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# PARENTS' PERCEIVED CHALLENGES AND BEST PRACTICES IN ENCOUNTERING FOOD NEOPHOBIA AMONG PRESCHOOL CHILDREN

***Nurul Ain Saipudin, Nornazira Suhairom, Nur Husna Abd. Wahid***

**ABSTRACT**

**Introduction:** Three objectives of this study were (1) to determine the prevalence of FN; (2) to determine the parents' perceived challenges in having food neophobic children (FN); and (3) to determine the parents' perceived best practices for food neophilic children (FA). **Methods:** This study adopted a mixed-method approach with a survey questionnaire among 126 parents of 4 to 6 years-old children; and purposive phone interviews to the 6 selected participants. The questionnaire consists of two sections, quantitative and qualitative which are comprised of demographic information, children's height and weight, Food Neophobia Scales (FNS), and an open-ended questionnaire on parents' challenges and best practices in FN. **Results:** The quantitative results reported prevalence of FN was 38.1% in which higher in 5 years, girls and normal-weight children. Qualitative analysis of open-ended questionnaire and interviews outlined three major challenges in FN and three major best practices in FA. Among the reported challenges of FN parents were related to problematic feeding behavior and preferences (37.3%); negative beliefs and perception about new foods (34.5%); and lack of practical skills, ideas and meal strategies (28.2%). Food skills activities with children (38.4%), role modelling (15.8%), and creativity in food design (13.5%) were the best practices reported by FA parents. **Conclusion:** These results suggest parents require greater knowledge and skills on how to improve children's eating behaviors. Feeding interventions such as food skills education should focus on providing parents, teachers and health practitioners with practical, emotional, and informational feeding supports to manage FN.

**Keywords:** Food neophobia; Food neophilic, Preschool children; Parental influence; Food skills education
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## Introduction

Due to the rapid physical, psychological, and social development that occurs throughout the preschool years, it is crucial to instil appropriate eating habits. Appropriate nutritional behaviour ensures that a nutritious diet is consumed, which is necessary for the development of a healthy child and a preventative measure against malnutrition and several non-communicable diseases such as cardiovascular disease, diabetes mellitus, and hypertension [1,2]. Research results indicate that the diets of preschool children in Malaysia do not adhere to nutritional recommendations [1,2]. Sugar, fat, and refined carbohydrates are abundant in many children's diets, which may contribute to childhood overweight and obesity [3-5].

Based on the national nutrition survey among children aged 1 to 10 years, results of the food recall, and two days of food records, children had insufficient daily intakes of calcium (548 mg) and dietary fibre (7.4 g), while the percentage of energy from total fat and saturated fats exceeded 30%, and sodium intakes were also relatively high (1,684 mg) [2]. Malaysian preschoolers, particularly those from

*Department of Technical and Engineering Education, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia (UTM), Skudai, 81310 Johor Bahru, Johor, Malaysia*

**Corresponding Author:**
Nurul Ain Saipudin, Department of Technical and Engineering Education, School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia (UTM), Skudai, 81310 Johor Bahru, Johor, Malaysia
**Tel:** +607-5534393 **Email:** nurulain.s@graduate.utm.my

 

low-income families, had the lowest average intake of fruits (M=0.07 serving/day), meat and poultry (M=0.78 serving/day), and milk and dairy products (M=1.14 serving/day) in a day [2]. Several studies have also found that Malaysian preschool children consume insufficient amounts of vegetables and fruits [3-6]. The lack of fruit and vegetable consumption may lead to a decrease in antioxidants and vitamins obtained in the body. As a consequence, the risk of diet-related diseases and malnutrition (stunting, wasting, underweight and overweight) is increasing [7]. Thus, it is important to identify factors that may have an impact on children's dietary choices. While gender, age, and family socioeconomic status are the most important factors in children's food choices, food neophobia has also been identified as an important factor in shaping children's food preferences and food intakes [8].

Food neophobia is one of the feeding disorders that is related to being afraid of and rejecting eating novel or unfamiliar foods, especially the healthier ones, namely fruit, vegetables and meat [9,10]. Food neophobia is not a permanent food disorder, because the acceptance of eating the new food can be fostered through repeated food exposure and modelling of the rejected food's consumption [9,10]. However, many other factors may contribute to the occurrence of food neophobia in children. These include the genetic and environmental factors that are associated with the children's personality traits (particularly fear and shyness) [8]. Also, children learn quickly from their parents' attitudes regarding eating habits and feeding styles [8,11]. Food neophobia is a common occurrence in childhood and is mostly mild during childhood. Nevertheless, food neophobia peaches a peak at crucial preschool age - between the ages of two and six years [8,11]. Children who have food neophobia (food neophobic) have a lower BMI and consume fewer vegetables and fruits than children who do not have food neophobia (food neophilic), but they consume the same amount of starchy and sweet products [8,11,12].

In Malaysia, the issue of food neophobia in preschool children has not been studied solely and comprehensively. To the best of our knowledge, there have been only two studies done in Malaysia that focus on food neophobia among primary school-aged children [9,10]. These obsolete studies need to be improvised and extended to the preschool level, with parents' perceived challenges and best practices to address food neophobia among their children aged 4 to 6 years. Thus, this study has three objectives to be achieved:
(1) to determine the prevalence of FN in preschool children from Johor, Malaysia;
(2) to determine the parents' perceived challenges in having food neophobic children (FN)
(3) to determine the parents' perceived best practices for food neophilic children (FA).

## Methods

### Participants

This survey was a quantitative study design conducted among volunteered parents of children aged 4 to 6 years who had registered in public early childhood education institutions under *Jabatan Perpaduan Negara dan Integrasi Nasional (JPNIN), Kementerian Perpaduan Negara Malaysia - Tabika Perpaduan* around Johor, Malaysia, specifically in the urban area of Johor Bahru. The volunteered participants were mainly the parents who had joined the WhatsApp group of *Tabika Perpaduan* Johor Bahru, where the online survey was channelled. *Tabika Perpaduan* was purposely selected because it was one of the leading public preschools in Malaysia that strictly practices the standard curriculum of the National Preschool Curriculum or *Kurikulum Bersepadu Prasekolah Kebangsaan (KSPK)* by the Malaysia Ministry of Education. This institution is also well-known for its sternly following the standard guidelines for menu planning, food preparation, and food serving as advised by the Nutrition Division of the Ministry of Health. Ethics approval for data collection was obtained from Universiti Teknologi Malaysia [UTM.J.53.05.02/13.11/1/4Jld23(67)] and JPNIN, Johor [JPNINJ600-8Jld13(28)].

To control the characteristics of the participants and the reliability of the findings, the selected children were among the healthy children with no chronic disease or surgical disorder; they were not medically ill at the time of screening, such as with severe infection, dengue, or tuberculosis; they were not physically disabled, including amputation in any parts of the body; and they were not deaf or unable to speak, which suspected to affect the child's growth, food intake, and nutrition.

### Data Collection

This study adopted a mixed-method approach with a survey questionnaire and purposive phone interviews to the selected participants. Researchers

 

used a mixed methods approach because it can give more reliable results than using either quantitative or qualitative methods alone [13].

Figure 1 shows the brief flowchart of the study. Out of 197 participants who were invited and screened, only 127 participants agreed and were eligible to participate in the study. Others were excluded for a few of reasons: no response (n=24), not interested (n=32), health problems such as allergies (n=5), and asthma (n=10).

For the first phase (quantitative phase), an online administered questionnaire was given to the retained participants (n=126). The questionnaire consists of two sections, quantitative and qualitative. For the quantitative section, data comprised of demographic status, a parent's report of the children's height and weight, and the prevalence of children's FN through validated Food Neophobia Scales (FNS). For the qualitative section, data comprised of an open-ended questionnaire related to parents' challenges and best practices in FN was collected.

For the second phase (qualitative phase), six participants were then selected to be interviewed. Through a purposive sampling technique, six participants were selected based on their FN scores and responses in the open-ended questionnaire. Three selected participants with high FN scores indicated as "food neophobia" (FN01, FN02, FN03) and low FN scores indicated as "food neophilic" (FA01, FA02, and FA03), were interviewed respectively. The aims of these interviews were to further explore their previous responses and understand the parents' perceived challenges and best practices as found in the open-ended feedback in Phase 1.

**Data Analysis**

The quantitative data was analysed using IBM SPSS Statistics version 20.0 (Armonk, NY: IBM Corp). According to their children's type of FN, parents were categorised into three categories: Food Neophobic (FN), Average and Food Neophilic (FA) group. The prevalence of FN in each group was calculated and statistical differences between the FN group and gender, age, and weight status were tested using a chi-square test ($\chi 2$) procedure. The significance level was set at $p<0.05$. Weight and height data were transformed into weight- for-height z-scores (WHZ) and then categorized into underweight, normal, and overweight according to the World Health Organization (WHO) child growth standards (2015). Children with a WHZ of less than −2SD were considered to be underweight, those with a WHZ between −2SD and 2SD were classified as normal, and those with a WHZ of more than 2 were categorized as overweight.

The qualitative responses from the interviews were categorized and analysed using thematic analysis. To further support the reported challenges and best practices of FN from parents' perspectives in the open-ended questions, there were three stages of analysis [17, 18]. Firstly, all the textual units on parents' names were coded (FA01, FA02, FA03, FN01, FN02, FN03). Secondly, the codes were reviewed, and thematic categories were formed. Finally, the thematic categories were grouped into broader themes and sub-themes before being merged and compared with the results of open-ended questionnaires in Phase 1 [18].

**Results**

As illustrated in Table 1, there were more girls (n = 76; 60.3 %), children aged 5 years (n = 60; 47.6 %) and normal weight children (n = 62; 49.2 %) who participated in the study. Generally, about 58.7 % of parents considered their children had an average food neophobic, followed by food neophobic (38.1 %) and 3.2 % were food neophilic (willingly to try new foods). The total mean score of the FN scale was 24.22 ± 4.54 (Table 1).

Table 2 shows the comparison of age, gender and weight status among neophobic, average, and neophilic children. The percentage of food neophobic children was higher in girls (n = 26; 54.2 %), children aged 5 years (n = 24; 50.0 %) and normal weight (n = 23; 47.9 %) children. None of the examined variables (age, gender, and weight status) were significant among the study groups ($p>0.05$).

 

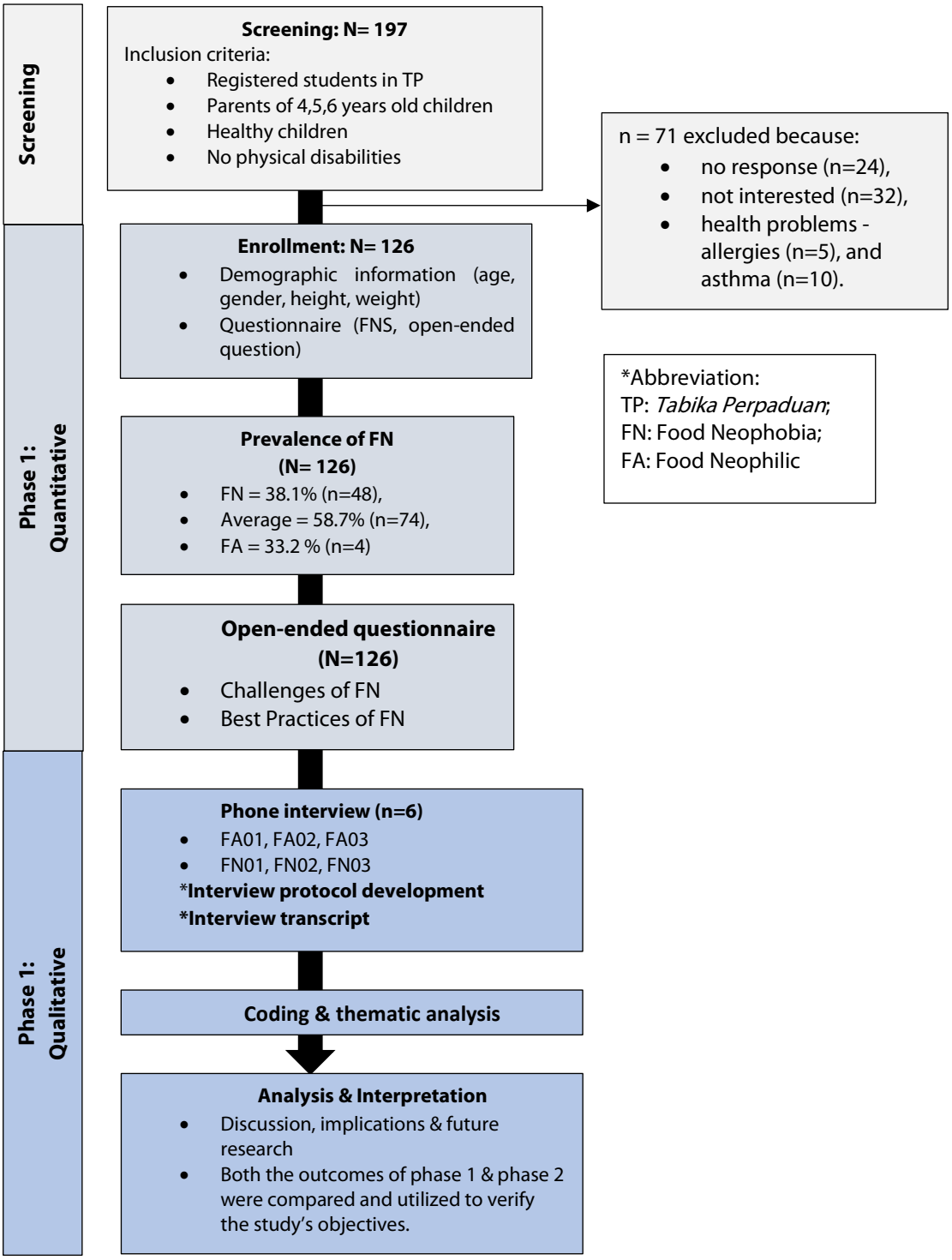


Figure 1. Brief Study Protocol Flowchart

Table 1. Demographic and socioeconomic characteristics of the study sample

| Variable | M | SD | Range | n | % |
|---|---|---|---|---|---|
| **Age group** | | | | | |
| 4 years | | | | 21 | 16.7 |
| 5 years | | | | 60 | 47.6 |
| 6 years | | | | 45 | 35.7 |
| **Gender** | | | | | |
| Boy | | | | 50 | 39.7 |
| Girl | | | | 76 | 60.3 |
| **Food Neophobia Scores*** | 24.22 | 4.635 | 12-40 | | |
| **Food Neophobia Scale*** | | | 8.0 – 40.0 | | |
| Neophobic | | | 25-40 | 48 | 38.1 |
| Average | | | 18-24 | 74 | 58.7 |
| Neophillic | | | 0-17 | 4 | 3.2 |
| **Weight Status** | | | | | |
| Underweight | | | | 37 | 29.4 |
| Normal | | | | 62 | 49.2 |
| Overweight | | | | 27 | 21.4 |

*Reference: Zalilah et al. (2005) & Laureati et al. (2015)

Table 2. Classification for food neophobia

| Characteristics | N (%) | | | |
|---|---|---|---|---|
| | Neophobic (n= 48) | Average (n= 74) | Neophilic (n= 4) | p-value* |
| **Age group** | | | | |
| 4 years | 7 (14.6) | 12 (16.2) | 2 (50.0) | 0.351 |
| 5 years | 24 (50.0) | 34 (45.9) | 2 (50.0) | |
| 6 years | 17 (35.4) | 28 (37.8) | 0 (0.0) | |
| **Gender** | | | | |
| Boy | 22 (45.8) | 27 (36.5) | 1 (25.0) | 0.488 |
| Girl | 26 (54.2) | 47 (63.5) | 3 (75.0) | |
| **Weight status**† | | | | |
| Underweight | 14 (29.2) | 22 (29.7) | 1 (25.0) | 0.996 |
| Normal | 23 (47.9) | 37 (50.0) | 2 (50.0) | |
| Overweight | 11 (22.9) | 15 (20.3) | 1 (25.0) | |

*p-value <0.05 showed a statistically significant difference

† WHO Growth Reference (2007)

The parents' answers to the two open-ended questions produced a few themes (Table 3). The most frequent answers associated with challenges were "problematic feeding behaviour and preferences" (37.3%), followed by "negative beliefs and perception about new food" (34.5%), and "lack of practical skills, ideas, and meal strategies" (28.2%). To further understand and support the response, parents' interviewed statements are also presented in Table 3.

The most frequent answers related to best practices were "food skills activities with children" (38.4%); followed by "role modelling" (15.8%); and "creativity in food design" (13.5%). About 38.4% of the parents indicated that they enjoyed conducting activities such as selecting, shopping, preparing, cooking, and serving foods together with their children in the house. For those parents who responded to role modelling, the practices they adopted involved displaying healthy eating, conducting food and table manners assessment and repeated exposure to the new foods (Table 3). Some of the comments are listed in Table 3.

 

Table 3. Responses from open-ended questionnaires and phone interviews

| Response | n | % |
|---|---|---|
| **RQ1- What are parents' challenges in introducing new foods to children?** | | |
| **Theme 1: Problematic feeding behavior and preferences** | 53 | 37.3 |
| *"She doesn't eat any meat, she'll prefer her favourite meal - eggs with soy ketchup all day if I let her all day …Because she kind of doesn't eat anything."* (FN01) | | |
| *"If it is chocolate and doughnuts. She definitely tries that kind of food group"* (FN01) | | |
| *"My son only eats chicken rice. Every day is chicken and rice. Not interested in other meals. Yes, it was easy for me! But it is worrying"* (FN02) | | |
| *"The most difficult thing to accept is vegetables. Especially green vegetables. What else can I do to introduce her new vegetable?"* (FN03) | | |
| **Theme 2: Negative beliefs and perception about new foods** | 49 | 34.5 |
| *"She's way too picky, all new foods feel nasty to her. She doesn't want to eat that"* (FN01). | | |
| *"Whenever I introduce certain foods and she's like, "No, no, no, no." She'll take one look at it and be like "no" (sigh)* (FN01). | | |
| *"My son wasn't even up for trying a bite. He was just like, "I don't like it. I never tasted it, and it was totally weird"* (FN02). | | |
| *"No black coloured dishes please. My daughter is so against with them. What looks weird to her. She won't try it."* (FN03) | | |
| **Theme 3: Lack of practical skills, ideas and meal strategies** | 40 | 28.2 |
| *"I've got no more ideas about this. Please help! (sigh)…"* (FN01) | | |
| *"Deeply inside, I felt like a loser mom. I was disappointed and gave up. He didn't want to listen to me."* (FN02) | | |
| *"He enjoys eating while at school. Maybe he has his peers and teachers around. In home, it is so difficult to convince him to eat something new or healthy (sigh).."* (FN02) | | |
| *"She requested me to cook exactly like what had been cooked in her preschool. I was puzzled because the foods turned out to be different. She refused to taste.(laugh)* (FN03) | | |
| **RQ2- What are parents' best practices in introducing new food to children?** | | |
| **Theme 1: Food skills activities with children** | 51 | 38.4 |
| *"She will be so excited when I let her wash and prepare ingredients to cook or bake. She will ask me many things. She will wait it cooked patiently too"* (FA01) | | |
| *"Choose and buy fruits together. Every day my son enjoys eating fruits that he chose from"* (FA02) | | |
| " *Yes! He will definitely try the food that he also helps cook in the kitchen. Maybe he learned to appreciate the effort of cooking". (*FA02) | | |
| **Theme 2: Role modelling** | 21 | 15.8 |
| *"My husband and I always practice eating healthy food. We also practice "no white sugar" and "no junk foods" as it's not good for your brain"…"* (FA03) | | |
| *"I teach my children to appreciate (food). Even though it was new thing to them. I would ask them to open-up and value the food".* (FA03) | | |
| *"Eat in front of him. Show him the way"* (FA02) | | |
| **Theme 3: Creativity in food design** | 18 | 13.5 |
| *"..sometimes I blend all the vegetables and make it like sambal (laugh)"* (FA03) | | |
| **Theme 4: Parents' feeding styles** | 15 | 11.3 |
| *"I will feed him if he really refuses to eat..."* (FA02) | | |
| *"I usually force my son to try. Because you should not judge the food before trying it first…!" (FA02)* | | |
| *"My children enjoy competition and rewards. I use that approach to make them eat their vegetables..."* (FA03) | | |
| **Theme 5: Gardening** | 15 | 11.3 |

| | | |
|---|---|---|
| *"Indeed, since planting my own Brazilian spinach, cucumber and bitter gourd, my family's vegetable intake has increased…"* (FA02) | | |
| **Theme 6: Recurring stories about nutrition values** | 13 | 9.8 |
| *"I taught my children by saying that eating vegetables would make them prettier and smarter. Hypnosis scripts are a must with children..."* (FA03) | | |

## Discussion

This study aimed to determine the FN challenges and best practices perceived by the parents of preschool children in selected *Tabika Perpaduan Negeri Johor*. The range of FNS as reported by parents ranged between 8.0 to 40.0, while the prevalence of FN was 38.1% and food neophilic was 3.2%. This rate is comparable to previous study of FN in Malaysia among 8 to 9-years-old girls in primary school [9]. The previously reported FN prevalence was 32.7%, and food neophilic was 11%. Another local study among 332 of 7 to 9 years old children in primary school was a bit lower at 18.4% [10]. Meanwhile, FN prevalence rates in other countries, including Poland, India, the United States, Japan, and Spain [19-23], varied widely, possibly due to differences in age groups, instruments, cut-off points, and samples used in the studies [24] (Figure 2). According to Torres et al., the prevalence of food neophobia in children ranges from 12.8 to 100%, with the prevalence being particularly high in 5-year-olds, girls, and underweight children [25].

As reported by the parents, among the biggest challenges of FN is the children's problematic feeding behaviour and preferences (37.3%). These included extreme food favours (monotony); a high preference for sweetened and savoury foods; high dependency on milk; and difficulties eating vegetables (especially leafy vegetables) and dishes such as meat and seafood. FN parents expressed their worries, particularly over their children's limited food selection. Children with FN were more likely to consume fewer vegetables and whole grains, but more calories and low-nutrient foods like fast food, junk food, and highly sweetened cereals and beverages [5]. The trend of food monotony and obsessive food restriction among FN children, who obviously lack diet diversity and a higher fat intake, may also increase susceptibility to many chronic diseases and health complications [8, 21]. Further investigation into the relationship between FN and the actual intake of foods is required to observe the trends and differences between the findings. However, this relationship was still controversial when Li et al. found that parents' indications towards their food neophobic children's intakes were inconsistent with the actual intake. This is especially seen in the mean intake of meat, which was

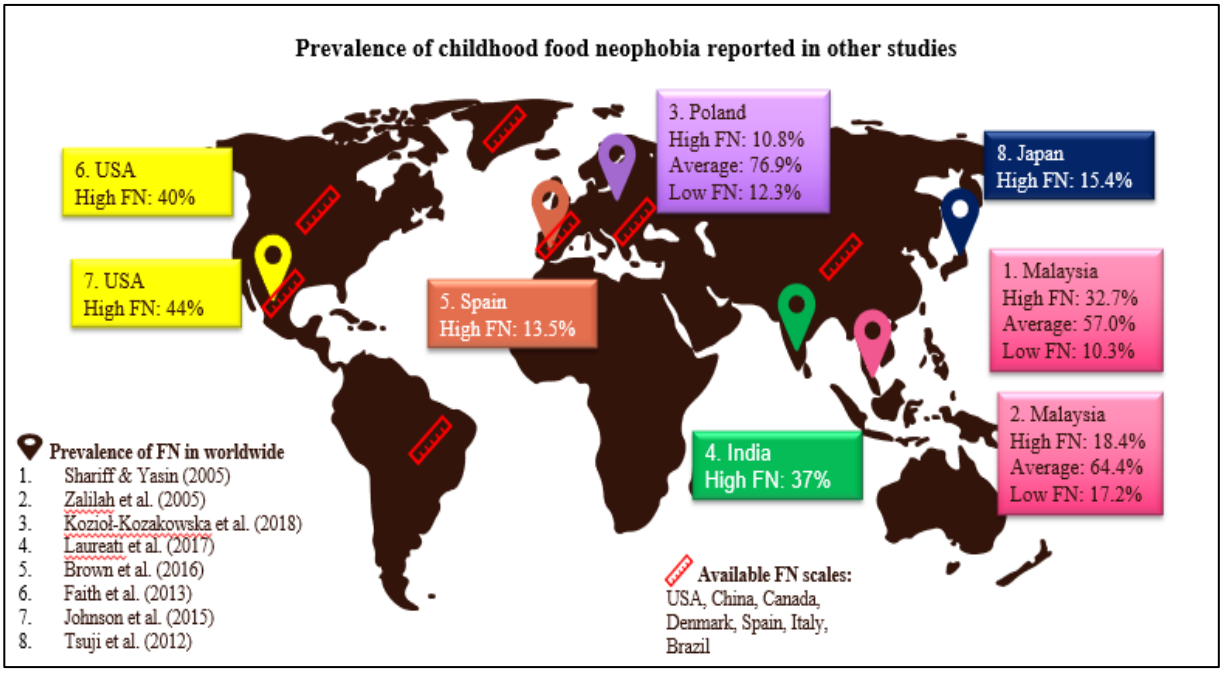


Figure 2. Prevalence and Available Scales of Childhood Food Neophobia Reported in Other Studies

significantly greater in children whose parents indicated they avoided this particular food group [26].

About 34.2% of parents related the challenge of FN to their children's negative beliefs and perceptions. This includes a lack of interest in trying; anxiety; feelings of disgust, nastiness, and weirdness towards the texture and colour of the food. This supports findings from systematic review and qualitative studies that associated FN to the excessive sensitivity towards the sensory aspect of the food (e.g., texture, colour, shape, and smell of food), in which this sensitivity still considered as normal if at the early phase of infancy [8]. However, if FN was left unidentified and untreated at earlier age, FN may last until adulthood and may result in a new diagnosis known as Avoidant Restrictive Food Intake Disorder, which is also known as "Selective Eating Disorder", which is one of the risk factors for Anorexia Nervosa (AN) [27, 28].

Other than that, a few parents expressed their challenges regarding lack of time in preparing a meal and lack of practical skills, ideas, and meal strategies to encourage their children to eat. Changes in employment patterns and family structure reduce the amount of time parents, particularly mothers, can devote to meal preparation [29]. This subsequently increases the trend of ordering food online among parents and subsequently limits the parents' food preparation skills to cooking the home meal for their children [29]. This trend may unintentionally contribute to the rising prevalence of many diet-related diseases, as well as disrupt children's nutritional status and well-being development [28, 29].

Some of the parents, especially working parents, complained about being emotionally disturbed when the children rejected the food they prepared, even without tasting it. The disappointment feeling was more likely to happen when children's responses did not reflect the parents' expectations on how children should eat and the parents' struggles to keep their children fed with a healthy diet. Perhaps, this is the turning point where parents highlight the effective role of teachers in successfully making some of their children eat while in preschool. When children enter school, their parents' influence is said to be diminished, and instead, their eating habits are influenced by teachers, peers, and the media [4,5]. As in Social Cognitive Theory, teachers and peers (especially same-gender peers) can serve as the most effective agents in promoting food acceptance during preschool lunch [30].

About 38.4% of the parents agreed that by doing food skills activities together with their children (i.e. selecting, shopping, preparing, cooking, and serving foods), the children's interest in trying foods could be enhanced. Food skills, which could be defined as a repertoire of life skills that include activities such as meal planning, shopping, budgeting, cooking, and label reading were significantly related to higher intake of dietary fibers and calcium [31]. Similarly, according to DeCosta et al., by conducting the hands-on activities and experiential learning strategies that were related to sensory and cooking activities, there was an increment in vegetable and fruit acceptance and consumption among the FN children, rather than by using a nutrition education approach solely [32]. Dudley's review also suggested another successful strategy by utilizing cross-curricular approaches and contingent reinforcement in order to develop fruit and vegetable acceptance among children [33], but unfortunately, there are still few nutrition education interventions that include these elements [34].

The benefits of the experiential learning approach that had been used by most of the parents with FA children, not only included the element of meaningfulness through the food skills activities they do, but also the added value of nutritional and health benefits for the children's health. Furthermore, many studies have shown that hands-on learning activities in early childhood education are a healthier, greener, and more sustainable approach to both education and physical wellness [3,32,35]. Even though FN is known to peak between the ages of 2 and 5, children in this age range are essentially more amenable to developing their new food preferences [12]. Thus, by incorporating experiential learning strategies in a positive and supportive environment, children would have more chances to experience the new taste, potentially leading to fewer FN behaviours [35].

The second-best practices rated by the parents were positive role modelling and responsive feeding styles towards their children (15.8%). This included practices like eating together; displaying healthy eating; good manners while at the dinner table; repeated exposure; and encouragement. Role modelling was found to have a greater impact on

 

children's diet quality compared to parental dietary intake itself. Parents who demonstrated healthy eating habits and food choices were positively associated with children who scored higher on the Healthy Eating Index (HEI) [36]. In Vaughn's study too, most parents agreed that by increasing the exposure of the disliked food, their children would slowly but surely accept the food [36]. Several authors have also suggested the repeated tasting opportunities of disliked foods as many as 15 times among picky children as a regular part of their diet [21, 23]. The repeated exposure strategy has been shown to improve both consumption and liking of novel and disliked foods, including vegetables and fruits [23, 37, 38]. Besides, the present study also indicated that creativity in food design was important to attract children to try new foods. This could be proven by a few statements from FA parents who used various interactive methods to prepare and present novel foods for their children. This is congruent with the Malaysian Dietary Guidelines (MDG) recommendation to provide a wide variety of fruits and vegetables of various colours and textures, whole grains, low-fat dairy products, and limit energy-dense and nutrient-poor foods and beverages in children's meals [39].

The study had a few limitations that could affect the study outcomes or generalizability of the findings. First, there is no diversity in ethnicity involved because the majority of the participants in the selected *Tabika Perpaduan* Johor were Malay. Secondly, the weight status was also based on parents' reports, and this may have led to a few underreports. Thirdly, an assessment using the food neophobia scale may not have been the most sensitive measure of food neophobia either. In the future, the child's usual dietary intake data may be required to calculate the effects of food neophobia behaviour on the child's energy and nutrient intakes. Finally, since the subjects of the study were recruited from Johor Bahru, the major city in Johor. Therefore, the results should judiciously reflect the challenges and best practices of parents in urban Malaysia but may not be generalizable to the whole of Malaysia.

## Conclusion

Based on the aim and objectives of this study, the key finding indicated that the perceived challenges and best practises from the overall 126 participants in Phase 1 were matched with those identified from the interviews with selected parents of food neophobic (FN) and food neophilic (FA) children in Phase 2. The outcomes in Phase 2 found that FN parents considered the greatest challenges in having FN children were related to their children's problematic feeding behaviour and preferences, whilst FA parents considered the best practises for food neophilic children were related to active involvement in food skills activities with their children.

This study contributes to the existing literature in several ways. These findings suggest that parents, caregivers, teachers, and health practitioners need more knowledge and skills on 'how to feed' children after investigating the common challenges and best practises in childhood FN issues of parents in urban areas of Johor, Malaysia. Feeding interventions such as food skills education should focus on providing parents and teachers with practical, emotional, and informational feeding support to manage FN. Supporting parents and teachers is vital to developing healthy eating habits during toddlerhood, which will certainly continue throughout adulthood.

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## References

[1] Yang WY, Burrows T, Macdonald-wicks L, Williams LT, Collins CE, Siew W, Colyvas K. Body Weight Status and Dietary Intakes of Urban Malay Primary School Children: Evidence from the Family Diet Study. Children. 2017. 1–16. http://doi.org/10.3390/children4010005.

[2] Shariff ZM, Lin KG, Sariman S, Lee HS, Siew CY, Yusof BNM, Mun CY, & Mohamad M. The relationship between household income and dietary intakes of 1-10 year old urban Malaysian. *Nutrition Research and Practice*. 2015. *9*(3), 278. https://doi.org/10.4162/nrp.2015.9.3.278

[3] Sha An Ali M, Mohd Nazir NA, Abdul Manaf Z. Preference, Attitude, Recognition and Knowledge of Fruits and Vegetables Intake Among Malay Children. *Malaysian Journal of Medical Science.* 2020. *27*(2), 101–111. https://doi.org/10.21315/mjms2020.27.2.11

[4] Poh B, Ng B, Siti Haslinda M, Nik Shanita S, Wong J, Budin S, Norimah A. Nutritional status and

dietary intakes of children aged 6 months to 12 years: Findings of the Nutrition Survey of Malaysian Children (SEANUTS Malaysia). *British Journal of Nutrition.* 2013. *110*(S3), S21-S35. https://doi.org/10.1017/S0007114513002092

[5] Chong KH, Wu SK, Hafizah YN, Bragt MCE, Poh BK, Group, SMS. Eating Habits of Malaysian Children: Findings of the Southeast Asian Nutrition Surveys (SEANUTS). Asia Pacific Journal of Public Health. 2016. 28(5), 59S-73S. https://www.jstor.org/stable/26686287

[6] Man CS, Salleh R, Ahmad MH, Baharudin A, Koon PB, Aris T. Dietary Patterns and Associated Factors Among Adolescents in Malaysia: Findings from Adolescent Nutrition Survey 2017. *International Journal of Environmental Research and Public Health*. 2020. *17*(10), 3431. https://doi.org/10.3390/ijerph17103431

[7] Koo HC, Poh BK, Lee ST, Chong KH, Bragt MCE, Talib RA, Group, SMS. Are Malaysian Children Achieving Dietary Guideline Recommendations? *Asia Pacific Journal of Public Health*. 2016. *28*(5), 80S-20S. https://www.jstor.org/stable/26686283

[8] Wolstenholme H, Kelly C, Hennessy M, Heary C. Childhood fussy/picky eating behaviours: A systematic review and synthesis of qualitative studies. The International Journal of Behavioral Nutrition and Physical Activity. 2020. 17. https://doi.org/10.1186/s12966-019-0899-x

[9] Shariff ZM, & Yasin ZM. Correlates of Children's Eating Attitude Test Scores among Primary School Children. Perceptual and Motor Skills. 2005. 100(2), 463–472. https://doi.org/10.2466/pms.100.2.463-472

[10] Zalilah MS, Khor GL, Mirnalini K, Sarina S. Food Neophobia and Nutritional Outcomes in Primary School-Children. J Community Nutrition. 2005. 7(3) : 121 ~ 129.

[11] Lafraire J, Rioux C, Giboreau A, Picard D. Food rejections in children: Cognitive and social/environmental factors involved in food neophobia and picky/fussy eating behavior. *Appetite*. 2016;96:347-357. doi: https://doi.org/10.1016/j.appet.2015.09.008

[12] Cooke L, Carnell S, Wardle J. Food neophobia and mealtime food consumption in 4-5 year old children. *Int J Behav Nutr Phys Act*. 2006;3:14. Published 2006 Jul 6. doi: https://doi.org/10.1186/1479-5868-3-14

[13] Creswell JW. Mixed-method research: Introduction and application. In G. Cizek (Ed.), Handbook of Educational Policy. 1999; pp. 455-472, San Diego: Academic Press.

[14] Pliner P, Hobden K. Development of a scale to measure the trait of food neophobia in humans. Appetite. 1992;19(2):105-120. https://doi.org/10.1016/0195-6663(92)90014-w

[15] Falciglia GA, Couch SC, Gribble LS, Pabst SM, Frank R. Food neophobia in childhood affects dietary variety. *J Am Diet Assoc*. 2000;100(12):1474-1481. https://doi.org/10.1016/S0002-8223(00)00412-0

[16] Ungku Fatimah UZA. "Measuring food safety culture: Insights from onsite foodservice operations". Graduate Theses and Dissertations. 2013. 13145. https://lib.dr.iastate.edu/etd/13145

[17] Boyatzis RE Transforming qualitative information: Thematic analysis and code development. 1998. Sage Publications, Inc.

[18] Braun V, Clarke V. Using thematic analysis in psychology. Qualitative Research in Psychology. 2006. 3, 77–101. doi: https://doi.org/10.1191/1478088706qp063oa

[19] Laureati M, Bergamaschi V, Pagliarini, E. Assessing childhood food neophobia: Validation of a scale in Italian primary school children. 2015. https://doi.org/10.1016/j.foodqual.2014.08.003

[20] Kozioł-Kozakowska A, Piórecka B, Schlegel-Zawadzka M. Prevalence of food neophobia in pre-school children from southern Poland and its association with eating habits, dietary intake and anthropometric parameters: A cross-sectional study. Public Health Nutrition. 2018. 21(6), 1106–1114. https://doi.org/10.1017/S1368980017003615

[21] Brown CL, Vander Schaaf EB, Cohen GM, Irby MB, Skelton JA. Association of Picky Eating and Food Neophobia with Weight: A Systematic Review. *Childhood Obesity*. 2016. *12*(4), 247–262. https://doi.org/10.1089/chi.2015.0189

[22] Faith MS, Heo M, Keller KL, Pietrobelli A. Child food neophobia is heritable, associated with less compliant eating, and moderates familial resemblance for BMI. *Obesity (Silver Spring)*. 2013;21(8):1650-1655. https://doi.org/10.1002/oby.20369

[23] Johnson SL, Ryan SM, Kroehl M, Moding KJ, Boles RE, Bellow LL. A longitudinal intervention to improve young children's liking and consumption of new foods: Findings from the Colorado LEAP study. *International Journal of Behavioral Nutrition and Physical Activity*. 2019. *16*(1), 49. https://doi.org/10.1186/s12966-019-0808-3

[24] De Almeida PC, Rosane BP, Nakano EY, Vasconcelos IAL, Zandonadi RP, Botelho RBA. Instrument to Identify Food Neophobia in Brazilian Children by Their Caregivers. *Nutrients*. 2020. *12*(7), 1943. https://doi.org/10.3390/nu12071943

[25] Torres TO, Gomes DR, Mattos MP. Factors Associated With Food Neophobia In Children: Systematic Review. Revista Paulista de Pediatria. 2021. 39, e2020089. https://doi.org/10.1590/1984-0462/2021/39/2020089

[26] Li Z, van der Horst K, Edelson-Fries LR, et al. Perceptions of food intake and weight status among parents of picky eating infants and toddlers in China: A cross-sectional study [published correction appears in Appetite. 2017 Mar 1;110:116]. *Appetite*. 2017;108:456-463. doi: https://doi.org/10.1016/j.appet.2016.11.009

[27] American Psychiatric Association. Diagnostic and statistical manual of mental disorders (5th ed.). DSM-5. 2013.

[28] Fitzpatrick K, Forsberg S, Colborn D. Family-based treatment for avoidant restrictive food intake disorder: Families facing neophobias. In: Loeb K, Le Grange D, Lock J, editors. Family therapy for adolescent eating and weight disorders: New applications. New York, NY: Routledge; 2015. p. 256–76

*[29]* Lau TC, David, NCY. Online Food Delivery Services: Making Food Delivery the New Normal. *Journal of Marketing Advances and Practices.* 2019. 1, 62–77.

[30] Bandura A. Self-efficacy: The exercise of control, New York: W.H. Freeman. 1997.

[31] Lavelle F, Spence M, Hollywood L, McGowan L, Surgenor D, McCloat A, Mooney E, Caraher M, Raats M, Dean M. Learning cooking skills at different ages: A cross-sectional study. International Journal of Behavioral Nutrition and Physical Activity. 2016. 13(1), 119. https://doi.org/10.1186/s12966-016-0446-y

[32] DeCosta PEI, Mølle P, Frøst MB, Olse A. Changing children's eating behaviour - A review of experimental research. *Appetite*. 2017. *113*, 327-357. https://doi.org/10.1016/j.appet.2017.03.004

[33] Dudley, D.A., Cotton, W.G. & Peralta, L.R. Teaching approaches and strategies that promote healthy eating in primary school children: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act* 12, 28. 2015. https://doi.org/10.1186/s12966-015-0182-8

[34] Peralta LR, Dudley DA, Cotton WG. Teaching Healthy Eating to Elementary School Students: A Scoping Review of Nutrition Education Resources. *J Sch Health*. 2016;86(5):334-345. doi: https://doi.org/10.1111/josh.12382

[35] Nekitsing C, Hetherington MM, Blundell-Birtill P. Developing Healthy Food Preferences in Preschool Children Through Taste Exposure, Sensory Learning, and Nutrition Education. Current Obesity Reports. 2018. 7(1), 60–67. https://doi.org/10.1007/s13679-018-0297-8

[36] Vaughn AE, Martin CL, Ward DS. What matters most - what parents model or what parents eat?. *Appetite*. 2018; 126:102-107. https://doi.org/10.1016/j.appet.2018.03.025

[37] Wardle J, Cooke LJ, Gibson EL, Sapochnik M, Sheiham A, Lawson M. Increasing children's acceptance of vegetables; a randomized trial of parent-led exposure. *Appetite*. 2003;40(2):155-162. doi: https://doi.org/10.1016/s0195-6663(02)00135-6

[38] Zajonc RB. Mere exposure: a gateway to the subliminal. Curr Dir Psychol Sci. 2001; 10:224–8. doi: https://doi.org/10.1111/1467-8721.00154

[39] National Coordinating Committee on Food and Nutrition Ministry of Health Malaysia. Malaysian Dietary Guidelines for children and adolescents. Putrajaya, Malaysia. 2013.