A Comparison of Calorie and Protein Intake in Hospitalized Pediatric Oncology Patients Dining With a Caregiver Versus Patients Dining Alone: A Randomized, Prospective Clinical Trial

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Hospitalization and cancer therapy can contribute to decreased food intake in children and adolescents with cancer, making it a challenge to meet their nutritional needs. The affect of hospitalization and the eating environment for pediatric oncology patients has not been studied very well, and the effect of altering the social aspect of mealtime for hospitalized pediatric oncology patients has not been studied at all. The authors conducted a randomized, prospective clinical trial to determine if hospitalized pediatric oncology patients consume more protein and calories when eating with a family member or when eating alone in their room at mealtime. All food and beverage intake was recorded for 3 consecutive days, and a food service satisfaction survey was completed on Day 3. Food records were analyzed for calorie and protein intake, and surveys were analyzed for patient/parent satisfaction. The study was completed by 200 hospitalized patients and their parent/caregiver. Overall, neither calorie nor protein intake differed significantly between the two groups, but patient/parent satisfaction was significantly higher in the group of patients who dined with their caregiver. By using analysis of variance, the authors found that ideal body weight and years of sickness were significantly associated with calorie and protein intake.

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Meeting the nutritional needs of patients on oncology services, especially rapidly growing infants, children, and adolescents, is a continuous challenge. Inadequate nutrient intake can eventually result in malnutrition, which can lead to poorer treatment outcomes, decreased tolerance to therapy, an increased susceptibility to infections, and cancer cachexia (Mauer et al., 1990; van Eys, 1979). Ideally, nutrient intake should be increased to prevent malnutrition during this physiologically compromised period. However, a variety of iatrogenic effects as well as consequences of disease progression can cause nutrient intake to drastically decrease; these include common treatments such as chemotherapy and radiotherapy that can cause nausea and vomiting (Mauer et al., 1990). Tumor growth as well

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as medications can produce anorexia. Additional factors contributing to nutritional risks include stomatitis, diarrhea, malabsorption, blood loss, dysgeusia, xerostomia, and learned food aversions (Bernstein, 1982; Mauer et al., 1990). Furthermore, the anxiety of being hospitalized, combined with a variation in the feeding environment, can contribute to a decreased appetite (Hunsberger, 1989). Finally, hospitalized patients often eat in bed, an environment not typically associated with mealtime (Schauster & Dwyer, 1996).

With the emphasis on the physiological consequences of cancer, the psychosocial aspect of nutrition can be ignored. Eating is far more than nutrient intake; it is a social act acquired as early as birth. Beginning with the feeding relationship, food means nourishment as well as nurture to the child. Ultimately, this feeding relationship contributes to a social relationship with the family (Satter, 1990). In an effort to increase the child's overall food intake, it is important to examine the effects of making hospital mealtimes more social. The purpose of this study was to determine whether or not there is higher calorie and protein intake and satisfaction with food services when hospitalized children dine with their caregivers as compared to dining alone.

Psychosocial Aspects of Eating

Although the iatrogenic effects and consequences of cancer and its treatment are primarily responsible for decreased food intake, Williams, Virtue, and Adkins (1998) discovered that when hospitalized pediatric patients on oncology services were allowed to have more autonomy over when and what they ate, patients had significantly increased caloric intake. This increased autonomy resulted from a total change in the food service system. Previously, the children were served three meals each day at specific times. The new room service system was conducted similarly to traditional room service in a hotel. Whenever patients were hungry (between the hours of 7:00 a.m. and 6:30 p.m.), they telephoned the St. Jude Room Service and placed their order. The food was then delivered to them within 30 minutes. Williams et al. found through conducting a quality assurance project including an evaluation of calorie and protein intake, that patients' caloric intake improved significantly after the implementation of room service. In this study, through a quality improvement monitor, patient intake and satisfaction were recorded before and after the introduction of room service. Patients' calorie intake went up significantly ($p < .01$) as did protein intake ($p = .17$) after the initiation of room service. Patients also rated the food service on quality of food, acceptability of menus, times of meals and snacks, courtesy of personnel, and promptness of service. Where excellent ratings on these criteria had been 30% to 63% prior, they increased to 65% to 82% after room service was introduced.

Since this psychosocial change had such a positive effect, it is worth investigating what other changes are related to the psychosocial aspects of eating. For example, would patients eat better if allowed to eat with a family member, other patients, or health care staff? There is some evidence that eating with another person or people has positive affects on food intake. Although geriatric patients have barriers to nutrient intake such as dental problems and taste changes, Sanford (1997) found that incorporating group eating into a hospital setting increased appetites, based upon nurse observation. Wykes (1997) suggested that making inpatient mealtimes more social by having nurses eat with the patients would improve patient intake and enhance the nurse-patient relationship. Littlewood and Saeidi (1994) found that when allowed to eat with their nurse, 86% of geriatric psychiatric patients reported they liked the nurse's company at mealtimes.

Family Mealtimes

Children are most comfortable when they can eat in the presence of their family members because the pleasant environment that eating within a group can provide increases the sense of well-being associated with eating (Hunsberger, 1989). It is well established that the behaviors of parents and caregivers directly affect a child's choice of foods (Centers for Disease Control and Prevention, 1996; Crocket, Mullis, & Perry, 1988). Stanek, Abbott, and Cramer (1990) studied the diet quality and eating environment of preschool children and found that children who had social mealtimes, usually with parents, siblings, or both, ate more servings of all of the basic food groups. In the study by Stanek et al., parents of preschool children ($n = 1{,}200$) were asked to complete questionnaires about eating habits and a 1-day food dietary was completed and analyzed. A total of 427 (36%) completed surveys were returned. Stanek et al. noted that children who ate

with a companion at mealtime (a parent, siblings, or both) ate more from all food groups than those who ate alone. In these children, companionship at mealtime and positive food-related parenting behaviors were also related to improved dietary quality. Supporting positive parenting during mealtimes could improve the quality and amount of food eaten. Additionally, Vauthier, Lluch, Lecomte, Artur, and Herbeth (1996) studied food consumption in 774 parents and children using food diaries. Vauthier et al. suggested that the number of meals eaten together within a family highly contributed to similarities in energy intake, once again illustrating the emphasis of family example in determining nutrient intake.

Illness and Family Dynamics

Although the social impact of families eating together is important and should be considered, health care professionals must also understand and appreciate the psychosocial impact a child's illness has on family dynamics. For example, fears concerning death are often expressed by families of patients on oncology services through becoming obsessive about food intake. This excessive focus on eating can decrease the child's appetite even more (Bernstein, 1982; Mauer et al., 1990). When a caregiver eats with a child rather than just trying to get the child to eat, there may be less caregiver preoccupation with getting the child to eat and more emphasis on sharing the mealtime experience (Schauster & Dwyer, 1996).

Modeling

Modeling is a common behavioral approach to treatment that can be applied to feeding, and this consists of observing an influential role model perform the desired action. If the patient observes his or her caregiver enjoying eating and participating in the mealtime, this example can positively affect mealtime for the patient (Rosenthal & Bandura, 1979). Even nutrition education programs that have resulted in behavior change have used an aspect of the social learning theory that incorporates the use of influential role models (Tibbs et al., 2001). With evidence strongly suggesting the importance of socializing during mealtimes, a study demonstrating the effects of caregivers dining with pediatric patients on oncology services would add to the present body of knowledge. A study of this nature might help guide understanding on how to increase nutrient intake in nutritionally compromised pediatric patients on oncology services.

Purpose

The purpose of this study was to determine whether hospitalized pediatric oncology patients who shared mealtimes with their primary parent/family caregiver had greater nutrient intake (calorie and protein intake) than those patients who ate alone. The patients ate at the same time, and the conditions under which they ate were determined by the structure of a randomized clinical trial. In addition, patient and caregiver satisfaction with the two mealtime conditions was also compared. The specific aims of the study were as follows:

1. To compare calorie intake, protein intake, and patient satisfaction between patients dining with caregivers (Arm 1) and patients dining alone (caregiver could be present but not eating at the same time as the patient) (Arm 2, control arm).
2. To determine whether demographics such as gender, age, diagnosis, percentage of the ideal body weight, and years of sickness contributed to differences in calorie intake, protein intake, and patient satisfaction in the two meal conditions.

Definitions

The following definitions were adhered to in this study:

- pediatric = from 3 to 18 years of age
- patients on oncology services = patients with leukemia or solid tumors; patients on bone marrow transplant services and in the intensive care unit were excluded because they typically eat poorly when hospitalized and are frequently on nutritional support
- caregiver = parent or guardian
- dining with caregiver = the caregiver eats at the same time as the child in the room
- dining alone = the caregiver does not eat in the room with the child at the same time the child

eats. The caregiver may be physically present but does not eat

- nutrient intake = total protein in grams per day and total kilocalories per day
- room service = feeding on-demand rather than during traditional mealtimes
- years of sickness = the length of time elapsed from the date of diagnosis until the patient and parent/caregiver enrolled in the study

Methods

Population/Subjects

Hospitalized patients with leukemia and solid tumors who were being treated on oncology services at St. Jude Children's Research Hospital, Memphis, TN, were studied. Sequentially admitted patients, who agreed to participate in the study, were randomly assigned to a group that dined with a caregiver (Arm 1) or to a group that dined alone (Arm 2, control arm). Participants were males and females and represented a variety of ethnic and racial groups. There had to be a caregiver available to eat all meals with the patient during the 3-day treatment period for the patient to be eligible for the study.

Patients were excluded from the study if they were younger than 3 years of age or older than 18 years of age, were receiving intensive care unit services or bone marrow transplant services, were receiving parenteral or enteral nutrition, were previously enrolled in the study, had an anticipated hospital stay of less than 3 days, were unable to record food intake with 90% proficiency, had grade III or IV gastrointestinal toxicity, or were admitted in a fasted state.

The study was approved by the St. Jude Institutional Review Board, and all patients/parents on the study signed a consent form after being informed of the clinical trial protocol. Data were collected from January 1998 to August 2002. The project staff members were trained on protocol procedures, and competency with these procedures was ensured before they were allowed to enroll patients on the study. Thereafter, all staff underwent additional training on a yearly basis during competency verification sessions.

Study Procedures

The caloric and protein intake of each patient in the study was determined by the analysis of three 24-hour food diaries recorded by the caregiver. Upon consent to participate in the study, the primary caregivers were instructed on how to maintain a food diary. The food diary instruction tool was validated by randomly choosing 5-10 caregivers on each of the three inpatient floors before initiation of the study.

Once caregivers agreed to participate in the study, they were provided written information on how to keep an accurate food diary. This information was also explained orally and contained 8 points (Table 1). A practice tray was then provided to each caregiver. After they practiced recording the food eaten on the trays, the trays were checked for accuracy by the instructor. All caregivers needed to successfully complete the practice session before they were allowed to continue on the study. All food diaries recorded in this study were sent to Clinical Nutrition Services at St. Jude for nutrient analysis. The food diaries were analyzed by the CBORD Diet Analyzer System (version 2.0.1, 1991, the CBORD Group, Ithaca, NY).

Patient satisfaction was measured through the use of a food service patient satisfaction survey (Table 2). The survey was completed once by each study participant or caregiver, or both, on the patient's third day in the study. This survey addressed the patient's satisfaction with the menu, the quality of the food, the timing of food delivery, and the overall process of room service. To ensure that there was a survey completed, an investigator verbally administered the survey to the patient/caregiver. Questions were asked of patients if possible, but depending on the age of the child or how she or he was feeling, the caregiver often offered responses to the survey for the child. Sometimes patients and caregivers both completed the survey. For the purpose of analysis, caregiver and patient satisfaction survey results were blended. The information collected for each patient included demographic data, height, weight, total caloric intake per day, and total protein intake per day.

In this study, patients in the control group (Arm 2) were those who ordered according to standard room service procedures. In these procedures, patients or caregivers ordered patients meals when ready to eat and

Table 1. Food Diary Instructions

1. Write down every food or beverage that your child eats and drinks each day. Include all snacks and meals.
2. Write down exactly how much of the food or beverage your child actually ate or drank.
   Examples are
   - ½ of a tuna salad sandwich
   - ¼ of a hot dog on a bun
   - ½ of a 12-ounce can of Coke®
   - ¼ of a small Milky Way® bar
   - ½ of an 8-ounce carton of whole milk
3. When possible, use standard sizes or weights.
   Examples are teaspoon, tablespoon, cup, ounce
4. Write down brand names of items such as Kraft® American Cheese, Quaker® Instant Oatmeal, Oreo Cookies®.
5. Write down cooking methods of food.
   Examples are
   - baked fish
   - fried okra
   - stewed tomatoes
6. Write down the names of special foods or drinks such as Big Mac®, Personal Pan Pizza®, Taco Bell Grande®, Snickers Bar®.
7. Keep diary records close to wherever your child eats and drinks.
   Examples may be
   - in the kitchen
   - in the dining room
   - on the coffee table
   - in the car
8. Return the completed record to the Department of Food and Nutrition Services office or to your nutritionist.

dined alone. The treatment group (Arm 1) contained patients who when they ordered their meals, they also ordered meals for their caregivers, and the patients and caregivers dined together in the patient's room.

Study Design

The patients were randomized into the two arms of the study, stratified based on diagnosis (leukemia or solid tumor) and age (3-7 years, 8-12 years, 13-15 years, or 16-18 years). The patients in the first arm of the study ate with their caregivers after ordering via room service, and those in the second arm dined alone. The two arms are referred to as "treatment," with Arm 2 being the control group, in that it was the standard treatment. Patients had to have an expected hospital stay of 3 consecutive days to participate in the study. The caloric and protein intake of each patient was analyzed for each meal, each day. Patient satisfaction was measured by a food service patient satisfaction survey. The survey addressed the patient's satisfaction with the menu, the quality of the food, the timing, and the overall process of room service. We grouped the answers of "never," "sometimes," or "no" as *no satisfaction* and those of "frequently," "always," or "yes" as *satisfaction*.

Statistical Analysis

A total of 220 patients participated in the study, and 20 of them did not have any records of calorie and protein intake. Among the 20 patients who did not complete the records, 7 were in Arm 1 and 13 in Arm 2. No significant difference was detected by chi-square test in treatment assignment ($p = .17$), diagnosis ($p = .59$), age ($p = .28$) or gender ($p = .21$) between patients who completed the calorie and protein records ($n = 200$) and those who did not ($n = 20$). Therefore, the missing data were assumed random in the analysis, and those 20 patients who did not complete calorie and protein records were deleted from the analysis. Although patients were required to be hospitalized for 3 days, some patients did not complete all 3 days of food records. The patients who had only 1 or 2 days of food records were not excluded from the study.

The method of repeated measures ANOVA was used to check for trends in time of the calorie and protein

Table 2. Patient Survey

PATIENT ID ____________________ PATIENT NAME ______________________________________
PATIENT ROOM __________________ DATE ____

Inpatient Food Satisfaction Report

Menu/Food/Delivery				
1. Menu selections met your needs	never	sometimes	frequently	always
2. In general, all food ordered was sent/delivered	never	sometimes	frequently	always
3. Hot food was hot. Cold food was cold	never	sometimes	frequently	always
4. Food was good	never	sometimes	frequently	always
5. Special requests were handled appropriately	never	sometimes	frequently	always
6. Food was delivered within 30 minutes	never	sometimes	frequently	always
Room Service/Order Placement				
1. Room service order procedures are easy to understand	no	yes		
2. Room service order takers were pleasant and helpful	never	sometimes	frequently	always
Overall				
1. I am pleased with room service	no	yes		
2. I am satisfied with the meal service environment	never	sometimes	frequently	always

Please feel free to make any other comments or observations:

____
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____
____
____

Thank you for your assistance.

intake for Arms 1 and 2. The results indicated that neither the calorie nor protein intake changed significantly over time (p = .38 and .54, respectively). Therefore, we compared the two arms based on the patients' averages of the caloric and protein intake in the study. For the patients who had only records of 1 day for the calorie and protein intake, we used the available records; for those who had records of 2 or 3 days, we used the averages of the available records. Student's t test was conducted for the comparison. In addition, analysis of variance method (ANOVA) was used to study the effects of gender, age, diagnosis, years of sickness, and ideal body weight (IBW), along with the treatment assignment and their interactions to the caloric and protein intake. Age in the analysis was taken as a discrete value, indicating which age stratum the patient was in. Years of sickness in the analysis indicated whether the patient was diagnosed with leukemia or solid tumor within 1 year or longer. The IBW of each study participant was calculated based on his or her height and weight. All patients were classified into two groups in the analysis: less than or above 90% of IBW.

We first considered the full ANOVA model and then the induced ANOVA model by removing from the full model the interaction terms that were found not to be significant. Analysis results under the two models were consistent. The Breslow-Day test was used to check the homogeneity of the odds ratios among the 10 questions in the patient satisfaction survey, and there was no significant nonhomogeneity detected (p = .76). The Cochran-Mantel-Haenszel test was then used to check the difference of the overall satisfaction rates between the two treatment arms. We estimated the common odds ratio of Arm 1 versus Arm 2, which provides a measure of the satisfaction of the two Arms. All tests

Table 3. Characteristics of Study Participants

Characteristic		Total (*N* = 200)	Treatment Group: Ate with caregiver (*n* = 102)	Treatment Group: Ate alone (*n* = 98)
Gender	Male	111 (55.5%)	52 (50.98%)	59 (60.2%)
	Female	89 (44.5%)	50 (49.02)	39 (39.8%)
Diagnosis	Leukemia	128 (64%)	65 (63.73%)	63 (64.29%)
	Solid tumor	72 (36%)	37 (36.27)	35 (35.71%)
Ideal body weight (kg)	< 90%	43 (21.5%)	21 (20.59%)	22 (22.45%)
	= 90%	157 (78.5%)	81 (79.41%)	76 (77.55%)
Median age in years (range)		9.14 (3.01-18.94)	9.11 (3.01-18.42)	9.17 (3.04-18.94)
Mean ideal body weight (lbs)		102.54	103.15	101.91

were two-tailed, and the significance level was set at $p = .05$. The data analysis was conducted using the statistical software SAS (SAS Institute, Inc.).

Results

Study Participants

Of the 200 patients who had calorie and protein intake records, there were 111 males and 89 females, spanning 3.0 to 18.9 years of age (median 9.14 years). Within the group of study participants, 128 (64%) of them were leukemia patients and 72 (36%) were diagnosed with solid tumor. Seventy-nine percent of the patients' weight were above or equal to 90% of their IBW. Fifty-one percent of patients were assigned to eat with a caregiver, and 49% of patients dined alone. Table 3 tabulates a summary of the patient characteristics.

Analysis of Calorie and Protein Intake

The mean calorie and protein intake of the two arms of the study were close in value (see Table 4), and there was no significant difference between the two arms ($p = .97$ for calorie and $p = .88$ for protein, *t* test). The 95% confidence intervals of the mean calorie and protein intake are presented in Table 4.

Table 4. Calorie and Protein Intake of Two Arms

Treatment Arm	*N*	Mean (95% Confidence Interval)
Calorie intake (Kcal/day)		
Ate with caregiver	102	931 (814-1,048)
Ate alone	98	934 (809-1059)
Protein intake (gram/day)		
Ate with caregiver	102	30.9 (26.4-35.5)
Ate alone	98	30.5 (25.6-35.4)

The factors included in the ANOVA were treatment assignment, gender, age, diagnosis, years of sickness, IBW, and their interactive effects. We found age was strongly associated with the intake of calories and protein. Ideal body weight was marginally significantly associated with calorie intake ($p = .08$) and significantly associated with protein intake ($p < .01$). In addition, years of sickness was significantly associated with the intake of calories ($p = .03$) and protein ($p = .04$).

We also found that the interactive effects of gender and treatment, gender and diagnosis, diagnosis and IBW, and age and IBW on the calorie and protein intake of patients were significant (see details in Table 5). Female patients who ate alone and male patients who ate with a caregiver had significantly more calorie and protein intake (see Table 6). Differences in calorie and protein intake among the different age strata were studied, and we found that children at ages 13-15 years took in significantly more calories and protein than the other groups. We also found that the patients ages 3-7 years tended to eat better alone, but the age 8-12 years group tended to eat better with caregivers (see Table 6). However, within each age stratum, the calorie or protein intake did not have significant differences between the two arms.

We examined calorie and protein intake in relationship to IBW and found that the calorie and protein

Table 5. Results of Reduced ANOVA Model

Classification	*F* value	*p* value
Calorie intake		
Treatment	0.01	.97
Gender	0.55	.46
Diagnosis	0.93	.34
Age	2.81	.04*
IBW	3.13	.08
Years of sickness	4.70	.03*
Treatment • gender	4.29	.04*
Gender • diagnosis	8.00	< .01*
Diagnosis • IBW	4.64	.03*
Age • IBW	3.21	.02*
Protein intake		
Treatment	0.02	.88
Gender	1.10	.30
Diagnosis	0.29	.59
Age	3.73	.01*
IBW	7.28	< .01*
Years of sickness	4.40	.04*
Treatment • gender	5.42	.02*
Gender • diagnosis	5.13	.03*
Diagnosis • IBW	4.66	.03*
Age • IBW	4.39	< .01*

*Statistical significance.

intake tended to be higher in the below 90% IBW group (see Table 6), and the protein intake was significantly higher than the patients who were above 90% IBW ($p < .01$; see Table 5). But in both IBW groups, the calorie or protein intake did not differ significantly between the patients who ate with their caregivers and those who dined alone (see Table 6).

Last, we studied calorie and protein intake in relationship to years of sickness and found that the calorie and protein intake were significantly higher in the patients who had been sick for more than 1 year. Yet, there were no significant differences between calorie and protein intake between the patients who ate in Arm 1 or Arm 2 (see Table 6).

Analysis of Patient Satisfaction With Food

We compared patient satisfaction rates between the two arms of the study by using the Cochran-Mantel-Haenszel test. The overall satisfaction rates were significantly different between the two treatment arms ($p < .01$). The estimate of the common odds ratio of the satisfaction of the two arms was 1.70, with a 95% confidence interval ranging from 1.35 to 2.15. This suggests that patients who ate at the same time as their caregiver reported experiencing significantly higher satisfaction with their food service than those who dined alone.

Discussion

Overall, we found no significant difference in the total protein or calorie intake of children eating at the same time as their caregiver when compared to children dining alone. Because caregivers who were not eating with the child could still be physically in the room, this may have contributed to the lack of differences seen. An approach may have been to have caregivers leave the room to assess the difference more accurately; however, this would not be feasible, maybe not even ethical, in very young children. There may be issues of patient safety as well. However, this approach might be feasible in an older child and adolescent. According to Skolin, Hursti, and Wahlin (2001), 10% of patients report that the “ward environment" is responsible for their poor eating. Further investigation of the "eating" environment is needed.

Once we looked at more specific factors, we found some interesting differences. As might be expected in an American culture, older patients ate more overall calories and protein than younger patients, but it is interesting to note that some groups ate better when eating alone, whereas some ate better while eating with their caregiver. Younger children, ages 3-7, ate better alone, whereas children 8-12 ate better with their caregiver. This is the opposite of what one might expect. It seems more natural that the younger children would eat better with their caregiver. This is more consistent with the findings of Stanek et al. (1990), where it was reported that preschool children ate better if they ate with a companion who also ate, whether that be parent, sibling, or both. It could be that parents did not eat with the child but stayed in the room to assist. This may have influenced how much the child ate, so that the two arms were more similar in this age category than in the others. Also, it could be that the socialization of mealtime is more important to the older child.

Another interesting finding is that increased calorie and protein intake was associated with lower IBW (< 90%). This could be due to dietitian involvement. Although dietitian involvement was not monitored for

Table 6. Interactive Effects of Calorie and Protein Intake

			Mean (95% Confidence Interval)	
Classification	**Ate with caregiver**	***N***	**Calorie intake Kcal/day**	**Protein intake grams/day**
Gender				
Female	Yes	50	817 (661-974)	26 (20, 31)
	No	39	1003 (771-1236)	33 (24, 42)
Male	Yes	52	1040 (866-1214)	36 (29, 43)
	No	59	887 (743-1032)	29 (23, 35)
Age				
3-7	Yes	39	720 (583-857)	23 (18, 28)
	No	36	874 (737-1012)	27 (23, 32)
8-12	Yes	32	1073 (819-1327)	35 (26, 44)
	No	31	879 (686-1072)	29 (22, 36)
13-15	Yes	13	1130 (775-1484)	40 (24, 56)
	No	15	1127 (656-1597)	42 (20, 64)
16-18	Yes	18	992 (679-1305)	34 (21, 47)
	No	16	991 (502-1480)	30 (13, 47)
IBW				
< 90%	Yes	21	1063 (735-1391)	38 (25, 51)
	No	22	1074 (727-1421)	39 (24, 54)
= 90%	Yes	81	897 (773-1021)	29 (24, 34)
	No	76	893 (763-1023)	28 (23, 33)
Years of sickness				
< 1 year	Yes	79	862 (731-992)	29 (24-34)
	No	75	909 (768-1050)	29 (24-35)
= 1 year	Yes	23	1169 (910-1428)	39 (29-49)
	No	23	1013 (725-1301)	34 (24-45)

these patients, the clinical practice guidelines at St. Jude Children's Research Hospital are such that dietitians were more likely to be working with patients who have IBW below 90%. Thus, encouragement from the dietitian may have prompted the patient to eat more. This also may be the reason patients who had been sick for a longer period of time ate better. It could be that they had previously experienced some nutritional side effects of their therapy and were being followed by a dietitian. If so, they may have been encouraged to eat more—the potential for this intervention was not monitored. In another study, 42% of the parents reported emotional support and practical help as important for their child's eating problems (Skolin et al., 2001). The dietitian may help to provide this support and practical advice, thus promoting improved intake.

We had purposely eliminated bone marrow transplant, intensive care patients and patients receiving parenteral or enteral support from this study. It was felt that they were sicker and were eating less, and that these factors would skew the study results. Based on our study findings, however, patients who were sick for longer periods of time (ie, greater than 1 year) actually ate better. An area for additional research might be to look at one or more of these "excluded" groups to see if the relationship between length of sickness and calorie and protein intake hold true with these other groups.

Another possible research study might be to look at outpatients versus patients in the hospital. It may also prove worthwhile to stratify patients based on current therapy, which was not done in this study.

Patients who ate at the same time as their caregivers expressed significantly greater satisfaction with food services. This, in itself, is sufficient reason to allow caregivers to eat with patients, in that satisfaction and quality of life are extremely important for all people. In a recent article by James et al. (2002), 69% of the caregivers reported that they had insufficient time to meet their own needs due to the demands for caring for a sick child. One of the negative side effects of this lack of time was a weight change. Additionally, these caregivers reported that time-saving conveniences would be a

benefit to them and that they had given up a focus on self-care in order to care for their child. Meals provided in the room could be seen as a time-saving benefit and a way to enhance self-care. Providing caregivers with a meal in the room may alleviate some stress from caregivers and thus contribute to their improved quality of life. Because caregivers at St. Jude are provided free meal tickets that can be used in the inpatient setting or cafeteria, there is no cost savings to allowing caregivers to eat in the room with patients. In other hospitals, patients could be billed for caregiver trays to offset the lost revenue from cafeteria sales.

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