



Picky Eating Behavior and Food Preferences among Preschool Children

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Abstract

Background: Eating behaviors and food choices established during childhood affect health in later life. Thus, **the aim** of this study was to assess picky eating behavior and food preferences among preschool children. **Design:** A descriptive research design was utilized. The study included 320 preschool children randomly selected from four nursery schools selected by using a multistage random sampling from nursery schools of Zagazig city, Egypt. **Tools for data collection:** A structured questionnaire consisted of three parts; Socio-demographic data, Food Preference Questionnaire for Children (FPQC) and Picky Eating Scale. **The results** revealed that all of the studied preschool children preferred snacks food category followed by starchy food (99.4 %) and 57.5 % of the studied preschool children were picky eaters. Also, the results shows that there was a statistically significant association between children's picky eating behavior and their food preference categories. **Conclusion:** A relatively moderate percentage of the preschool children were picky eaters and it is a worrying fact that all the children consume sweets or snacks on a daily basis on the other hand, the least preferred food category was vegetables. **Recommendations:** Conduct further longitudinal studies to track at-risk picky eater children for developing more tailored nutrition interventions that support their growth and development.

Keywords: Picky eating, Food preferences, Nursery, and Preschool children.

Introduction

Greater attention and concern than ever before is now focused on the period of early childhood. The preschool age, which is very important in the life cycle of a child, falls within this period (**Danister, 2017**). Pre-school period covers the ages between 3 and 6 years. This is a critical time of physical, mental, and intellectual growth in which the child starts to experience his independence and develops many habits essential to the adult life (**Dougherty et al., 2015; Kaya & Efe, 2016**).

Early childhood is the most important period when considering the nutritional status of children. Nutrition is a key aspect in a child's growth, development, and overall functioning (**Elfagi et al., 2020**). Growing children need adequate dietary intake to provide them with sufficient energy and nutrients as protein, fat, carbohydrates, vitamins and minerals. These needs can be met by including a variety of foods from each of the main food groups (**Public Health Agency, 2021**). As children start complementary feeding and become exposed to an increasingly diversified diet, many begin to exhibit "picky eating" behaviors which also referred to as fussy eating, selective eating, faddy eating, and choosy eating. It is a complex behavior that broadly refers to a combination of traits (**Samuel et al., 2018**).

Despite the recognized importance of nutrition in early childhood, studies indicate that many preschool children do not meet the recommended dietary guidelines. Factors such as picky eating, food preferences, and limited exposure to a variety of foods contribute to inadequate nutrient intake (**Anukunwathaka et al., 2023**).

Picky eating in children is usually described as the child having strong food preferences, consuming an inadequate variety of foods, restricting the intake of some food groups, eating a limited amount of food, or being unwilling to try new foods. Picky eating is generally defined as an unwillingness to eat familiar foods or try new foods. It is severe enough to interfere with daily routines and cause problems for the parent or child, which may disrupt the parent-child relationship (**Chao & Chang, 2017**). Such selective eating behaviors may lead to a limited intake of certain foods or food groups, and accordingly, of key nutrients and may result in a failure to meet adequate nutritional and/or energy needs, which could have serious and negative implications on health as growth impediment, nutritional deficiency, or other functional impairments (**Samuel et al., 2018**).

Causes of picky eating include early feeding difficulties, late introduction of lumpy foods at weaning, pressure to eat and early choosiness, especially if the mother is worried; protective factors include the provision of fresh foods and eating the same meal as the child. Picky eating at the peak age of prevalence (38 months) was associated with greater maternal age, maternal smoking, higher maternal social class, lower pre-pregnancy body mass index, higher maternal educational attainment, lower parity, and the infant being male and of a lighter birth weight (**Mudholkar et al., 2023**).

Strategies to handle picky eating include offering a variety of healthy foods, being a positive role model, creating a pleasant mealtime environment, involving the child in meal planning and preparation, offering small portions, encouraging without forcing, being patient and persistent, and seeking professional help if needed. By following these strategies, parents can help their preschoolers develop a healthy and varied approach to food (**Kamarudin et al., 2023**).

In addressing the nutritional needs of preschool children, healthcare professionals, particularly nurses, play a vital role in promoting healthy eating habits. Nurses working in various healthcare settings, including primary care clinics, schools, and community health centers, are in a unique position to interact with families and provide education on nutrition. They can offer guidance on age-appropriate food choices, portion sizes, meal planning, and strategies to overcome picky eating behaviors (**Chen et al., 2022**).

Indeed, the picky eating behaviors of the child can be quite worrisome for parent or caregivers. It is important to understand whether picky eating are associated with reduced diet variety and nutrient intakes, and if these, in turn, have any implications on the child's nutritional status and growth. There is scarcity in the studies conducted about this issue in Egypt, consequently the aim of the present study is to assess picky eating behavior and food preferences of preschool children.

Aim of the study:

The study aim was to assess picky eating behavior and food preferences among preschool children.

Research Questions:

1. What is the prevalence of picky eating behavior among preschool children?
2. What are the food categories preferred by preschool children?
3. Is there a relation between picky eating and food preferences among preschool children?

Subjects and methods:

Research design:

A descriptive research design was utilized for conducting this study.

Study setting:

The study was conducted at four nursery schools randomly selected from the East and West educational administrations of Zagazig city. These nursery schools were Gaid-Youssef nursery, Norte dame nursery, Ali-Zaki nursery and Nasiriyah nursery.

Study subjects:

The study included 320 preschool children and their mothers attending the above-mentioned setting during the study time. The subjects were selected according to the following inclusion criteria:

- Age from 4 to less than 6 years.
- Enrolled in the nursery schools in the study setting.
- Those mothers who accept and permit their children to participate in the study.

Sample size calculation:

The sample size was calculated by software Epi-info package, assuming a prevalence of moderate picky eating behavior among preschoolers is about 71.0% (Sukumaran & Joy, 2015), with 80% power of test and at a 95% level of confidence. The sample size was 320 preschool children and their mothers.

Sampling technique

A random multistage cluster sampling technique was used in the recruitment of this study subjects as follows:

Stage 1:

At this stage, the researcher selected two educational administrations of the Zagazig city; these were namely the East and West administrations.

Stage 2:

The researcher list all nursery school at East and West educational administrations of Zagazig City (34 and 40 nursery schools, respectively).

Stage 3:

This stage involved random selection of Nursery schools: Four Nursery schools (Gaid-Youssef nursery, Norte dame nursery) at East Zagazig Educational Administration, (Ali-Zaki nursery and Nasiriyah nursery) at West Zagazig Educational Administration.

Stage 4:

This stage involved selection of the classes as clusters from schools according to the required sample size. This was done through random sampling of the classes. All children in the selected classes were included in the sample.

Tool for data collection

Data of the present study were collected by using a structured questionnaire developed by the researchers after reviewing related literature and consisted of three parts as follow;

Part one: This part was used to assess social class and demographic characteristics of the participants. It adapted by El-Gilany et al. (2012), which include;

- **Demographic data of the children:** This involved questions about age by birth date, gender, number of siblings, and birth order.
- **Socio-demographic characteristics of parents:** This included data as age, educational level, residence, working status, marital status, family income, crowding index, home utilities, and media at home etc. Scoring of social class: The total score is 48 and the social class is classified to high $\geq 70\%$ [33.6 – 48], medium 40- < 70% [19.2 - < 33.6] – low < 40% [< 19.2].

Part two: Food Preference Questionnaire for Children (FPQ) adopted from Fildes et al. (2014).

The food preference questionnaire for children requires mothers to rate their children's liking for 75 commonly consumed individual foods. Response options include "likes a lot", "likes", "neither likes nor dislikes", "dislikes", "dislikes a lot", and "never tried". Mothers are instructed to select 'has never tried' if their child has never eaten a particular food. The food preference ratings can be grouped into six internally reliable categories; vegetables, fruits, meat/fish, dairy (including eggs), snacks and starches.

Scoring: responses are scored 1-5, with higher score indicative of greater liking of food. "Has never tried" is coded as missing, food preference scale score for the six food categories are obtained by summing the single food preference item scores within each food category and dividing this sum by the number of items.

Part three: Picky Eating Scale adopted by **Wardle et al (2001)**.

The degree of picky eating was assessed using the Food Fussiness and Enjoyment of food subscales subscale from the Child Eating Behavior Questionnaire (CEBQ). This scale consisted of ten items in which parents rate the frequency of their child's behaviors and experiences on a 5-point scale ranging from 1 (never) to 5 (always), but it was modified into three point Likert scale to make it easier for participants to respond, as recommended by participants in the pilot study; where, always "3", sometimes "2" and never "1".

Scoring: Child picky eating was measured by using the Food Fussiness subscale. Questions were answered on a 1 to 3-point Likert scale and averaged to create a mean score with a possible range of 1 to 3, with higher scores indicating picky eating. Where, score of 2 or 3 was considered picky.

Content validity & Reliability:

The tool was revised by a panel of three experts in the fields of community health nursing, community medicine in Zagazig University who conducted face and content validity of all items of the study tool. There were no recommended modifications. The reliability of the tool was tested through measuring its internal consistency by calculating Cronbach alpha coefficient. Their reliability proved to be satisfactory as the value of Cronbach alpha coefficient of FPQC is .879.

Pilot study:

A pilot study was carried out on a sample of 32 children and mothers, representing about 10 % of the total studied sample. The pilot study was aimed to test clarity of the instructions, the format of the questionnaire, comprehension of the items, and to estimate the exact time required for filling the questionnaire sheet. The necessary modifications were done based on the analysis of the pilot study to develop the final format. The participants involved in the pilot study were excluded from the main study sample.

Fieldwork

Once permission was granted to proceed with the study, the researcher met with the directors of the selected nursery schools, explained to them the study aim and procedures, as well as the data collection forms. They were asked to seek the permission of the mothers of the children in the selected classes to participate in the study. Once mothers' consents were secured, the researcher set up a schedule for collecting data with the help of the director of each nursery school. After that, the researcher interviewed each mother individually and explained to them the purpose and nature of the study and the data collection forms and confirmed the secrecy of information obtained. The time spent for filling out the forms ranged from 20-25 minutes including the anthropometric measurements of the child. The researcher visited the nursery schools from the time it opens in early morning until it close in the afternoon (the opening and closing time varied from nursery school to another). Data collection were conducted from the beginning of October 2021 to the end April 2022.

Administrative and ethical considerations:

Official permissions were obtained from the Education Directorate at Zagazig based on letters from the Faculty of Nursing explaining the aim and procedures of the study. The Director General referred the researcher to the directors of the selected schools with approval letters. Then the researcher met with each of them and explained the aim of the study and the nature of tool used for data collection. The researcher gave the director of each school and the social worker a copy of the tool and the formal letters.

The study proposal was approved by the Research Ethics Committee (REC) and the Postgraduate Committee of the Faculty of Nursing at Zagazig University. Then, the agreement of participants was taken from mothers of the preschool children after full explanation of the aim of the study. Participants was given

the opportunity to refuse participation and they were notified that they could withdraw at any time of the data collection interviews; also, they were assured that the information would be confidential and used for the research purpose only. The researcher assured maintaining anonymity and confidentiality of the subject's data.

Statistical analysis:

Data entry and statistical analysis were done using SPSS 22.0 statistical software package. Data were presented using descriptive statistics in the form of frequencies and percentages for qualitative variables and means and standard deviations and medians for quantitative variables. The Cronbach alpha coefficient was calculated to assess the reliability of the developed tools through their internal consistency. Qualitative categorical variables were compared using a chi-square test (χ^2). Whenever the expected values in one or more of the cells in a 2x2 tables was less than 5, Fisher exact test was used instead. Quantitative continuous data were compared using the nonparametric Mann-Whitney test. The Spearman rank correlation was used for assessment of the interrelationships among quantitative variables and ranked ones. In order to identify the independent predictors of the knowledge, attitude, practice, nutritional status and picky eaters scores multiple linear regression analysis was used after testing for normality, and homoscedasticity, and analysis of variance for the full regression models were done. Statistical significance was considered at p-value <0.05 .

Results:

Table 1 reveals that the studied children's age ranged between 4 and 6 years, with mean 5.47 ± 0.48 years and 61.3 % of them were females. As displayed, 55.6 % of the studied children had one sibling. Regarding birth order, 40.6 % of the children had last birth order rank.

Table 2 shows that mothers' age ranged between 24 and 47 years, with a mean of 32.73 ± 4.15 years and 58.7 % were house wives. As for the fathers, their age ranged between 27-60 years, with a mean of 37.28 ± 5.02 years, whereas 94.1 % of fathers had university or postgraduate education. Regarding fathers' job, 43.8 % of them were professionals. For 98.7 % of the families, the monthly income was just enough for daily needs. Whereas, the crowding index was less than two persons per room in 79.1% of the families and 94.4 % of them had high social class.

As displayed in **Figure 1**, all the studied children prefer snacks followed by starchy food (99.4%) then fruits (95.6 %). On the hand, the least preferred food category was vegetables (70.3 %).

Figure 2 shows that 57.5 % of the studied preschool children were picky eaters.

Table 3 demonstrates no statistically significant associations between the studied preschool children's picky eating behavior and their characteristics.

Table 4 reveals a statistically significant associations between studied preschool children's picky eating behavior and their preference of food categories of vegetables ($p=0.002$), fruits ($p=0.006$), meat/fish ($p=0.002$) and dairy ($p=0.002$).

Discussion:

Early childhood represent a critical time-period to establish healthy eating habits for optimal growth, development, and disease prevention. These habits are difficult to be changed later in life. Picky eating is estimated to be quite high in the preschool age. Parents and caregivers, especially mothers, influence the eating behavior of their children through awareness, attitudes and beliefs regarding food and feeding issues **Brown and Perrin (2020)**. Therefore, the current study was conducted to assess picky eating and food preferences among preschool children.

Pertaining to total preference of food categories among preschool children, the results of the present study demonstrated that all the studied children prefer snacks followed by starchy food then fruits among the majority of them. On the other hand, the least preferred food category was vegetables among more than two thirds of them. This finding might be explained by that children patterns of food preferences and eating behaviors emerge and differ, depending on the foods offered and on the contexts of feeding during the complementary feeding. This is supported by **Harris and Mason (2017)** who demonstrated that children who were previously exposed to a greater variety of solid foods show fewer rejection behaviors in response to later offers of new foods.

This result is consistent with the study conducted by **Chao (2018)** who found that most of children did not like to consume vegetables and **Toyama and Agras (2016)** mentioned that most of the children were unwilling to eat regular meals, refusing vegetables, and being likely to eat sweets or snacks instead of meals. Correspondingly, a study by **Goh and Jacob (2012)** affirmed that the main food group reported to be avoided among most of children was vegetables.

Regarding prevalence of picky eating among studied children, the current study revealed that more than half of the studied preschool children were picky eaters. This result was in accordance with a study done by **Qazaryan and Karim (2019)** who mentioned that more than half of the studied children were picky eaters. This result was in agreement with a study by **Angraini et al. (2021)** who reported that more than half of children were identified as picky eaters. In contrast, results of studies by **Hanapi et al. (2022)** and **Mok et al. (2022)** found that less than two fifth of children were picky eaters. This discrepancy may be related due to differences in data collection method, differences in age group, social and cultural differences.

The present study demonstrated that there was no statistically significant association between the studied preschool children' picky eating behavior and their characteristics. Similarly, **Sandvik et al. (2019)** found that there was no significant relation between the children demographic characteristics and picky eating. Conversely, **Van Der Horst et al. (2016)** revealed that there was a significant relation between the studied children picky eating and their demographic characteristics as age and not being the first child.

Concerning relation between picky eating prevalence and children food categories preference, the present study showed that there was a statistically significant association between studied preschool children' picky eating behavior and their preference of food categories of vegetables, fruits, meat\fish and dairy. This result was congruent with a study by **Goh and Jacob (2012)** who revealed that there was association between the children picky eating and main food categories that were prefer as milk and dairy products, meat and vegetables. Likewise, a study by **Toyama and Agras (2016)** found that there was significant relation between picky eating behavior and food preferences.

Conclusion:

The study results bring about the conclusion that a relatively moderate percentage of the preschool children were picky eaters and it is a worrying fact that all the children consume sweets or snacks on a daily basis on the other hand, the least preferred food category was vegetables.

Recommendations:

On the basis of the current study findings, the following recommendations are suggested:

- Develop and implement comprehensive nutrition education programs targeting both parents and children.
- Encourage parents of picky eaters to gradually introduce new foods, involve children in meal preparation, and create a positive mealtime environment that reduces stress around trying new foods.
- Conduct further longitudinal studies to track at-risk picky eater children for developing more tailored nutrition interventions that support their growth and development.

Table (1): Demographic characteristics of the studied children (n=320)

Demographic characteristics	Frequency	Percent
Age:		
4 - < 5	54	16.9
5 - < 6	266	83.1
Mean ± SD	5.47 ±.48	
Rang	(4-6)	
Gender:		
Male	124	38.7
Female	196	61.3
No. of siblings:		
No brother	37	11.6
One	178	55.6
Two	78	24.4
Three and more	27	8.4
Rank of child between his siblings:		
Single	37	11.6
The first	113	35.3
The middle	40	12.5
The last	130	40.6

Table (2): Demographic characteristics of the children's parents (n=320)

Demographic characteristics	Frequency	Percent
Mother age:		
24-35	244	76.3
36-47	76	23.7
Mean ± SD	32.73 ±4.15	
Rang	(24-47)	
Mother job:		
House wives	188	58.7
Working	132	41.3
Marital status:		
Married	308	96.3
Divorced	12	3.7
Father age:		
27- 36	168	52.5
37 – 46	139	43.4
47- 60	13	4.1
Mean ± SD	37.28 ±5.02	
Rang	(27-60)	
Father education:		
Illiterate	1	0.3
Basic	1	0.3
Secondary	17	5.3
University / Postgraduate	30	94.1
Father job:		
Worker- farmer	1	0.3
Employee	76	23.8
Professional	140	43.8
Free business	103	32.2
Residence		
Rural	34	10.6
Urban	286	89.4
Family type:		
Nuclear	213	66.6
Extended	107	33.4
Crowding index:		
<2	253	79.1
2+	67	20.9
Family income :		
Not enough	4	1.3
Enough for daily needs	316	98.7
Social class:		
Medium	18	5.6
High	302	94.4

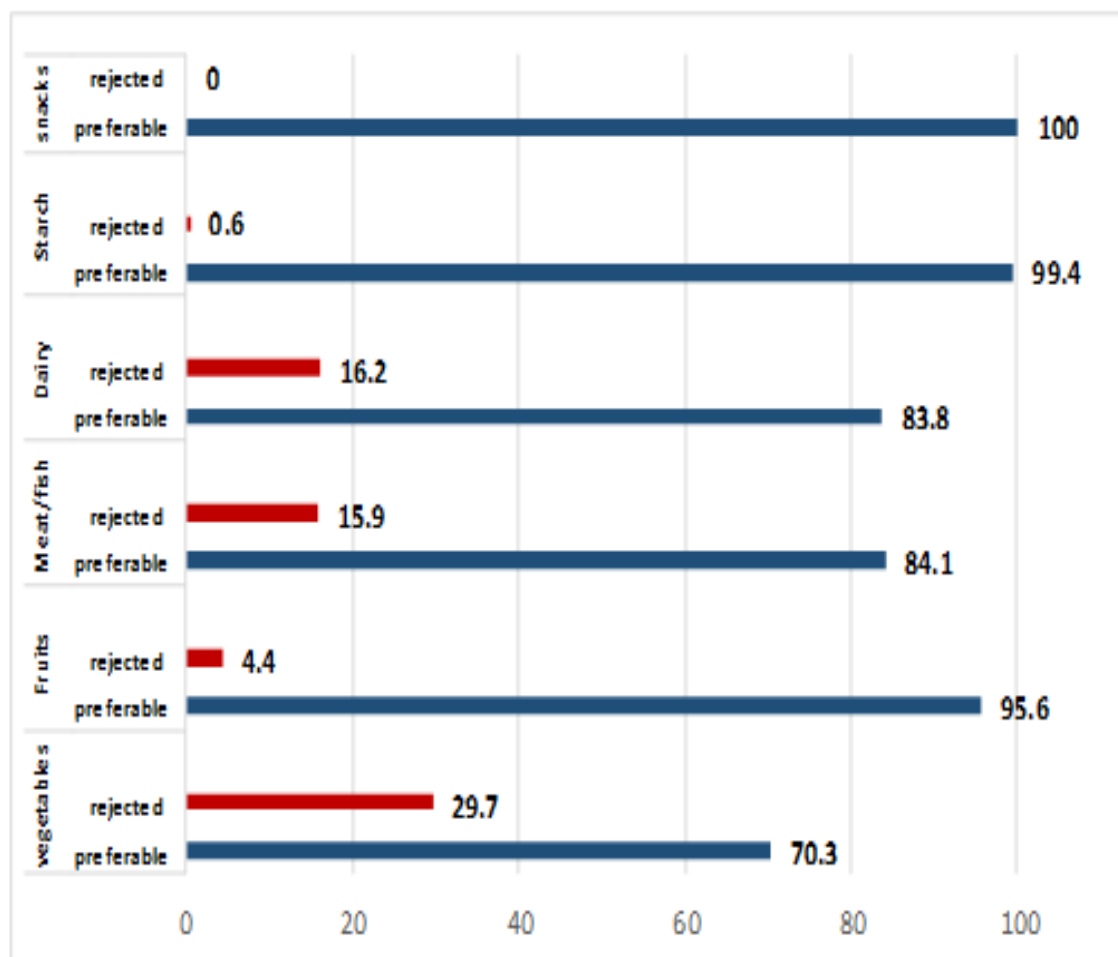


Figure (1): Total preference of food categories of preschool children (n=320)

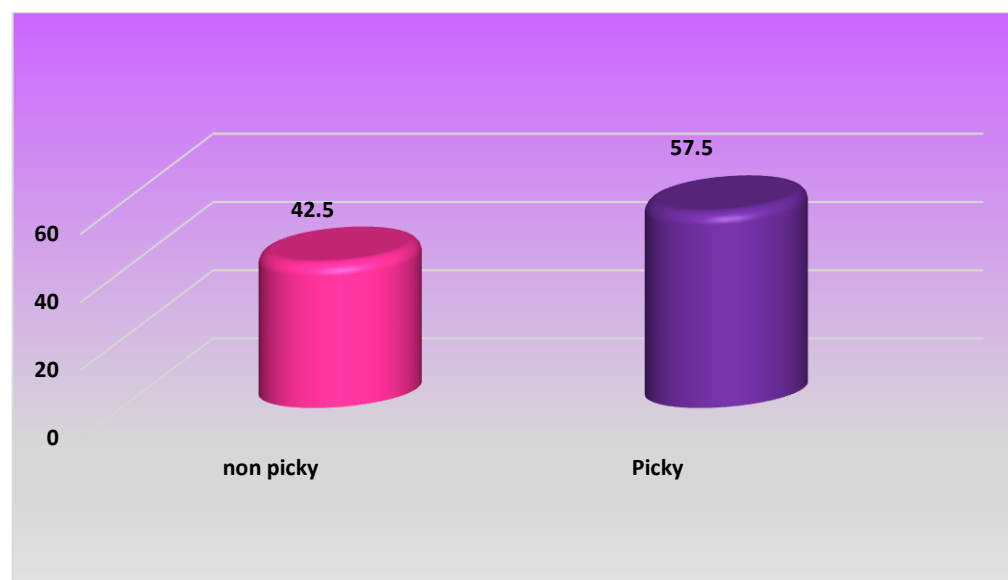


Figure (2): Prevalence of picky eating among studied children (n=320)

Table (3): Relation between picky eating of preschool children and their characteristics

Characteristics	Picky eaters				X ² test	p-value
	Non picky (n=136)		Picky (n=184)			
	No.	%	No.	%		
Age:						
4 - < 5	21	38.9	33	61.1	.347	.556
5 - < 6	115	43.2	151	56.8		
Gender:					.738	.390
Male	49	39.5	75	60.5		
Female	87	44.4	109	55.6		
Residence :					Fisher	.364
Rural	17	50.0	17	50.0		
Urban	119	41.6	167	58.4		
No. of siblings:					.560	.905
No brother	14	37.8	23	62.2		
One	75	42.1	103	57.9		
Two	35	44.9	43	55.1		
Three and more	12	44.4	15	55.6		
Rank of child between his siblings:					1.96	.581
Single	14	37.8	23	62.2		
The first	44	38.9	69	61.1		
The middle	17	42.5	23	57.5		
The last	61	46.9	69	53.1		
Social class:					.102	.750
Medium	7	38.9	11	61.1		
High	129	42.7	173	57.3		

(*) Statistically significant at $p < 0.05$

Table (4): Relation between picky eating prevalence and children food categories preference

Food categories preference	Non picky (n=136)		Picky (n=184)		X ² test	p-value
	No.	%	No.	%		
Vegetables						
Preferable	107	47.6	118	52.4	7.93	.005*
Rejected	29	30.5	66	69.5		
Fruits						
Preferable	135	44.1	171	55.9	7.49	.006*
Rejected	1	7.1	13	92.9		
Meat / fishes						
Preferable	124	46.1	145	53.9	8.93	.003*
Rejected	12	23.5	39	76.5		
Dairy						
Preferable	124	46.3	144	53.7	9.58	.002*
Rejected	12	23.1	40	76.9		
Starch						
Preferable	136	42.8	182	57.2	1.48	.223
Rejected	0	0.0	2	100.0		
Snacks						
Preferable	136	42.5	184	57.5	--	--
Rejected	0	0.0	0	0.0		

(*) Statistically significant at $p < 0.05$ (--) Test result not valid

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