

## PROBLEM EATING BEHAVIOR AMONG YOUNG CHILDREN WITH NORMAL DEVELOPMENT IN TAIPEI COUNTY

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*Interest in problem eating behavior in children has grown from a recognition that eating behaviors may contribute to child growth and development. In order to understand the status of problem eating behavior in young children and to examine whether background factors are related to them, a cross-sectional survey was conducted in Taipei County with 750 subjects between the ages of 1 and 5 years. The results showed that the common problem eating behavior includes eating snacks (64.6%), eating sweets (42.3%), picking foods (42.2%), and refusing foods (32.7%). Problem eating behavior has been seen in children as early as the first year of life. The cumulative rate curves of problem eating behavior increased by the age of 3 years. Child's age, number of siblings, mother's education, family economic index and urbanization level were selected as significant predictors with respect to problem eating behavior. It suggests that prevention or intervention of problem eating behavior should be implemented in young children as early as possible. (CJPH (Taipei): 1994; 13(1): 95-104)*

**Key words:** eating behavior, development, young children

### INTRODUCTION

Eating behavior has been recognized as one of the factors related to the growth of children [1]. A young child's early experience with food and eating has been considered paramount in the acquisition of food preferences and behaviors related to food intake [2]. For instance, the obese habitually select carbohydrates as meals or snacks even though other foods may be available [3,4]. Numerous investigations have shown that excessive consumption of carbohydrates is a major factor in the development of human obesity [5], and that sweetening the foods leads to an increase in the volume of liquid consumed by young infants

[6].

Sweets including sugar, syrups, candy, jelly, jams, sweet toppings, and honey are no recommendations for daily allowances. Sweets are used to furnish variety and interest to the meal. It must be especially restricted to avoid obesity. Several dietary guideline emphasize reduced intake of sweets. Most people consume snacks between meals and in the evening. Usually snacks are eaten too close to mealtime, thus spoiling the appetite. Far too often, snacks consist of high-calorie foods that are low in nutritive value. This means that some people will exceed their calorie requirements and that others, especially children, may not consume sufficient amount of essential nutrients. Therefore, reducing intake of snacks

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is also recommended [7].

Studies of food habits of children have shown repeatedly that the foods requiring particular emphasis for the improvement of diets are milk, dark green leafy and deep yellow vegetables, and whole-grain or enriched breads and cereals. Some of the food habits such as food dislikes and overuse of a few foods may contribute to these deficiencies [7].

It has been found that children developed a full range of food aversions similar to that seen among adults. These include rejection of items due to unpleasant tastes, potential risks, nonfood origins, or perceived offensive or disgusting connotation associate with the foods [8]. It has also been found that some young children drink too much milk or eat a limited variety of foods. They may eat excessive amounts of fast foods and fail to get the nutrients not provided by those foods. Since part of the early experience of the infant or young child involves the acquisition of knowledge regarding what he should or should not eat [9], refusing foods (or foods dislikes) and picking foods (or overuse of a few foods) should be viewed as problem eating behaviors.

As many as 45% of normally developed young children have mealtime problems [10]. Mealtime problems have been classified as children eating too much, too little, or the wrong food [11]. Once a young child establishes problem eating behavior, if it is not assessed at an early stage, it will become habitual. The approach to prevention or early intervention in problem eating behavior requires an understanding of the development and potential for modification of eating behavior.

Previous research has demonstrated that the preschool child is influenced primarily by his family [12,13]. Family members, especially mother, served as the primary role model as the child acquires early food attitudes and practices. However, it remains uncertain whether some characteristics of eating problem are related to demographic and familial factors.

Collecting food habits data in natural eating environments would help us understand what goes wrong in various behaviors and the relationship of the factors to the problem eating behavior. In order to understand the distri-

butions and developments of certain problem eating behaviors in young children with normal development and to examine the relationship between problem eating behavior and the related factors, a cross-sectional survey was conducted.

## METHOD

### Subjects

The subjects were 750 children between the ages of one and five in 1991. According to the birth registration of Taipei County, children aged 1 to five were stratified by gender and age. 75 children in each subgroup were then randomly chosen. For the purpose of ruling out any organic cause producing the eating problems, the subjects were first screened for survey eligibility using a standardized Development Test [14]. After these families were contacted by mail for home visits, 20 trained interviewers were sent to collect data. The children who successfully completed the selected performances which were appropriate to their age were included in the sample.

### Data Collection

The parents or caretakers of the subjects with normal development were interviewed from October to December, 1991. They were required to describe the subjects' eating patterns and to answer a series of questions about their own backgrounds and attitudes toward eating. Of the original 750 subjects, 555 were successfully interviewed (Table 1). The other subjects could not be reached because of the following reasons: living in foster families (61 cases), wrong address (7 cases), interview refusal (14 cases), abnormal development (13 cases), moving out of the area (89 cases), incomplete data (10 cases), and death (1 case). The completion rates of each group ranged from a high of 83.9% in the group of five year olds to a low of 67.8% for one year olds. The overall completion rate was 74.3%.

### Variables

The main independent variables in data analyses were factors of the child, parents, and family. The child's factors included age, birth

Table 1. Completion Rates by Age-Group

Item	Age Group					Total	
	(yrs) (mons)	1 12-23	2 24-35	3 36-47	4 48-59		5 60-71
Total subjects		149	152	151	146	149	747
No. of completion		101	110	104	115	125	555
Completion rate (%)		67.8	72.4	68.9	78.8	83.9	74.3

order, and gender. The parent's factors included age, education, occupation, birth place, religion, and attitude toward eating. The family's factors included economic status, urbanization level, number of siblings and adults in family.

As noted above, this study was designed for examining the status of problem eating behavior in young children. Therefore, the four dependent variables purposively selected included eating sweets, eating snacks, picking foods and refusing foods. The eating problem was measured in how many times the child ate and the quantity of food consumed. For each behavior reported, respondents were asked whether or not the behavior had maintained for more than 2 months and when the behavior had become a habitual practice. Problem eating behavior was defined as the performance of the behavior two or more times a day which exceeds the mode of distribution.

All independent and dependent variables included in the questionnaires were verified by experts in nutrition, health education, health administration, and health economics. Pretest was conducted with women which included 10 working mothers and 10 housewives. The revised questionnaires were then administered for data collection. The variables were selected as predictors when the significant correlations between the independent variables and the dependent variables were found.

## RESULTS

### Demographic Characteristics

The proportion of male and female sub-

jects were virtually the same (49.9% vs 50.1%). In terms of birth order, the first and second orders were reported with the same rate of 35%, and 29.8% of these subjects were ordered 3rd and over. Of the parents, the average age of 34 was reported by fathers, while 31 reported by mothers. 12.2% of fathers and 5.8% of mothers had completed at least some college; 63.7% of fathers and 65.6% of mothers were high school graduates; 24.0% of fathers and 28.5% of mothers had less than a high school education. Of the fathers, 35.5% reported their occupation in industry while 35.1% reported their occupation in business. Of the mothers, 68.1% were housewives, only 31.9% were employed. Majority of these subjects' parents were Taiwanese (89.2% for fathers and 84.8% for mothers). 80.4% of fathers and 79.3% of mothers reported a religion. The mean score of family economic was 4.1 (1=lowest; 9=highest). Sixty-one percent of the subjects were living at areas with urbanization level under 3 (1=lowest; 8=highest). The average number of siblings and adults in the family were 1.5 and 2.9 respectively.

### Problem Eating Behaviors

Table 2 presents the distributions of the four eating problems (eating sweets, eating snacks, picking foods, and refusing foods) by age-group. In order to measure these behaviors, the operational definitions were developed based on frequency. The mothers or care takers were asked how often the specific behaviors were performed (either feeding by others or request by child). A child being defined as having a specific behavior by his/her perform-

Table 2. Percentages of Problem Eating Behaviors in Young Children According to Age-Group

Behavior	1-year (101)*	2-year (110)*	3-year (104)*	4-year (115)*	5-year (125)*	Total (555)*
Eating sweets	28.7	50.0	46.2	43.5	42.4	42.3
Eating snacks	55.4	69.1	63.1	67.5	66.4	64.6
Picking foods	24.8	33.6	39.4	53.0	56.0	42.2
Refusing foods	24.8	28.4	35.6	36.5	36.8	32.7

\* number of complete cases

ance frequency of more than 5 times weekly and lasting 3 months and longer. For the 1-year old group, the highest percent (55.4%) was reported for eating snacks. For the 2-year old group, the most frequent eating problems were eating snacks (69.1%) and sweets (50.0%). For the 3-year old group, eating snacks (63.1%) and eating sweets (46.2%) were reported with higher rates. For the 4-year old group, over half of them reported eating snacks (67.5%) and picking foods (53.0%); eating sweets (43.5%) and refusing foods (36.5%) were also reported problems. For the 5-year old group, the rates were ranged from 36.8% to 66.4%. Overall, the four eating problems among young children rank as follows: eating snacks (64.6%), eating sweets (42.3%), picking foods (42.2%), and refusing foods (32.7%).

### Developments of Problem Eating Behaviors

Some of the parents had difficulties recalling the exact time a behavior became apparent. Since the low response rates were found in the 4- and 5-year old groups, only the developmental curves of the other three age-groups are shown (were calculated).

The cumulative performance rate curves of eating behaviors were presented in three month intervals following birth. Separate curves were plotted for each age groups. The cumulative rates of eating snacks (Figure 1) at the age of one year for the three age-groups were 41.4%, 37.1%, and 25.8% respectively. The cumulative rates at the age of two years increased dramatically to 54.5%, 62.8%, and 46.4% respectively. At each time point, the cumulative proportions among the 1- and 2-year old

groups were considerably greater than those of the 3-year old group.

Figure 2 and Figure 3 show the developmental patterns of refusing and picking foods. Although a gradual increase in slope was found, the cumulative proportions of all time points among the 3-year old group were less than that among the 1 and 2-year old groups. For the behavior of eating sweets (Figure 4), the gradual increases in slope were similar for the three age-groups.

Overall, the earliest time of having these specific behavioral characteristics is one year of age, but the developmental curves of eating snacks increases more dramatically than that of the other characteristics.

### Logistic Regression Models of Problem Eating Behaviors

Children at the age of 3 and over become proficient to feed themselves while the 1- and 2-year old children are often fed by their parents or caretakers. The multiple logistic regressions of discrepancies for both 1-2 years old and 3-5 years old groups (Table 3) were performed to determine the association with the predictors. Relative risks were calculated for each of the independent variables.

For the behavior of eating sweets, only family economic index was significantly correlated with both age-groups. The two variables associated with reported sweet foods intake for the 1-2 years old group, but not for the 3-5 years old group, were child's age and mother's education. For the 1-2 years of age group, the 1-year old children showed a lower rate of eating sweets than that of 2-year old

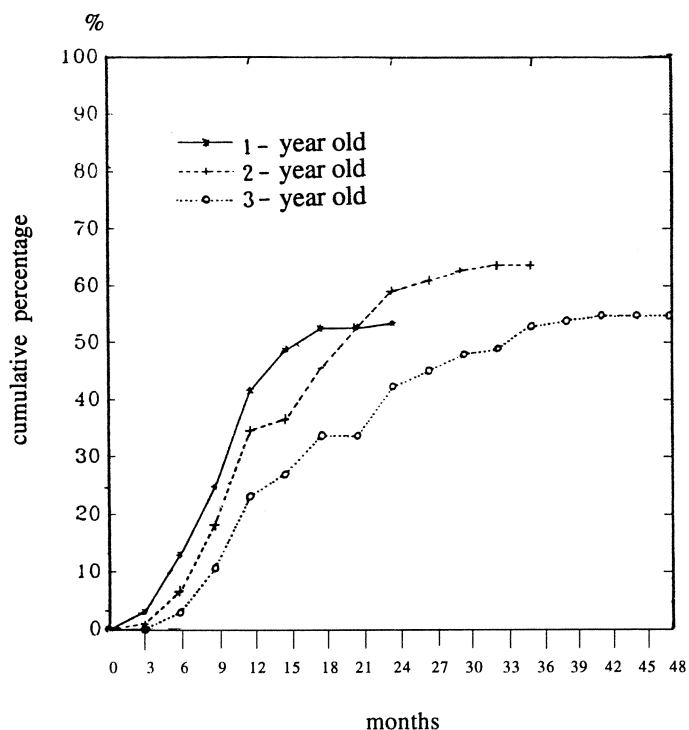


Fig. 1. Cumulative Rate Curves for Eating Snacks by 3 Months Interval

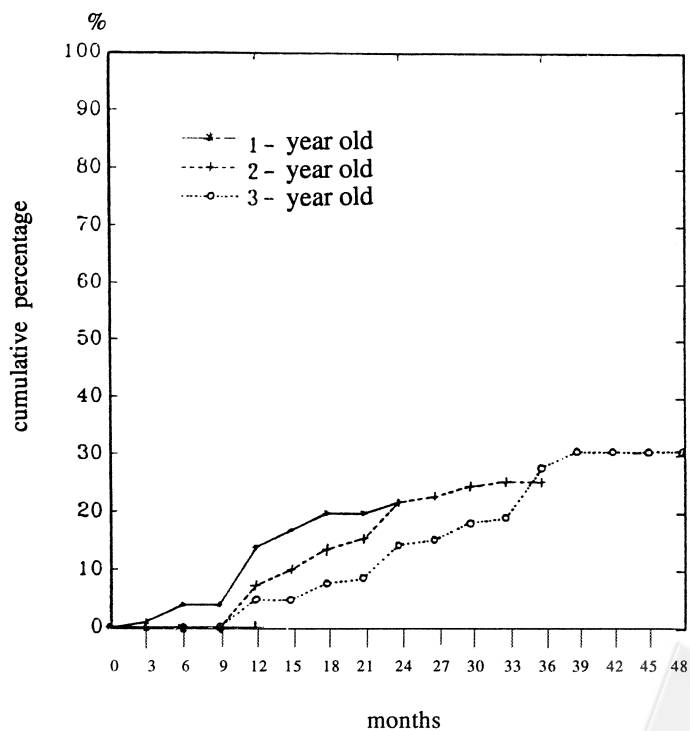


Fig. 2. Cumulative Rate Curves for Refusing Foods by 3 Months Interval



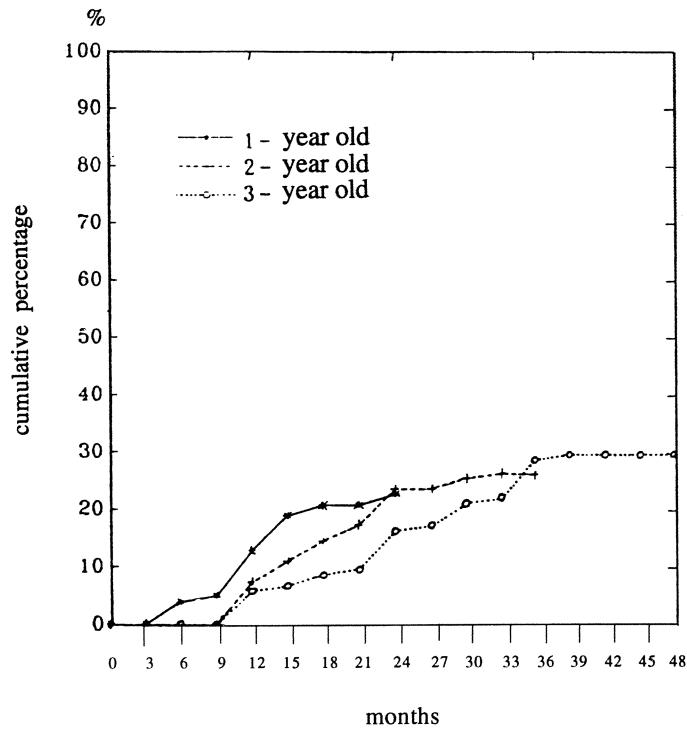


Fig. 3. Cumulative Rate Curves for Picking Foods by 3 Months Interval

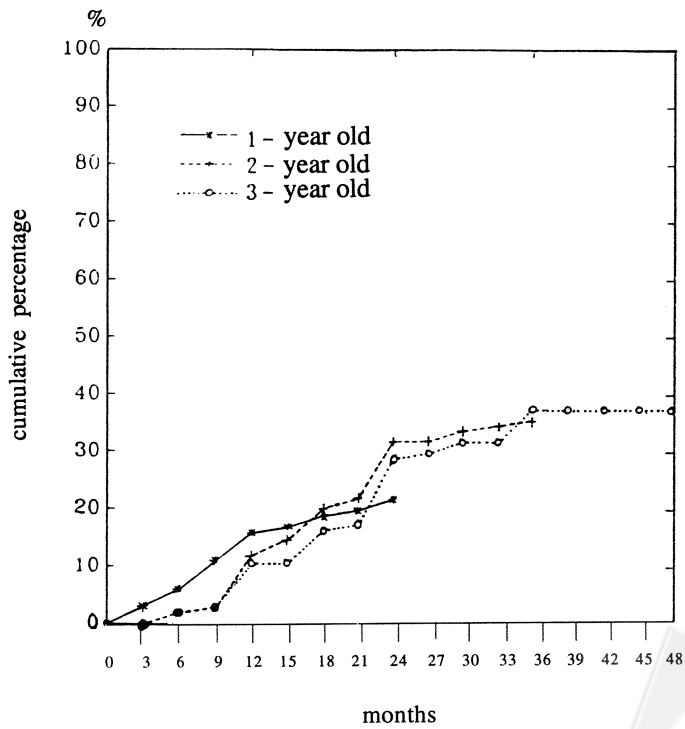


Fig. 4. Cumulative Rate Curves for Eating Sweet Foods by 3 Months Interval

Table 3. Logistic Regression Models of Factors Associated with Eating Behaviors in 1-2 and 3-5 Year Old Groups

Variable	Eating Sweets		Eating Snacks		Picking Foods		Refusing Foods	
	1-2	3-5	1-2	3-5	1-2	3-5	1-2	3-5
Child's age (yrs)								
1:2	0.4*		0.6		0.5		0.6	
3:5		1.5		0.9		0.5#		1.0
4:5		1.3		1.2		1.0		1.0
Child's gender								
male: female	0.6	1.1	0.9	0.8	1.4	0.9	1.3	0.8
Number of siblings								
<3:0	1.1	0.5	1.3	0.6	0.5#	0.3	0.7	0.7
>2:0	0.6	0.5	1.2	0.4	1.4	0.2*	1.7	0.4
Child's care								
other: parent	0.4	1.6	1.7	1.1	0.8	1.4	1.5	1.3
Mother's education								
JH: primary	1.0	0.7	0.7	0.5	1.5	0.7	1.1	0.9
SH: primary	0.6#	0.9	0.6	0.5	0.8	0.9	0.5	1.2
Mother's occupation								
worker: housewife	1.8	1.4	1.8	1.7	1.4	0.9	0.8	0.7
Mother's birth place								
other: Taiwan	0.6	0.8	1.6	0.9	0.7	1.2	1.1	1.5
Mother's attitude								
more (+): less (+)	0.8	0.8	1.0	1.3	0.8	0.9	0.6	1.1
Family economic index								
high: low	3.2*	2.0*	0.9	2.4*	1.6	1.4	1.6	0.9
Urbanization level								
high: low	1.3	1.0	1.3	2.0#	1.3	1.2	0.6	0.9

# p&lt;0.05      \* p&lt;0.01

The number presented in each cell is the value of relative risk

children. Additionally, the children with mothers who had graduated from senior high school and those with a low family economic index reported lower rates of eating sweets than those

children with primary educated mothers and a high family economic index.

Only two of the ten predictors were significantly correlated with the differences in

eating snacks among the 3-5 year old group. The two predictors were the economic indexes and urbanization levels of family. For the 3-5 years old group, those who lived in families with high economic indexes and urbanization levels reported significantly higher probability in eating snacks than children with low family economic indexes and urbanization levels.

Number of siblings was the only predictor for picking food behavior for both age-groups. Children with no siblings tended to have problem with picking foods more than children with siblings. Another predictor for the 3-5 year old group, but not for the 1-2 year old group, was the child's age. Compared with the 5-year old group, the 3-year old group showed a lower rate of picking foods. However, no variable was significantly correlated with refusing foods.

## DISCUSSION

A completion rate of 74.3% was found. For the children under the age of 4 years, the lower completion rates were mainly due to the situation that many young children with working mothers were sent to a relatives' or caretakers' homes for 24-hour nursing. Many foster families were located far beyond Taipei County.

Results of this study indicate that problem eating behaviors of eating snacks, eating sweets, picking foods and refusing foods commonly exist among young children. Almost one third of the subjects have these problem behaviors.

Once a child's problem behavior is detected, he/she and his/her family should participate in a behavior modification program as soon as possible. O'Brien et al [15] reviewed literature and concluded that for some children, their eating problem may be maintained by positive reinforcement, whereby the parent attends to the child's whims or demands; but for other children, the eating problem may be maintained by negative reinforcement when the deviate behavior terminates the demand. However, eating behavior must be viewed as a complex phenomenon. The assessment and intervention of children with eating problems

should include an interdisciplinary approach. The team should include a physician, dietician, nutritionist, health educator, and behavioral therapist.

It was also found that not a few of the children starting to pick or refuse foods, or to eat sweets or snacks (whether feeding by others or request by child) is during one year of age. However, the development of food preferences, as measured by fluid intake and sucking behavior, can be seen in infants as early as the first days of life [16]. With regards to the developmental speed, the cumulative rate curves increase dramatically by the age of 3 years. Therefore, the first two years of a young child's life are the key periods of his/her behavioral developments. It was noted that when children cannot completely feed themselves, their eating behavior is affected by certain familial factors [1]; and that the infant is a passive recipient of the caretaker's feedings [16]. Family thus plays an important role in establishing a child's healthy lifestyle. On the other hand, family also plays an important role in preventing the development of eating disorder.

The present study explored some possible predictors of individual eating problem through the analyses of logistic regression. For children under the of 3 years, the results suggest that the children who have primary educated mothers (reporting higher rates of eating sweets), no siblings (reporting higher rates of picking foods), or high family economic indexes (reporting higher rates of eating sweets) are at a higher risk of having inappropriate eating behaviors. For children over the age of 2 years, the results suggest that the children living in the families with high economic indexes (reporting higher rates of eating sweets and snacks), high levels of urbanization (reporting higher rates of eating snacks), or no siblings (reporting higher rates of picking foods) are at a higher risk of having inappropriate eating behaviors. These results can contribute to the development and potential for prevention of inappropriate eating behaviors. In the measurement of eating behavior, attention must be paid to the maintenance of behavior in the natural environment. The present study is cross-sec-



tional and correlational and therefore does not prove a causative role for factors in the development of eating problems. A longitudinal study design and observational instruments applied to the assessment of dietary intake will detect the causal relationship. Overall, it suggests that prevention or intervention of problem eating behavior should be implemented in young children as early as possible.

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# 台北縣正常發展之幼兒的問題飲食行為

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研究兒童的問題飲食行為之興趣，源自於飲食行為會影響兒童的生長和發育。為瞭解存在於幼兒的問題飲食行為現況，並探討它們是否與背景因素有關，以台北縣750位一至五歲的幼兒為對象，進行橫斷式調查。結果顯示，問題飲食行為包括吃零食(64.6%)、吃甜食(42.3%)、挑食(42.2%)、和拒食(32.7%)的分佈很普遍。問題飲食行為

最早出現於幼兒出生後的第一年。有問題飲食行為的比率累積曲線，在三歲以前向上增加。問題飲食行為的重要預測變項有：幼兒年齡、兄弟姊妹數、母親教育、家庭經濟指標、和都市化水準等。建議問題飲食行為的預防或介入策略，應自幼兒時期及早開始。(中華衛誌 1994；13(1)：95-104)

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