

## ORIGINAL ARTICLE

# Nutritional Study of Picky Eaters: A Case Control Study

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## Abstract

**Background:** Picky eating is a relatively common problem during childhood. Picky eating may cause parents considerable concern leading to physician visits and may cause conflict between parents regarding handling of their child's eating behavior.

**Objectives:** The present study was conducted to compare the nutritional status and daily calorie consumption among children with and without picky-eating-behavior.

**Methods:** The present study was conducted out in the Department of Paediatrics, Sir Salimullah Medical College and Mitford Hospital, Dhaka and private chambers of paediatrician, general physician from July 2013 to December 2013. The case was defined as a child who had anorexia or took one or two favorite foods as explained by the parents in an otherwise healthy child with picky eating disorder, while a control was defined as a child without having picky eating disorder.

**Results:** Thirty percent of the parents of cases complained that their children were not growing well as opposed to only 4% of the control group ( $p < 0.05$ ). Complaint of abdominal pain was considerably higher in the former group than that in the latter group ( $p < 0.05$ ). The history of forceful feeding was present in 20% of the cases compared to none in the control ( $p > 0.05$ ). The mean 24 hours intake of calorie was lower in the cases than that in the control, but the difference did not reach the level of significance ( $p > 0.05$ ). In terms of nutritional status very few children (8%) with picky eating behavior were wasted (low weight-for-height) ( $p > 0.05$ ). However, 26% of the picky-eaters were underweight in terms of BMI compared to 7% of the controls, but the difference was not statistically significant ( $p > 0.05$ ).

**Conclusion:** The study concluded that the children with picky-eating-behavior are almost similar to their control counterparts in terms of nutritional status (wasting, stunting and BMI) and calorie consumption.

**Keywords:** Picky eater, wasting, stunting, BMI.

## Introduction

Picky eaters may be defined as “a child who does not eat anything or take one or two favorite foods as explained by the parents in an otherwise healthy child”. Picky eating is a relatively common problem during childhood ranging from 8% to 50% of children in different samples and is characterized by a toddler or a child eating a limited amount of food, restricting

intake particularly vegetable, being unwilling to try new food, and having strong food preferences often leading parents to provide their child a meal different from the rest of the family.<sup>1</sup> Picky eating may cause parents' considerable concern leading to physician visits and may cause conflict between parents regarding the handling of their child's eating behavior. Although the long-term health effects of

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**Received:** 26 December 2020; **Accepted:** 26 May 2021

picky eating are unclear there is evidence in early childhood that picky eaters weigh less than non-picky eaters. Dubois found that picky eaters ate fewer calories and were twice as likely to be underweight than non-picky eaters.<sup>2,3</sup> A previous study of 135 children aged 5 years from the Stanford Infant Growth Study found that picky eaters consumed fewer calories than non-picky children and showed a less vigorous sucking style as an infant, suggesting that picky eating has trait-like characteristics.<sup>4</sup> Finally, a German study of 426 children 8 to 12 years of age found that picky eaters were more likely to exhibit behavioral problem behaviors than non-picky eaters.<sup>5</sup> Hence, there is evidence in childhood that picky eaters are likely to consume fewer calories and to weigh less, and in later childhood they demonstrate behavioral problems and in adolescence they have symptoms of anorexia nervosa. Hence, the studies to date suggest that a subset of those with picky eating tends to persist over time with similar symptoms, particularly during early and later childhood.<sup>6-8</sup> These types of studies are very few in our country. The present study examined a cohort of children assessed from 2 to 15 years of age to determine the nutritional status of the picky eaters in relation to their daily consumption of calorie.

### Materials and Methods

Study population was divided into case and control groups. A case was defined as a child who had anorexia or take one or two favourite foods as explained by the parents in an otherwise healthy child with picky-eating-disorder, while a control was defined as a child without having picky eating disorder. A total of 100 children, 2-15 years age (50 cases and 50 controls) were consecutively included in the study. The study was carried out in the Department of Paediatrics, Sir Salimullah Medical College and Mitford Hospital, Dhaka and private chamber of paediatricians and general physicians over a period of 6 months from July 2013 to December 2013. Children having any chronic illness like congenital heart disease, persistent pneumonia, chronic diarrhoea, epilepsy, cerebral palsy, undergoing major surgery and 2<sup>nd</sup> or 3<sup>rd</sup> degree malnutrition were excluded from this study. Calorie consumption was calculated based on the food 24 hours consumption which might be inherently associated with re-call bias. The demographic and anthropometric characteristics included in the study were age, sex, weight, height and BMI. Nutritional status was assessed using weight for age, height for age, weight for height Z score for younger children (5 or <5 years) and BMI for older children (>5 years old). Weight, height and age were

used to calculate weight for age (measures undernutrition) and height for age (measures stunting) z-scores, based on the National Center for Health Statistics 2000 reference data. A cut-off value of -2 z-score was used to define undernutrition (moderate to severe form of malnutrition). Weight was measured by using bathroom scale, height by stadiometer and OFC by measuring tape. Using computer software SPSS (Statistical Package for Social Sciences), data were processed and analyzed.

### Results

The present study was intended to compare the nutritional status and daily calorie consumption between children with and without picky-eating-behavior. The study included 50 cases (picky-eaters) and 50 controls (non-picky eaters).

All the children in the case group had history of poor feeding as opposed to none in the control group ( $p < 0.001$ ). There was no significant difference between cases and controls in terms of growth of the children ( $p = 0.517$ ). Complaint of abdominal pain was considerably higher in the former group than that in the latter group compared to none in the control group ( $p = 0.278$ ). The frequency of vomiting, loose motion, fever and cough were almost similar between the two groups ( $p = 0.590$  and  $p = 0.801$  respectively) (Table I).

Chief compliments	Group		p value
	Cases (n = 50)	Controls (n = 50)	
Not growing well	15(30.0)	12(24.0)	0.517
Abdominal pain	16(32.0)	7(14.0)	0.070
Forceful feeding	10(20.0)	0(0.0)	0.278
Vomiting /loose motion	8(16.0)	9(18.0)	0.590
Fever/cough	6(12.0)	7(14.0)	0.801

The case and control groups were almost alike in terms of their birth history ( $p = 0.832$ ). Exclusive breast-feeding up to 6 months was 40% in case group and 44% higher in either group with no significant intergroup difference ( $p = 0.651$ ). Developmental history was age appropriate in majority of the children of both case and control groups ( $p = 0.338$ ). Family history of picky eating demonstrated their significant presence in cases (18%) than that in control (4%) ( $p = 0.021$ ) (Table II).

**Table II**  
*Comparison of history between case and control groups*

History	Group		p value
	Case (n=50)	Control (n=50)	
<b>Birth history</b>			
LUCS	27(54.0)	26(52.0)	0.832
NVD	23(46.0)	24(48.0)	
<b>Feeding history</b>			
Exclusive breast feeding (up to 6 m)	20(40.0)	22(44.0)	0.741
Early complimentary feeding	30(60.0)	28(56.0)	0.651
<b>Developmental history</b>			
Age appropriate	45(90.0)	47(94.0)	0.338
Not age appropriate	5(10.0)	3(6.0)	
<b>Immunization history</b>			
Completely immunized	48(96.0)	50(100.0)	0.451
Not completely immunized	2(4.0)	0(0.0)	
Family history of picky eating	9(18.0)	2(4.0)	0.021

Majority of the case group (94%) and all of the control groups looked normal at appearance ( $p=0.245$ ). All the vital signs like temperature, pulse and respiratory rate (RR) were almost identically distributed between the case and the control groups ( $p=0.951$ ,  $p=0.191$  and  $p=0.513$  respectively) (Table III).

**Table III**  
*Physical examination finding between case and control groups*

Physical examination	Group		p value
	Case (n=50)	Control (n=50)	
<b>Appearance</b>			
Normal looking	47(94.0)	50(100.0)	0.245
Ill looking	3(6.0)	0(0.0)	
<b>Vital signs</b>			
Temperature	98.3 ± 3.6	98.5 ± 4.0	0.951
Pulse	82 ± 7	89 ± 6	0.193
RR	23 ± 2	22 ± 3	0.513

The mean 24 hours intake of calorie (estimated on the basis of food consumed during the last 24 hours) was somewhat lower in the case group than that of the control group ( $p=0.087$ ) (Table IV).

**Table IV**  
*Comparison of calorie consumption between case and control groups*

Calorie consumption	Group		p value
	Case (n=50)	Control (n=50)	
Calorie in 24 hours	1206.4 ± 201.5	1326.9 ± 194.0	0.087

Data were analyzed using Unpaired t-Test and were presented as mean SD

Over one-quarter (26.3%) of the case group children under weight (BMI below 5<sup>th</sup> centile) as opposed to only 7.1% of the control group, but the difference between the groups was not significant ( $p=0.369$ ) (Table V).

**Table V**  
*Comparison of BMI between case and control groups*

BMI (kg/m <sup>2</sup> )	Group		p value
	(Case n=19)	Control (n=14)	
Underweight (<5 <sup>th</sup> central)	5(26.3)	1(7.1)	0.369
Normal BMI (5 <sup>th</sup> - 85 <sup>th</sup> central)	13(68.4)	12(85.8)	
Overweight or Obese (≥85 <sup>th</sup> central)	1(5.3)	1(4.0)	

About 8% of children in the case group were wasted (in terms of weight for height Z score) compared to none in the control group ( $p=0.181$ ). None of the children in either group was stunted (height for age Z score) (Table-VI).

Nutritional status	Group		p value
	Cases (n=50)	Controls (n=50)	
<b>Weight-for-height Z Score</b>			
Wasted	4(8.0)	0(0.0)	0.181
Normal	46(92.0)	50(100.0)	
<b>Height-for-age Z Score</b>			
Normal	50(100.0)	50(100.0)	-

## Discussion

The present study was intended to determine the nutritional status of the picky-eaters and whether their nutritional status differs from the children with normal eating behavior. In this study we observed nutritional status (in terms of wasting, stunting and BMI) and daily calorie consumption. The study demonstrated that very few children (8%) with picky-eating behavior were wasted (low weight-for-height) and none of them was stunted (low height-for-age). Though, 26% of the picky-eaters were underweight in terms of BMI (BMI < 5<sup>th</sup> centile) compared to 6% of the control group, but the difference between the groups were not statistically significant ( $p = 0.369$ ).

Children can become picky eater for a number of reasons. Some children are naturally more sensitive to taste, smell, texture. Other children develop picky eating habits by modeling their parents fussy eating habits. Picky eating habits are more likely to develop when parents punish, bribe, or reward the children's eating behavior.<sup>9</sup>

In a large survey of 7,057 children aged 2-7 years old in Hong Kong, 43% were reported by their parents as being picky eaters.<sup>3</sup> A longitudinal study revealed that 40% of children's picky-eating behavior lasted longer than 2 years.<sup>10</sup> A cross-sectional survey found that the proportion of picky eaters increased from 19% at 4 months old to 50% by age 2 years.<sup>2</sup> Another cross-sectional survey of Chinese preschoolers reported that prevalence of picky eating was higher

in 24–35-month-olds (36%) compared to 6-11-month-olds (12%).<sup>11</sup> These findings suggest that picky eating is a chronic problem.

Jacobi et al<sup>8</sup> examined the prevalence of picky eating and the relationship between picky eating and correlates of picky eating, other child eating and behavioral problems and maternal eating problems in a cohort of 426 children aged 8-12 years. The study found that picky and nonpicky eaters differed significantly on all of the child eating behaviors. Overall, picky children were reported to avoid foods in general more often than nonpicky eaters. Picky children did not differ from nonpicky children with regard to their own and maternal eating disturbances. However, picky children displayed more problem behaviors comprising both internalizing and externalizing behaviors.<sup>7,8</sup>

Children with picky-eating habits have previously been identified as being at a potential risk for having nutritional deficits and the association of picky-eating behavior with growth status in children has also been evaluated.<sup>6,10,12</sup> A longitudinal study of 120 children aged 2-11 years, detected no significant effects on growth.<sup>6</sup> A cross-sectional survey in 1,498 children at 2.5, 3.5, and 4.5 years old, analyzed the relationship between eating behaviors, such as picky eating and dietary adequacy, and body weight; this study found that the amounts of energy, total fats, and protein consumed were significantly less for picky eaters than for non-picky eaters (energy,  $p = 0.0302$ , total fats,  $p = 0.0114$ ; and proteins,  $p < 0.0001$ ).<sup>5</sup> This study found that picky eat-ers were prone to consume fewer than two servings of meat and alternatives per day (odds ratio: 0.319; 95% CI 0.181-0.560). Further research found that picky eaters were twice as likely to be underweight at 4.5 years old as non-picky eaters (odds ratio: 2.415; 95% CI 1.383-4.216).<sup>5</sup>

The University College London's Institute of Child Health (UK) relates that: Typically a child or adolescent with selective eating remains within the normal range for both weight & height and show no abnormality on physical examination.

However, like any other scientific study, the present study is not without limitations. The sample size was very small and calorie consumption was calculated based on food 24 hours consumption which might be inherently associated with re-call bias.

## Conclusion

From the findings of the study it can be concluded that the children with picky eating behavior are almost comparable to their control counterparts in terms of nutritional status (wasting, stunting and BMI) and calorie consumption.

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