

Variables Associated With the Use of Complete Oral Calorie Supplements in Children With Feeding Problems

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ABSTRACT

Objective: To examine child and parent variables associated with complete oral calorie supplement use among children with feeding problems.

Design: Correlational examination of data from patient intake surveys.

Setting: Hospital-based feeding program.

Participants: Participants included 281 parents of children referred to a hospital-based feeding clinic, including 114 who received supplements (70.2% boys; mean age, 60.1 months) and 167 who did not receive (79.6% boys; mean age, 67.5 months).

Variables Measured: Children's age, gender, weight status, diagnostic category (no special needs, autism, or other special needs), supplement intake, oral motor problems, child mealtime behavior (using the Child Eating Behavior Questionnaire), parent feeding practices (using the Parent Mealtime Action Scale), and diet variety for child and parent.

Analysis: Chi-square analyses compared children who did and did not receive supplements for their percentage of gender, diagnostic, and weight status categories; *t* tests or Mann-Whitney *U* tests compared children who did and did not receive supplements, for age, oral motor problems, children's mealtime behavior, parent feeding practices, and diet variety.

Results: Compared with children who did not receive nutritional supplements, those who did were younger ($P < .01$) and more underweight ($P < .001$), and showed less Food Responsiveness ($P < .001$), less Food Enjoyment ($P < .001$), more Food Satiety ($P < .001$), and more Slow Eating ($P < .001$), and their parents were more likely to use Insistence on Eating ($P < .001$).

Conclusions: Whereas supplement use was related to underweight, 78.2% of children receiving them were normal weight or overweight, which suggests that supplements are being used to address mealtime selective eating. The use of supplements should be considered carefully because they do not appear to increase diet variety and may increase the chance of overweight over time.

Key Words: supplements, child, developmental disability, feeding problems, underweight, overweight, parent, meal (*J Nutr Educ Behav.* 2014;46:236-240.)

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Whereas complete oral calorie supplements (eg, Pediasure, Abbott Laboratories, Abbott Park, IL) have been widely used to address problems with weight gain and growth among children with both chronic diseases and developmental disabilities, few studies describe the use of these supplements and characteristics of the children receiving them and the parents who provide them. Even among the population in which supplements have been most studied, children

with cystic fibrosis, the research describing the benefits or limitations of their use is limited. In a recent review of supplement use, 27 studies involving children with chronic disease were identified; however, only 2 of these studies were deemed appropriate for inclusion in the review. The other studies were excluded for methodological flaws.¹ Both of these studies involved children with cystic fibrosis,^{2,3} and although both demonstrated improvements in anthropometric

measures, the authors of the review determined that no conclusions could be made about the use of complete oral calorie supplements in chronic disease. Supplement use has also been reported among children with developmental disabilities, with studies reporting between 8% and 22% of children with developmental disabilities using complete oral calorie supplements to some extent.^{4,5} Problems with oral motor functioning have been suggested as an indicator for supplement use, but there is also no research examining characteristics associated with supplement use among children with developmental disabilities.

Among children identified with feeding problems, both chronic health issues and special needs are common.^{6,7} In a range of clinical studies describing the treatment of

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feeding problems, dependence on complete oral calorie supplements has been described in children targeted for feeding intervention.⁸⁻¹¹ Although the use of complete oral calorie supplements has been documented in this population, little is known about child and parent factors associated with such dependence on supplements. The purpose of the present study was to fill these research gaps by examining the use of complete oral calorie supplements (defined as a liquid supplement that meets all of the child's nutritional needs) in a sample of children referred to a hospital-based feeding clinic, with a focus on child and parent characteristics associated with the extent of supplement use by these children.

METHODS

Participants

Information for this study was obtained from the chart review of 281 children from a hospital-based feeding clinic seen over an 18-month period, including 114 who received supplements and 167 who did not (75.8% boys; mean age, 64.5 months, SD, 41.7; mean body mass index [BMI] z score, -0.09 , SD, 1.76). This sample included only the charts of children receiving all of their caloric needs by mouth; thus, charts of all children receiving any enteral feeding were excluded. Every child was seen by a licensed psychologist who verified the special needs diagnosis through observation and clinical interview with the child's caregivers. A trained nutritionist or therapist in the clinic obtained children's height and weight for calculation of BMI scores ($\text{BMI} = \text{pounds} / \text{inches}^2 \times 704.5$) and determination of children's z scores compared with their age groups using Center for Disease Control and Prevention standards.¹²

These BMI z scores were then used to divide children into 3 weight status groups. Underweight children were below the fifth percentile for their age group, with BMI z scores < -1.645 ; overweight children were above the 85th percentile, with BMI z scores > 1.038 ; and normal weight children showed BMI z scores between and including -1.645 and 1.038 .

Procedures and Measures

As part of their feeding clinic intake surveys, parents were asked to report children's demographics, whether they gave children complete oral calorie supplements (no/yes), a measure of children's oral control problems, children's mealtime behavior, parent feeding practices, and diet variety for children and parents. The Penn State College of Medicine Institutional Review Board approved this chart review. All procedures were in accordance with Health Insurance Portability and Accountability Act regulations.

Oral motor problems were measured by a questionnaire that asked parents to report the presence or absence of 6 oral motor problems: drooling, poor tongue control, poor lip control, swallowing problems, poor sucking, and lack of chewing. The number of these 6 problems was used as the score for the child's oral motor problems (Cronbach $\alpha = .74$).

Child mealtime behavior was measured with the 8 dimensions of the 35-item Child Eating Behavior Questionnaire (CEBQ),¹³ which asked parents to use 5-point ratings (1 = never; 2 = rarely; 3 = sometimes; 4 = often; and 5 = always) for how much their children showed each behavior in a typical week. The score for each CEBQ subscale was calculated as the mean 5-point rating for items within the dimension. These 8 dimensions of child feeding behavior included Food Responsiveness (Cronbach $\alpha = .84$), Emotional Overeating (Cronbach $\alpha = .70$), Food Enjoyment (Cronbach $\alpha = .90$), Desire to Drink (Cronbach $\alpha = .92$), Food Satiety (with little appetite) (Cronbach $\alpha = .81$), Slow Eating (Cronbach $\alpha = .84$), Emotional Under-eating (Cronbach $\alpha = .78$), and Food Fussiness (Cronbach $\alpha = .79$). Originally, the CEBQ was developed with a sample of 536 children, for which these 8 dimensions showed internal reliability scores above Cronbach alpha .72 and test-retest reliability scores above 0.52.¹³ The psychometric properties of the CEBQ were also verified by factor analysis in a subsequent study.¹⁴

Parent feeding practices were measured with the 9 dimensions of the 31-item Parent Mealtime Action Scale (PMAS),¹⁵ which asked parents to use 3-point ratings (1 = never; 2 =

sometimes; and 3 = always) for how often they used each feeding practice in a typical week. The score for each PMAS subscale was calculated as the mean 3-point rating for items within that dimension. These 9 dimensions of parent feeding practice included Snack Limits (Cronbach $\alpha = .81$), Positive Persuasion (Cronbach $\alpha = .79$), Daily Fruit/Vegetable (FV) Availability (Cronbach $\alpha = .55$), Use of Rewards (Cronbach $\alpha = .69$), Insistence on Eating (Cronbach $\alpha = .70$), Snack Modeling (Cronbach $\alpha = .59$), Special Meals (Cronbach $\alpha = .58$), Fat Reduction (Cronbach $\alpha = .53$), and Many Food Choices (Cronbach $\alpha = .45$). The PMAS was developed from exploratory and confirmatory factor analysis with samples of 2,008 preschoolers and school-aged children, for which these 9 dimensions showing a mean internal validity of 0.62 and a mean test-retest reliability of 0.62. (The relatively low Cronbach alpha scores were interpreted as reduced reliability for parent actions, compared with parent attitudes about child feeding practices.) The 9 dimensions of the PMAS and these psychometric characteristics were confirmed in later samples of parents and children from Brazil¹⁶ and a hospital-based feeding clinic.¹⁷

Diet variety for children and their parents was measured by a food inventory (Table 1). The inventory used a 4-point rating to report how often 83 common foods were eaten by the child and by the parent (0 = never; 1 = monthly; 2 = weekly; and 3 = daily).

Data Analysis

Descriptive statistics were calculated for study variables, for the 114 feeding clinic children who received supplements and the 167 children who did not (Table 2). Chi-square analyses were used to compare children who did and did not receive supplements for the percentage of gender, diagnostic, and weight status categories. Children who did or did not receive supplements were then compared on a number of child and parent variables, using either a *t* test if the variable demonstrated a normal distribution based on the Kolmogorov-Smirnov z test, or using a nonparametric Mann-Whitney *U* test if the variable's distribution demonstrated a departure

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