoolers and their TV-watching during meal time, the results showed that more preschoolers were picky eaters if they were allowed to watch TV during meals than those preschoolers who were not allowed to watch TV during meal time (p > 0.05).

Chi-squared test found that there was no significant difference between preschoolers’ picky eating and the types of feeding persons (p > 0.05). However, the picky eating preschoolers were found significantly higher in the group of preschoolers with feeding persons having secondary education (p < 0.05). If the preschoolers refused to eat, feeding persons were asked to respond their feeding practices in one of the seven choices, they were: 1) let their children not eat, 2) force their children to eat, 3) give their children alternative food choice, 4) give their children snacks as rewards, 5) take away the food provided, 6) allow their children to watch TV during meal time. We group the responses of feeding practice into 3 categories. For responses that feeding persons show encouragement in getting their preschoolers to eat, they were grouped as positive responses such as give their children alternative food choice, give their children snacks as rewards, and allow their children to watch TV during meal time. For responses that feeding persons show no encouragement in getting their preschoolers to eat, they were grouped as neutral responses such as let their children not eat and take away the provided food. For responses that the feeding persons show threat to force their preschoolers to finish their food, they were grouped as negative responses such as let their children not eat or force their children to eat. With chi-squared analysis it was found no difference between the feeding practice types and picky eating problems (p > 0.05) (Table 5).

### Table 3: Characteristics of the feeding persons of preschoolers.

| Types of feeding persons | n (%) |
|--------------------------|-------|
| Parents                  | 146 (60.8) |
| Grandparents             | 52 (21.7)  |
| Maids/others             | 42 (17.5)  |
| Highest education obtained | n (%) |
| Primary education        | 35 (14.6)  |
| Secondary education      | 152 (63.3) |
| Tertiary education       | 53 (22.1)  |
| Self-perceived picky eaters | 34 (14.2)  |
| Food avoidance due to religions | 15 (6.3)  |
| Born in Hong Kong         | 106 (44.2) |

### Table 4: Results of Chi-squared tests.

| Picky eaters (assessed by dietary records) | Feeding persons |
|-------------------------------------------|-----------------|
| Yes n (%)                                  | No n (%)        |
| Preschoolers’ sex                          |                 |
| Male                                      | 71 (29.6)       |
| Female                                    | 67 (27.9)       |
| Feeding persons                           |                 |
| Parents                                   | 79 (32.9)       |
| Grandparents                              | 32 (13.3)       |
| Maids/Others                              | 27 (11.3)       |
| Feeding person’s education level           |                 |
| Primary education                         | 22 (9.2)        |
| Secondary education                       | 94 (39.2)       |
| Tertiary education                        | 22 (9.2)        |
| Feeding practices to picky eating         |                 |
| Positive                                  | 68 (28.3)       |
| Neutral                                   | 40 (16.7)       |
| Negative                                  | 30 (12.5)       |
| Allow preschoolers watching TV during meals |             |
| Yes                                       | 77 (31.3)       |
| No                                        | 61 (48.3)       |

### Table 5: Comparisons of types of feeding persons and the feeding practices.

| Allow watching TV during meal times | n (%) |
|-----------------------------------|-------|
| Yes                               | 75 (31.3) |
| No                                | 71 (29.6) |

Discussion

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Nevertheless, results in this study showed higher chance of...
picky eating among preschoolers who used to watch TV during meal time. This postulated the prolonged eating time would probably affect the taste of the food which made the preschoolers less interest to eat the provided food. This would be worth to be explored in future studies.

Limitation

The convenience sampling could lead to sampling bias. The proportions of different types of feeding persons were not evenly distributed. The recruited number of maids was much less than parents and this could be due to the demographic characteristics of the recruited population. Recruited families were mainly from low household-income family, which might not have financial abilities to afford employing maids to take care of the children. However, maids were usually the key caretakers among those families with higher household income.

Conclusion

Preschoolers fed by feeders with lower education may have limited skill and knowledge in food choices that preschooers may have higher chance in developing picky eating problems.

References

1. Wright CM, Parkinson KN, Shipton D, Drewett RF (2007) How do toddler eating problems relate to their eating behavior, food preferences, and growth? Pediatrics 120: e1069-1075.
2. Dovey TM, Staples PA, Gibson EL, Halford JC (2008) Food neophobia and ‘picky/fussy’ eating in children: a review. Appetite 50: 181-193.
3. Jacob C, Schmitz G, Agras WS (2008) Is picky eating an eating disorder? Int J Eat Disord 41: 626-634.
4. Leung S, Leung C, Luk WY (2012) A survey of infant and young child feeding in Hong Kong: parental perceptions and practices. Family Health Service, The Department of Health, Hong Kong SAR Government.
5. Mascola AJ, Bryson SW, Agras WS (2010) Picky eating during childhood: a longitudinal study to age 11 years. Eat Behav 11: 253-257.
6. Carruth BR, Ziegler PJ, Gordon A, Barr SI (2004) Prevalence of picky eaters among infants and toddlers and their caregivers' decisions about offering a new food. J Am Diet Assoc 104: s57-64.
7. Goh DY, Jacob A (2012) Perception of picky eating among children in Singapore and its impact on caregivers: a questionnaire survey. Asia Pac Fam Med 11: 5.
8. Lee A (2006) Health survey, Hong Kong, The Chinese University of Hong Kong, The Centre for Health Education and Health Promotion.
9. Pai HL, Contenko I (2014) Parental perceptions, feeding practices, feeding styles, and level of acculturation of Chinese Americans in relation to their school-age child’s weight status. Appetite 80: 174-182.
10. Braden A, Rhee K, Peterson CB, Rydell SA, Zucker N, et al. (2014) Associations between child emotional eating and general parenting style, feeding practices, and parent psychopathology. Appetite 80: 35-40.
11. Powell FC, Farrow CV, Meyer C (2011) Food avoidance in children. The influence of maternal feeding practices and behaviours. Appetite 57: 683-692.
12. Russell CG, Worsley A (2013) Why don’t they like that? And can I do anything about it? The nature and correlates of parents’ attributions and self-efficacy beliefs about preschool children’s food preferences. Appetite 66: 34-43.
13. Horodyski MA, Manfred S, Holly BH, Xie Y, Weatherspoon L (2010) Populations at Risk Across the Lifespan: Case Studies: Low-Income African American and Non-Hispanic White Mothers’ Self-Efficacy, ‘Picky Eater’ Perception, and Toddler Fruit and Vegetable Consumption. Public Health Nursing 27: 408-417.
14. Brown R, Ogden J (2004) Children’s eating attitudes and behaviour: a study of the modelling and control theories of parental influence. Health Educ Res 19: 261-271.
15. Centre for Health Protection (2009) Assessment of Dietary Pattern in Primary Schools 2008: Part 1 - Questionnaire Survey of Students, Parents and Schools. Department of Health - Central Health Education Unit.
16. Birch LL, Davison KK (2001) Family environmental factors influencing the developing behavioral controls of food intake and childhood overweight. Pediatr Clin North Am 48: 893-907.
17. Finistrella V, Manco M, Ferrara A, Rustico C, Presaghi F, et al. (2012) Cross-sectional exploration of maternal reports of food neophobia and pickiness in preschooler-mother dyads. J Am Coll Nutr 31: 152-159.
18. Galloway AT, Fiorito L, Lee Y, Birch LL (2005) Parental pressure, dietary patterns, and weight status among girls who are “picky eaters”. J Am Diet Assoc 105: 541-548.
19. Brann LS, Skinner JD (2005) More controlling child-feeding practices are found among parents of boys with an average body mass index compared with parents of boys with a high body mass index. J Am Diet Assoc 105: 1411-1416.
20. Chao RK (1994) Beyond parental control and authoritarian parenting style: understanding Chinese parenting through the cultural notion of training. Child Dev 65: 1111-1119.
21. Office of Disease Prevention and Health Promotion (2015) Dietary Guidelines for Americans.
22. Blissett J, Bennett C (2013) Cultural differences in parental feeding practices and children’s eating behaviours and their relationships with child BMI: a comparison of Black Afro-Caribbean, White British and White German samples. Eur J Clin Nutr 67: 180-184.
23. Hiza HA, Casavale KO, Guenther PM, Davis CA (2013) Diet quality of Americans differs by age, sex, race/ethnicity, income, and education level. J Acad Nutr Diet 113: 297-306.
24. Olivera-Ezzell N, Power TG, Cousins JH (1990) Maternal Socialization of Children’s Eating Habits: Strategies Used by Obese Mexican-American Mothers. Child Dev 61: 395-400.
25. Adamo KB, Papadakis S, Doijii L, Turnau M, Simmons L, et al. (2010) Using path analysis to understand parents’ perceptions of their children’s weight, physical activity and eating habits in the Champlain region of Ontario. Paediatr Child Health 15: e33-41.
26. Lindberg L, Ostberg M, Isacson IM, Dannaeus M (2006) Feeding disorders related to nutrition. Acta Paediatr 95: 425-429.
27. Rydell AM, Dahl M, Sundelin C (1995) Characteristics of school children who are choosy eaters. J Genet Psychol 156: 217-229.