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Comparison of long-term care residents' food intake, body weight, and food costs between two meal service styles

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COMPARISON OF LONG-TERM CARE RESIDENTS' FOOD INTAKE, BODY
WEIGHT, AND FOOD COSTS BETWEEN TWO MEAL SERVICE STYLES

By

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Thesis

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In

Human Nutrition

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“I can do all things in Christ who strengthens me.” Phil 4:1

Abstract

The purpose of this study was to determine if residents (n = 26) living in an Iowa long-term care facility had differences in food intake at their noon meal and body weight when served traditional tray meal service for 10 weeks compared to being served restaurant-style meal service for 10 weeks. The study also evaluated the facility's raw food costs of the two meal service styles.

Mean meal intake scale scores improved when residents were served restaurant-style meal service (0.4 ± 0.3) compared to traditional tray meal service. Residents did not show a significant percent weight ($1.1\% \pm 3.7\%$) change or percent BMI ($0.9\% \pm 3.7\%$) change between the two styles of meal service; however, 16 residents (62%) lost weight. There was a minimal difference in raw food costs between traditional tray meal service and restaurant-style meal service.

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Chapter I

Introduction and Background

A long-term care facility may become an elderly person's home for the rest of his or her life. Because of this there is an increasing trend to make facilities less "institutional" and more "resident-centered." Part of resident-centered care involves allowing residents to participate in diet-related decisions, increasing their desire to eat and enjoy food, thus decreasing their risks of weight loss, undernutrition, and other potentially negative effects of poor nutrition and hydration (1). Unfortunately, weight loss and malnutrition are common occurrences in long-term care facilities. In a meta-analysis of 10 studies by Morley and Silver (2), prevalence of protein-energy malnutrition ranged from 17% to 65% in long-term care residents. Study results varied depending on how the authors defined protein-energy malnutrition. Professionals working with the elderly living in long-term care facilities, including medical and nursing staff, registered dietitians, foodservice staff, and administrators, need to recognize the potential for weight loss and malnutrition and establish resident-centered meal options that reduce such risk.

Statement of the Problem

The problem with poor meal intake in the elderly is that it can lead to weight loss. Weight loss is one of the key indicators of poor outcome in a long-term care facility. Residents who lose 5% of their body weight in 30 days, 7.5% in 90 days or 10% in 180 days are at significant risk for malnutrition (3). The majority of persons with weight loss in long-term care either have protein-energy malnutrition or dehydration (4). Malnutrition and poor nutrition increase the likelihood of infections, pressure ulcers,

anemia, hypotension, decreased wound healing, and hip fractures, and contribute to confusion and impaired cognition (1,2). All of these conditions increase a resident's risk of morbidity and mortality. Conversely, excess weight gain leading to obesity can also be a type of malnutrition. Obesity is less common in long-term care residents, but when it occurs, it can be associated with immobility, decreased functional status, infections, and the development of pressure ulcers (2). It is important for long-term care professionals to provide an environment that will encourage good nutritional status.

Weight is a complex issue within long-term care and is influenced by many factors. One factor called "anorexia of aging" involves the smaller amounts of food people consume as they age. Reasons for reduced food intake among the elderly include decreased physical activity, disease conditions, more powerful signals of satiety, and a lower resting metabolic rate (1,5). Decreased appetite and food intake can also be related to changes in taste and smell that occur as people age. These problems can affect nutritional status and may also contribute to decreased pleasure with eating (6).

Another factor affecting a resident's weight is the food available in the facility and the way it is served. Food has many personal meanings to each resident that can either positively or negatively affect the quality of their remaining years (5). Evans and colleagues (7) interviewed residents (n=20) to examine their perspectives about quality dining in long-term care. When asked about menu selections, one respondent reminisced about foods served to her during happier times. "Oh gosh, my mother would make homemade cinnamon rolls and put walnuts in them." Other residents relied on family members to bring in traditional foods from home to satisfy their appetites and emotional

needs. An unacceptable or unpalatable diet can lead to poor food and fluid intake, resulting in weight loss and undernutrition and a spiral of negative health effects (1).

One way to encourage good meal intake is to liberalize the diet prescriptions whenever possible. It is the position of the American Dietetic Association that the quality of life and nutritional status of older residents in long-term care facilities may be enhanced by liberalization of the diet prescription (1). Liberalized diets allow residents to make their own decisions regarding food intake. A benefit of liberalized diets is that residents may eat an increased variety of foods, especially fruits and vegetables, which is associated with better nutritional status (8).

Finally, offering long-term care residents a choice of food at mealtime may help increase their nutritional intake. Crogan and colleagues (9) conducted a qualitative study and discovered that residents wanted to choose the foods they ate and wanted a voice in menu development. Traditionally in long-term care, the facility, a consultant, or a corporate dietitian develops cycle menus that repeat every three to five weeks. Although federal regulations require an alternate food item be available, mealtime choices can be limited. A more resident-centered approach is that the foodservice offers a wide range of menu options seeking input from residents, family, and staff (9). This type of liberalized approach produces several benefits, including better nutrition intake, lower incidence of unintended weight loss, more consistent blood glucose levels, and, perhaps most importantly, improved quality of life for the residents (1).

Resident-Centered Meal Service

Resident-centered meal service is no longer about serving the food on trays or adding tablecloths. The Centers for Medicare & Medicaid Services (10) have developed

survey protocols and interpretive guidelines for personnel conducting surveys in long-term care. These regulations state that the facility provides food prepared by methods that conserve nutritive value, flavor, and appearance. They also state that food is palatable, attractive, and at the proper temperature, and substitutes must be offered of similar nutritive value to residents who refuse food served. Although federal and state governments highly regulate foodservice in long-term care, there is room for innovative new ideas that will enhance each resident's dining experience.

Some long-term care facilities have chosen to serve meals in a more homelike manner, and their residents have benefited from it. Nijs and colleagues (11) conducted a randomized controlled trial on two groups of residents without dementia living in five Dutch long-term care facilities. During the six-month study, the intervention group (n=95) received family-style meal service, and the control group (n=83) received individual tray meal service. Quality of life, physical performance, and body weight were the outcomes measured. Residents receiving tray service chose their meal two weeks in advance, and the cooked food came served on an individually pre-plated tray. Residents who received family-style meals got a cooked meal served in dishes on the table and a menu choice between two types of vegetables, meat, and potatoes. Study results demonstrated that family-style meal service prevented a decline in the quality of life, physical performance and body weight of long-term care residents without dementia.

Nijs and colleagues (12) also conducted a randomized controlled trial with similar subjects and the same methods as those listed above but used intakes of energy, carbohydrates, fat, protein, and a Mini-Nutritional Assessment (MNA) score as outcome measures. Results showed that residents who received family-style meal service

consumed more total calories and macronutrients (+ 235 calories, + 29 g carbohydrate, + 9.1 g fat, + 8.6 g protein) than residents who received tray service during the six months of the study. Also, the percentage of residents who received family-style meals and who were classified as malnourished by the MNA decreased from 17% to 4%. The percentage of residents classified as malnourished who continued to receive tray meal service increased from 11% to 23%.

A study by Desai and colleagues (13) compared how changes in meal service impacted energy intakes in cognitively impaired long-term care residents. Researchers hypothesized that residents served restaurant-style meal service would have higher intakes than residents served traditional tray service. Although other environmental factors may have played a role in food intake, such as plate presentation, temperature, food choice at time of service and portion size flexibility, study results showed that residents (n=22) who received restaurant-style meal service consumed a mean of 265 ± 55 more calories per day than the residents (n=26) who received tray service. More importantly, these higher intakes occurred in individuals with lower Body Mass Indexes (BMIs), showing that high risk, cognitively impaired residents benefited the most from the changed foodservice and dining environment. Those individuals with higher BMIs did not show substantive differences in overall intake. This study is promising in that those residents who are at the highest risk of becoming malnourished are positively affected with the change in foodservice.

Finally, some long-term care facilities have turned their dining rooms into restaurants. As long ago as 1981, Macke Co., part of Custom Management Corporation (14), who operated foodservice management businesses at hospitals, retirement

communities, and long-term care facilities, transformed one of their facility's game rooms into a softly candlelit, reservations-only restaurant. A company representative discovered that in-house restaurants very successfully relieve the monotony of "captive dining" for elderly customers. "I can't think of any other program that is appreciated as much by the residents. It gives them a feeling of independence that they don't get at any other time."

While not all long-term care facilities can turn game rooms into upscale restaurants, several have successfully transformed their traditional tray meal service into restaurant-style meal service, giving residents an array of choices. One facility, Lutheran Home-Hickory (15) in North Carolina, received a grant from the Long-Term Care Enhancement and transformed their dining area. Not only did they change the décor, they added a buffet line. Residents were served their drink of choice and the soup of the day while they waited for their meal. If a resident disliked broccoli but asked for a double portion of macaroni and cheese, they were allowed to make that choice. Another facility, Abernethy Laurels (15), has found that since instituting table-side dining services, resident satisfaction in food quality and atmosphere rose phenomenally. Weight loss was reduced and malnutrition became non-existent. The ability to choose their own foods, socialize with friends, interact with attentive staff members, and enjoy a delicious and healthy meal provided a dignity unmatched by most other services (15).

Purpose and Definitions of the Study

Based on a review of the literature, study hypotheses include:

- Long-term care residents will eat more on average when participating in restaurant-style meal service than when they receive traditional tray meal service as evidenced by daily recorded noon meal intake scaled scores.
- Long-term care residents who participate in 10 weeks of restaurant-style meal service will not have a significant weight change compared to their participation in 10 weeks of traditional tray meal service as evidenced by percent weight gain/loss and percent change in BMI.
- Restaurant-style meal service will not significantly increase raw food costs to the facility compared with traditional tray meal service.

For this study, terms are defined as follows:

Restaurant-Style Meal Service: At the noon meal, a certified nurse's aide (CNA) brought each resident who could make their meal choice a generic menu listing the "posted menu" and menu alternates such as a chef salad, a soup/sandwich combination, and various side salad choices. The "posted menu" came from the five-week cycle menu developed by the dietary manager and the consultant dietitian. The resident made his/her menu selections. The CNA relayed those selections to the kitchen staff that plated the resident's choices.

Traditional Tray Meal Service: Residents were asked upon admission about their likes/dislikes by the dietary manager. These were placed on their diet card, which was kept in the kitchen. A five-week cycle menu was developed by the dietary manager and consultant dietitian. Foods listed on the menus were served to each resident according to his/her diet order, noting his/her pre-stated likes/dislikes. If a menu item was listed as a dislike, a substitute was automatically served.

Meal Intake Records: Records were completed by foodservice staff by direct observation immediately after residents were done eating. Dietary staff charted the following scaled scores for the percentage of the food eaten at the noon meal: 0 or R (refused) = 0% intake, 1 = 25% intake, 2 = 50% intake, 3 = 75% intake, 4 = 100% intake. Fluid intakes were recorded separately and were not counted in the scaled score for this study.

Anthropometric Measurements: Each subject was weighed at the beginning of the study, after 10 weeks, and at the end of the study on a balance beam wheelchair scale (Detecto, Web City, MO USA). All subjects were clothed and weighed at similar times. For example, some subjects were weighed each time before breakfast and after voiding. Other subjects were weighed each time in the afternoon. A trained certified nurse's aide weighed the residents using the same technique all three times. Height was obtained from the resident's chart. Body Mass Index (BMI) was calculated as weight (kg) divided by height (m²). Percent weight loss was calculated as follows:

$$\frac{\text{Current weight} - \text{Past weight}}{\text{Current weight}} \times 100$$

Resident-Centered Care: One component of resident-centered care involves the type of meals served to a person living in a long-term care facility. This term is used interchangeably with terms such as "individualized care," "person-centered care," and "patient-centered care." Since this study deals with the type of meal service to long-term care residents, all such terms are classified as "resident-centered care."

Summary

Weight loss and malnutrition are not always avoidable in elderly people living in long-term care facilities due to their disease process. However, when it is avoidable,

long-term care professionals need to do everything they can to help residents maintain both their weight and their quality of life. Based on the literature, one method of doing both may be by making simple changes in the style of meal service.

Encouraging the elderly to eat a variety of foods and offering choices in what and how much is served may be effective ways of reducing malnutrition. While restaurant-style meal service is not the only way to give residents a choice, it has been shown to be a very resident-centered style of foodservice.

Chapter II

Review of Literature

Introduction

This chapter will explain in further detail the importance of resident-centered care, assessment of malnutrition in elderly long-term care residents, the use of meal service as a means to lower the risk of malnutrition, the differences in dining styles, and techniques to properly determine food intakes.

Resident-Centered Care

The Institute of Medicine (IOM) (16) has designated resident-centered care as one of six core needs for American health care. An IOM 2001 report, *Crossing the Quality Chasm: A New Health System for the 21st Century*, defines resident-centered care as “providing care that is respectful of and responsive to individual resident preferences, needs and values, and ensuring that resident values guide all clinical decisions.” Some of the key components of this care include knowing the person as an individual and being responsive to individual and family characteristics, emphasizing freedom of choice, and appropriately involving the person’s family, friends, and social network (17).

The Centers for Medicare & Medicaid Services (10) have set guidelines regulating the care in long-term care facilities. One of these guidelines mandates that resident care must enhance dignity and respect in full recognition of his or her individuality. This includes promoting resident independence and dignity in dining. Another guideline states that food should be palatable, attractive, and at the proper temperature as determined by the type of food to ensure resident’s satisfaction. Both of these guidelines support resident-centered care.

One way for dietitians to provide resident-centered care is to work closely with the facility's foodservice manager to develop menus and dining experiences that are pleasurable, preserve resident dignity, and accommodate preferences (1). Nutrition is one of the major determinants of successful aging and, for most, eating is one of life's most pleasant daily experiences (18). Residents who enjoy their meals are more likely to eat adequately, resulting in less food waste and decreased risk of malnutrition and weight loss.

Resident-centered care is not a new concept, but its implementation has been slow in some health care facilities where the organizational structures value paperwork compliance rather than older adults' satisfaction with care (16). Long-term care residents often have complex health care conditions that limit their function, depress their senses of taste and smell, require multiple medications, and necessitate therapeutic or mechanically altered diets (18). These treatments can limit independence, choice, and pleasure and have a negative effect on quality of life (18). In the interest of preserving both the health and happiness of their residents, long-term care facilities need to find a balance between residents' required medical treatments and personal preferences (18).

Implementation may also be slow if corporations or facility administrators are afraid of any increased costs associated with practicing resident-centered care. However, focusing care on individual residents should help lower the risks and the costs associated with malnutrition. The challenge for long-term care staff is to provide care that satisfies the residents while keeping costs at or below current standards.

Assessment of Malnutrition

Taber's Cyclopedic Medical Dictionary (19) defines malnutrition as the "lack of necessary or proper food substances in the body; any disorder of nutrition due to a deficient diet or deficient breakdown, assimilation or utilization of food." It covers a range of disorders from undernutrition to overnutrition. To determine whether a resident suffers from a diagnosis of malnutrition, he or she must be thoroughly assessed. One tool clinicians can use for assessment is the Mini-Nutritional Assessment (MNA) (4). The MNA evaluates anthropometric measurements such as BMI, mid-arm circumference, calf circumference, weight loss, medications, disease state, mobility, cognition, skin issues, dietary intake, and a self-assessment. Although the MNA is an appropriate nutritional screening tool for long-term care residents, there is no "gold standard" for diagnosis (4). The MNA does not include biochemical data, and appropriate ranges for BMI are disputed with cut-off points of optimal BMI ranging from 18.5 – 29.0 (20, 21, 22). According to Morley and colleagues (4), clinical judgment remains the "gold standard" in diagnosing malnutrition.

The National Institutes of Health Guidelines for the Identification, Evaluation, and Treatment of Obesity (23) recommend using BMI as a practical approach of assessing body weight. In fact, many studies use BMI as a measure of nutritional status. However, BMI may not be the best measurement to use with elderly people. The American Dietetic Association publication, *Nutrition Care of the Older Adult: A Handbook for Dietetics Professionals Working Throughout the Continuum of Care*, states that usual body weight is the preferred standard for older adults, with the most important issue being achievement of a stable weight for a period of six months or more (24). To

accurately measure weight, facility staff need to weigh residents at the same time of the day each month, dressed in minimal clothing without shoes (4).

A study by Suominen and colleagues (25) suggested that by closely monitoring elderly long-term care residents' weights, clinicians can partially assess nutritional status. Researchers compared energy and nutrient content of all food served in a 14-day period to 23 elderly residents with dementia in one facility in Finland. All the residents were either malnourished or at risk of being malnourished, according to the MNA. Nurses weighed the residents on the same scales as usual once a month for 3 months. Residents ate less total energy than was recommended, but consumed adequate nutrients with the exception of vitamins D and E and folic acid. Even with inadequate energy intakes, 57% of the residents studied had not lost weight and the rest of them only lost between 1 and 3 kg.

Another study by Ryan and colleagues (26) suggested that weight loss, as an indicator of protein-calorie malnutrition, increased the mortality of long-term care residents. Researchers found that out of 153 long-term care residents studied, the 24 residents who lost at least 5% of their body weight in one month were 4.6 times more likely to die within one year. Body weight is therefore a useful tool to identify residents at increased mortality risk.

To summarize, malnutrition covers a wide range of disorders where a resident is not consuming adequate nutrition. Clinicians can use the MNA, among other assessment tools, to diagnose malnutrition, but the most commonly used indicators are BMI and weight changes over time. Either one of these indicators are appropriate to screen residents for nutritional risk.

Foodservice

Many facilities use high calorie supplements or fortified food to meet the nutritional needs of those residents at risk for malnutrition. While these are good short-term approaches, researchers have begun to identify certain foodservice factors that could affect nutritional risk.

A study by Carrier and colleagues (27) discovered that there was a potential link between certain foodservice practices and the risk of malnutrition in 132 cognitively intact long-term care residents living in 38 facilities in New Brunswick. Risk of malnutrition was measured using a valid nutritional screening tool based on BMI and percentage of weight loss over time. Study results showed that one foodservice factor that significantly increased the probability of residents being at risk of malnutrition was buffet-style meal service. Researchers stated that when residents ate in dining rooms where food was served buffet-style, they tended to choose smaller portions. More research is needed to determine how food delivery systems influence risk of malnutrition.

Conversely, Shatenstein and Ferland (28) found that buffet-style meal service favored resident-centered care without negatively affecting nutritional status in 22 long-term care residents with dementia. This pilot project evaluated food intakes, anthropometric measurements, and biochemical parameters of tray meal service compared to buffet-style meal service. Although the study lasted for only 10 weeks, researchers concluded that buffet-style meal service led to greater food consumption by residents, but it had no impact on weight or on the other nutritional status parameters evaluated. Longer follow-up was needed to determine if these results can be sustained.

Surprisingly, Carrier and colleagues (27) found that residents who expressed overall food satisfaction had an increased risk of malnutrition. The standard assumption is that residents who are satisfied with food will consume adequate quantities. This study found just the opposite. It could be that malnourished residents were satisfied with the foods they actually consumed, but they left large portions of disliked foods on their plates uneaten, not wanting to complain. Residents who directly stated their food dissatisfaction to staff more frequently received foods they preferred and, thus, increased their appetite and nutritional status.

Finally, Carrier and colleagues (27) found that a longer menu cycle of 28 days compared to 21 days helped to decrease residents' risk of malnutrition. The longer cycle may help increase the variety of foods offered and reduce monotony, resulting in larger energy intakes. This reinforced the fact that offering several choices at a meal enhances resident food satisfaction and gives a sense of control.

Each resident has the right to make choices about his/her life and health care in the facility (29). For example, residents should be able to choose where and what they want to eat. Facilities should not have a "one-size-fits-all" approach to meals and snacks. Evans and colleagues (7) stated that when the relationship between appetizing food, quality food service, and quality of life in long-term care is investigated, some residents indicated that they often dislike the food served to them because of appearance, lack of variety, or failure to address their personal preferences. Crogan and colleagues (9) found that some residents who perceive that their input is not valued give up in frustration and feel isolated.

In their qualitative study, Evans and colleagues (7) examined 20 residents' perspectives about quality dining in long-term care. Some of the choices residents want include getting enough to eat, having a variety of foods to choose from, and being able to choose an alternative to food dislikes. In regard to getting enough to eat, residents wanted appropriate amounts of food, not so little that they go away hungry and not so much that they were overwhelmed by the amount of food on their plates. Many residents discussed at length the problem of lack of variety, but they liked having the ability to make substitutions when they didn't like what was on the menu. Clearly, more than dietary prescriptions were being attended to when residents got just the right amount and type of food they wanted and their requests for alternatives or additional servings were granted.

Catering to residents' wants and needs can have significant results. Anonymous (30) described a 120-bed long-term care facility in Kansas where more than 10% of the residents suffered from significant weight loss in the late 1990s. Interviewers spent six months with residents and staff to discover problems, and they recommended simple changes in their foodservice, including cutting the entrée into bite-sized pieces after cooking, then reassembling it; reducing scoop sizes to alleviate resident complaints about large portions of food; serving beverages in glasses rather than in sealed containers; serving muffins, appetizers, or salads at the beginning of the meal to encourage residents to stay in the dining room; serving food on colored plates or adding a colorful garnish to help the visually impaired; and liberalizing seasoning restrictions to improve taste. Within one year, the number of residents losing weight decreased by 75%, while overall fluid consumption nearly doubled. Resident complaints about foodservice were cut in

half, and decreased overall food waste allowed the facility to buy better quality food. Costs of these changes were minimal.

Long-term care facilities are regulated by the federal Centers for Medicare and Medicaid Services through delegated authority to each state. In North Carolina, the Division of Facilities Services encourages facilities to assess and operationalize various dining methods, allowing residents to select their foods, dining times, dining patterns, and other preferences (29). The regulations allow facilities to utilize innovative dining approaches, such as buffet lines, restaurant-style, or family-style serving options to promote a more pleasing atmosphere (29, 31). Residents desire family dining experiences that include serving plates of hot food from steam tables or hot carts located in the dining room instead of trays from the kitchen (9). Positive and successful dining programs promote independence and self-esteem and encourage residents to eat and drink more, resulting in less weight loss (31, 32).

Dining Styles

Many dining styles exist, but is there a particular style of foodservice in long-term care facilities that works best? Based on the studies by Nijs and colleagues (11, 12) explained in Chapter I, family-style meal service prevents a decline in the quality of life, physical performance, and body weight of long-term care residents without dementia. Results showed that mean body weights and energy intakes decreased significantly in those residents who received tray meal service. However, mean body weights remained relatively stable, while mean energy intakes increased significantly in the residents who received family-style meals. The advantage of family-style meals in these studies was that it did not create a new task for the staff; it was embedded in the daily activity pattern.

These results suggest that family-style meal service is a way to prevent malnutrition without having a negative influence on staff satisfaction, workload, or cost to the facility.

Remsburg and colleagues (33) conducted a three-month pilot study to determine the feasibility of implementing a comprehensive buffet-style dining program and to determine its impact on weight and biochemical indicators of nutritional status among long-term care residents. Forty residents from three long-term care units were randomized to participate in buffet-style dining at supper only or to continue to receive the traditional tray-style meal service. Buffet-style meal service allowed residents to see the food served from the steam table, select from a variety of food choices, and ask for small portions or seconds of selected foods while maintaining ideal food temperatures. Study results showed biochemical data did not change significantly, weight remained constant, quality of life seemed to be enhanced, and overall resident satisfaction ratings with food and dining services increased by 25% with buffet-style meal service. Unfortunately, the facility's change to buffet-style meal service did result in new costs. Tablecloths and dining room decorations were purchased. Cabinetry was installed to house steam tables and to store bulk items, and small refrigerators were purchased to store cold items in each dining room. Special electrical outlets were installed to accommodate the steam table, and new food shippers and utility carts were purchased to transport food and supplies to the nursing unit dining rooms. In contrast, the costs of food, food preparation, and foodservice personnel did not change.

Desai and colleagues (13) found that restaurant-style meal service improved food temperature and plate presentation, flexibility in portion size, and food choices at the time of service. Leppert (34) interestingly noted that the evening meal, which traditionally has

fewer staff available to assist with meal service, demonstrated the greatest positive impact on intake in residents served restaurant-style meals.

One factor facilities need to consider when deciding between meal service styles is the amount of food waste generated. A study by Hackes and colleagues (35) compared food waste generated in three styles of meal service: tray service, restaurant-style service, and family-style service. Of the three styles, residents who received tray service discarded more food waste by weight for all three meals than residents receiving either family-style service or restaurant-style service. Most of this waste was discarded at lunch, the main meal of the day. Less plate waste is evidence that the needs of the residents are being met (36). Of the various styles of meal service discussed, both family-style and restaurant-style service had positive benefits to the residents and staff without increased costs to the facility.

Food Intake Determination

Once a facility decides which style of meal service is best suited to their residents and staff, they need to carefully evaluate how resident meal intakes will be monitored. Reed and colleagues (37) found that the prevalence of low food intake (54%) and fluid intake (51%) was high among residents (n=407) with dementia in 45 assisted living and long-term care facilities in four states. Unfortunately, there was a discrepancy between these researchers' observations and the intakes reported by staff. By periodically reviewing meal intake records, clinicians could put interventions into place to increase resident intakes. However, those records must be as accurate as possible. Errors in meal intake documentation can give a false picture of a resident's nutritional status, which may delay potentially necessary interventions.

Castellanos and Andrews (38) conducted a study to determine the accuracy of nursing assistants' meal intake charting when intakes were assessed using 0%, 25%, 50%, 75%, or 100% consumed. These percentages were used to evaluate the tray as a whole, including both foods and beverages. The intake figures were typically recorded at some later time, usually from memory, into an intake log. Study results showed that nursing assistants' estimates were correct less than 45% of the time. Staff failed to identify 65% of residents eating poorly (<75%) at two out of three meals. Specifically, nursing assistants tended to overestimate intake on the breakfast trays and underestimate on the lunch trays. The problem may be partly due to the delay between when the meal trays were cleared and when estimates were logged into the medical record. An optimal system requires the recording of intake estimates into the record while the estimator is viewing the tray.

Plate waste is an accurate method to determine the amount of food eaten. Nichols and colleagues (39) conducted a study in a 140-resident retirement community living facility in Tulsa, Oklahoma. Data were collected for three meals in a three-day period, including one weekend day. Before each meal, a representative serving of every food item was weighed using an electronic digital scale to determine the initial weight. For food waste measurement purposes, the investigators intercepted previously selected soiled trays shortly after residents finished their meals. Percent food wasted was calculated and a mean of 20% of the total food served was not consumed. Researchers determined that fats were the most wasted foods, followed by vegetables and then meats. The study did not determine what percent of food items residents gave away, dropped, or spilled, and snacks and foods brought in from the outside were not accounted for either.

Hence, the results of this study represented only an approximation of food intake and food waste.

Another method for estimating food intake allowed nursing assistants to mark pictures of each food served. Andrews and Castellanos (40) used the Food and Fluid Estimation Diagram (FFED) that depicted generic foods/food groups commonly served in the nursing home. There were five pictures of each food or drink, each one shaded to represent 0%, 25%, 50%, 75%, and 100% consumption. Nursing assistants correctly estimated the simulated intake of individual food items 85% of the time using the FFED.

Although plate waste studies and the FFED are more accurate than nurse's aides recording intakes at a later time, these methods are cumbersome and time-consuming in the practical setting. A study by Simmons and Reuben (41) compared the accuracy of long-term care staff's chart documentation, research staff's documentation according to direct observations, and research staff's documentation according to photographs of residents' trays before and after each meal. Results found that long-term care staff's documentation reflected a significant overestimation of intake of approximately 22% compared with the other two methods. There was no difference between research staff direct observations and photographs with respect to total percent intake.

Two other studies by Shatenstein and colleagues (28, 42) confirmed the accuracy of direct observation in meal intake documentation. In both studies, researchers concluded that well-trained and practiced observers familiar with serving utensils and portion sizes can indeed provide accurate intake data. In the long-term care setting, regular mealtimes observation is a practical form of nutrition monitoring for older adults

at nutritional risk as long as intakes are recorded at the time of consumption and not at the end of the shift (32, 42).

Summary

Meal service is an important component of resident-centered care that needs to be a priority in long-term care facilities in order to give residents the dignity and individualization they deserve. One way facilities can provide resident-centered care is by offering a dining style that will allow residents to choose what they want to eat. Clearly, offering residents choices at meals reduces their risk of malnutrition by increasing their energy intake and slowing weight loss. Of the dining styles discussed, residents who participated in family-style or restaurant-style meal service seemed to have the best nutritional outcomes. These styles also had the least additional costs associated with them. Once a facility decides on an appropriate dining style, they need to carefully train their staff in food intake documentation. Direct observation can be an accurate way to document resident food intake as long as staff is well trained. Appropriate documentation of residents' meal intakes and weights are key components in determining their nutritional risk. Since protein-energy malnutrition rates are so high in long-term care, it is the responsibility of every staff member to try to prevent it from happening.

Chapter III

Research Methodology and Design

Introduction

This study researched whether the food intakes and weight changes of residents living in a long-term care facility were affected by the noon meal service style. It also examined the monthly food costs between traditional tray meal service and restaurant-style meal service. Based on an extensive literature review, the researcher hypothesized that residents offered restaurant-style meal service would eat more food on average than residents who were served traditional tray meal service as evidenced by daily recorded noon meal intake scaled scores. The researcher also hypothesized that residents involved in this study would not have a significant weight change regardless of the type of meal service they received. Finally, the researcher hypothesized that there would be no significant difference in monthly raw food costs between the two types of meal service.

Study Setting and Sample

In order to determine the differences in raw food costs, meal intakes, and body weights of residents who were served traditional tray meal service compared to restaurant-style meal service, a study was conducted at a 48-bed, long-term care facility in rural Iowa. Thirty residents, men (n=4) and women (n=26) aged 76-98 years, were recruited to participate and gave informed consent (Appendix A). Each participant was able to make independent meal choices, received either a regular or mechanical soft food consistency diet order and fed themselves with minimal staff supervision. Residents who were admitted to the facility after the study began, who needed to be fed by the staff, or

who were less than 65 years of age were excluded from the study. However, there were no residents aged 65-75 years who were able to participate in the study.

In order to allow residents to make meal choices, diets were liberalized as much as possible. All residents received either general or mechanical soft diets as ordered by their doctor. The study was reviewed and approved by the Administrator and Director of Nursing of the long-term care facility (Appendix B) and the physician in charge of the facility (Appendix C), as well as by the College of Health and Human Services' Human Subjects Research Committee at Eastern Michigan University (Appendix D).

Training

The dietary staff and certified nursing assistants were trained by the researcher on meal intake records (Appendix E) and weight techniques (Appendix F) at a group inservice. Dietary staff familiar with the portion sizes served recorded individual resident meal intakes by direct observation immediately after residents were done eating their meal. Food and fluid intakes were recorded separately. The certified nurse aides normally responsible for weighing residents were trained to weigh participants at the same time of the day and after voiding. The researcher calculated each resident's BMI from their weight and height.

Study Procedure

The study began in November, when the five-week fall/winter menu cycle was implemented at the facility. All residents were weighed at the beginning of the study. Foods from the fall/winter menus were served to each resident in the traditional tray meal service for a period of 10 weeks, or until the menu cycle had been completed two times. With this type of meal service, each resident was served the meal listed on the dietitian

approved menus. Residents who stated upon admission that they disliked a particular food item being served were automatically served the substitute for that meal. Dietary staff monitored the noon meal intake each day for each resident using the scale 0 or R (refused) = 0% intake, 1 = 25% intake, 2 = 50% intake, 3 = 75% intake, and 4 = 100% intake. At the end of the 10 weeks, all the residents were weighed again. Then the facility changed to restaurant-style meal service for the noon meal. This meal service allowed residents to choose between the meal that was offered in the five-week cycle menu, an alternate vegetable, a chef salad entrée, a soup/sandwich combination, and additional side salads. A certified nurse's aide asked each resident at the table what he/she wanted to order. Once the residents were done eating, dietary staff monitored noon meal intakes as noted above for the 10 weeks, or two menu cycles. Residents were weighed a third time at the end of the 10 weeks during which the facility served restaurant-style meals. Monthly raw food costs and the resident food cost per day were calculated by the facility administrator to determine if there was a change in dollars spent on traditional tray meal service compared to restaurant-style meal service.

Statistics

The data were analyzed using the Statistical Package for the Social Sciences (SPSS) (43) software program. Comparisons in body weights (noted as % BMI and % weight change) and noon meal intakes were calculated using Pearson Correlation Coefficients and two-tailed t tests. Significance levels were set at 0.05. Monthly raw food costs were calculated after deleting all food costs associated with the assisted living wing of the facility and all staff and visitor meals. They were then divided by the number of resident days per month to equal the cost to feed one resident for one day.

Chapter IV

Data Analysis

Introduction

Data analysis was done using the Statistical Package for the Social Sciences (SPSS) Student Software version 15.0 program (43). Hypotheses for food intake and body weights used both a Pearson Correlation and a two-tailed significance test to determine if it was statistically significant. Significance was determined to be <0.05 . Study results were reported in both table form and narrative form in this chapter. No statistical analysis was completed for monthly raw food costs, but the results were listed in table form.

Of the 30 residents who gave consent to participate in the study, only 26 residents actually participated. During the data collection period, one resident was admitted to the hospital, one died, one was admitted to hospice care, and one relocated to another facility; these four residents were withdrawn from the study. The final study group consisted of 24 women and two men. Participant characteristics are presented in Table 1. Mean age was 88 years (range 76-98 years), with 42% of the residents over 90 years of age. Of the residents who participated in the study, 30% ($n=8$) had a diagnosis of dementia and 19% ($n=5$) received a liquid nutritional supplement due to poor meal intake or previous weight loss. Forty-two percent ($n=11$) of the participants received a mechanical soft diet consisting of ground meat and soft foods due to chewing and/or swallowing problems. Residents were not given pencils to mark their own menu, so all residents received assistance from staff in making meal choices.

Table 1. Selected characteristics of study participants (n=26) in an Iowa long-term care facility

Characteristic	n	%
Age		
76-79	2	8
80-89	13	50
90-99	11	42
Gender		
Male	2	8
Female	24	92
Dementia Diagnosis		
Yes	8	31
No	18	69
Use of Supplement		
Yes	5	19
No	21	81
Diet Ordered		
General	15	58
Mechanical soft	11	42

Meal Intakes

Table 2 shows that, on average, the study subjects (n=26) did eat more during the 10 weeks they were offered restaurant-style meal service than during the 10 weeks they were offered traditional tray meal service. Meal intakes were scaled to 0 or R (refused) = 0% intake, 1 = 25% intake, 2 = 50% intake, 3 = 75% intake, and 4 = 100% intake. The scaled score for subjects served traditional tray meal service was 2.5 ± 0.6 , while the scaled score for subjects served restaurant-style meal service was 2.9 ± 0.7 . The mean difference between the types of meal service was 0.4 ± 0.3 . Subjects served traditional tray meal service ate an average of 62% of their noon meal. Subjects served restaurant-style meal service consumed an average of nearly 75% of their noon meal. The Pearson Correlation coefficient indicates that a significant correlation was observed between the

two types of foodservice ($r = 0.92$, $p < 0.05$). The two-tailed significance test also indicates a significant difference in subjects' meal intakes ($p < 0.05$).

Table 2. Paired sample intake statistics for traditional tray meal service compared to restaurant-style meal service in an Iowa long-term care facility

Average Intake	n	Scaled Score	Mean Difference	Pearson Correlation	p value (two-tailed)
Traditional Service	26	2.519	--	--	--
Restaurant Service	26	2.924	0.405	0.920	<0.001

Weight Changes

Mean differences between residents' ($n=26$) percent body weight change and percent BMI change in traditional tray meal service compared to restaurant-style meal service are presented in Table 3. Of the 26 residents in this study, 16 residents (62%) lost weight, eight residents (31%) gained weight, and two residents (7%) had no weight change between meal service styles. The weight changes ranged from zero to eight pounds in each resident. The mean difference in percent body weight between the time subjects were served traditional tray meal service and when they were served restaurant-style meal service was $1.1\% \pm 3.7$. The mean difference in percent BMI change between the two meal service styles was $0.9\% \pm 3.7$. Pearson Correlation coefficient indicates that a significant correlation was not observed between subjects who were served traditional tray meal service compared to restaurant-style meal service in either percent weight change ($r = +0.15$, $p > 0.05$) or percent BMI change ($r = +0.11$, $p > 0.05$). A two-tailed significance test also indicated there was not a statistical significance between the two foodservice styles ($p > 0.05$) for either percent weight change or percent BMI change.

Table 3. Paired sample percentage weight statistics for residents served traditional tray meal service compared to restaurant-style meal service in an Iowa long-term care facility

% Weight Change	n	Mean % Weight Change	Mean Difference	Pearson Correlation	p value (two-tailed)
Traditional Service	26	-0.115%	--	--	--
Restaurant Service	26	-1.249%	1.134%	0.148	0.130
% BMI change	n	Mean % BMI Change	Mean Difference	Pearson Correlation	p value (two-tailed)
Traditional Service	26	-0.324%	--	--	--
Restaurant Service	26	-1.236%	0.911%	0.113	0.226

Food Costs

Table 4 presents the total raw food costs for the long-term care facility during the months the study was conducted. The number of resident days was a calculation of the number of residents in the facility times the number of days in the month. The resident food cost per day was calculated by dividing the raw food cost by the number of resident days. This is the amount the facility spent on food to feed one resident for one day. It did not include supplies or labor costs. The facility administrator calculated these costs but was unable to split January's costs into the amount spent on traditional tray meal service and the amount spent on restaurant-style meal service. He was also unable to break the costs down to determine what was specifically spent on the 26 residents who participated in the study. Therefore, these monthly food costs reflect the amount spent on all residents in the long-term care facility. Based on these figures, the administrator felt there was no real difference in food costs between traditional tray meal service and restaurant-style meal service.

Table 4. Monthly food cost data for an Iowa long-term care facility

Month	Raw Food Cost	Number of Resident Days	Resident Food Cost Per Day
November	\$4,488.31	1104	\$4.07
December	\$5,087.35	1214	\$4.19
January	\$4,378.78	1131	\$3.87
February	\$4,455.74	1066	\$4.18
March	\$5,100.68	1195	\$4.27

Resident Comments

Although neither residents nor staff were interviewed or surveyed as part of this study, several of them conveyed their thoughts about restaurant-style meal service. Some of the comments residents had included, “It’s about time you did something like this,” “I love the choices,” and “I’m so happy I can choose what I want to eat.” One resident did not like the choices; “Now I have to think about what I want to eat. I’d rather just be served a tray.” Still other residents had no preference about their style of meal service. Dietary staff stated that residents seemed to be eating more of the food served after restaurant-style meal service was implemented.

Chapter V

Discussion

Introduction

There is a growing trend toward resident-centered care in long-term care facilities. Meal service is an important component of resident-centered care, and one way to accomplish this type of care is to allow residents to make meal choices through restaurant-style meal service. No previous study has documented the impact of meal intake, body weight, and raw food costs when a facility compared 10 weeks of traditional tray meal service to 10 weeks of restaurant-style meal service using the same residents and a similar menu with both meal service styles. Dietitians, administrators, and long-term care-givers can benefit from this knowledge.

This study provides evidence to support all three hypotheses made in Chapter III. First, residents who were served restaurant-style meal service did eat more at the noon meal than residents served traditional tray meal service. Second, restaurant-style meal service did not significantly affect the residents' weights. Third, the style of meal service did not impact raw food costs. This chapter will discuss each of these findings in more detail.

Food Intakes

The mean difference between traditional tray service and restaurant-style meal intake scores (See Table 2) indicated that a significant ($p < 0.001$) increase (0.4 ± 0.3) occurred when residents were offered restaurant-style meal service rather than traditional tray meal service at their noon meal. This increase may be related to many factors. Since food consumption was estimated and not weighed, there may have been bias in those

staff members who documented food intakes. However, the same dietary staff members who were familiar with the portions served were the ones who directly observed meal consumption and documented it immediately after the residents were done eating. Based on the studies by Shatenstein and colleagues (28, 42) this is an accurate and practical method to evaluate meal consumption in elderly persons living in a long-term care facility.

Another factor in the increase in food intake may be related to increased menu choices offered with restaurant-style meal service. During the 10 weeks residents were served traditional tray meal service, dietary staff members substituted foods noted as dislikes on each resident's diet card. Residents were not asked if the substitute was acceptable at the time the meal was served. Food was plated and served to each resident based on the cycle menu approved by the registered dietitian regardless of the resident's wishes that day. Once restaurant-style meal service began, residents were asked just prior to the meal if they wanted the posted menu (the same menu that was served during the traditional tray service phase of the study), the soup/sandwich combination, or a chef salad. They were also offered a vegetable substitute and additional salad choices. Dietary staff members honored each resident's menu selections. Given these choices, residents who weren't hungry for the posted menu but instead chose a lighter lunch, i.e. the chef's salad, may have eaten a higher percentage of the meal served.

Finally, higher meal intakes may be related to the satisfaction that many residents expressed in restaurant-style meal service. Although some residents had no preference in meal service styles and one resident did not like making meal choices, many residents were pleased with the choices offered with restaurant-style meal service. "It's about time

you did something like this,” “I love the choices,” and “I’m so happy I can choose what I want to eat” were some of the comments residents had about restaurant-style meal service. These comments, combined with the staff’s comments that residents seemed to be eating more of the food served after restaurant-style meal service was implemented, led this researcher to believe that this meal service style improved meal intakes and promoted resident-centered care for some residents.

The evidence shown in this study coincides with the evidence found in the study by Shatenstein and colleagues (28) where researchers observed meal intakes of three nonconsecutive days using tray meal service compared to three nonconsecutive days 10 weeks after introducing buffet-style meal service. A significant increase in meal intakes was noted in residents who were served buffet-style meal service. Although buffet-style and restaurant-style meal service differ, residents in both studies were offered choices at the time of meal service. Another difference between the two studies is the length of time residents were observed. The longer observation of 10 weeks of traditional tray meal service compared to 10 weeks of restaurant-style meal service in this study suggests a long-term benefit to residents when they are offered meal choices.

Weight Changes

Mean differences in percent body weight ($p = 0.130$) and percent BMI ($p = 0.226$) changes (See Table 3) indicated there was no significant change in residents’ weights ($1.1 \pm 3.7\%$) or in their BMIs ($0.9 \pm 3.7\%$) based on the type of meal service provided. Of the 26 residents in this study, 16 residents (62%) lost weight, eight residents (31%) gained weight, and two residents (7%) had no weight change between meal service styles. The weight changes ranged from zero to eight pounds in each resident. Even though these

weight changes were not statistically significant, the finding that 62% of residents lost weight was unexpected.

It might be assumed that residents who ate more at the noon meal would gain weight since this is the main meal of the day. However, residents in this study were offered a choice to eat less food at this meal. They ate more of what they were given, resulting in a significant increase in food intake, but they may have actually eaten fewer calories overall.

These results coincide with previous study outcomes (28, 33) that showed no significant differences in residents' weights from meal service changes after 10 weeks or three months, respectively. However, the study by Nijs and colleagues (11) showed that after six months there was a significant mean weight gain between the control group that was served individual tray meal service and the intervention group that was served family-style meal service. One difference between these four studies is the length of time residents were followed. Longer follow-up provided evidence that meal choices do contribute to resident weight gain.

Food Costs

The resident food costs per day (See Table 4) ranged from a low of \$3.87 in January to a high of \$4.27 in March, a difference of \$0.40 to feed one resident for one day. The facility administrator felt there was a minimal difference in food costs between traditional tray meal service and restaurant-style meal service. However, there were some factors that may have impacted the food costs. For instance, since the food costs were based on the facility as a whole, resident census may have changed the amount spent on food. During the time of this study, fuel and food prices rose. The increased

amount spent in March may have been a reflection of rising food costs overall. More money was spent in December on holiday meals and year-end purchases, and the facility did not need to spend as much in January. Finally, even though the same “posted” menu was rotated for all 20 weeks of this study, brand names of individual food items may have changed, causing a change in dollars spent.

This facility had a limited budget for food and labor. Therefore, the facility administrator did not want the additional menu options chosen during the restaurant-style portion of this study to increase staff hours or meal costs. The ingredients for the chef salad were kept on hand at all times, and the soups were made from scratch using left-over meat and vegetables whenever possible. Labor costs were increased when the restaurant-style meals were served because the afternoon cook came in one-half hour early to help with meal service, but no other additional staff members were required. The certified nurses aides who were on duty obtained resident menu choices just prior to the meals. The facility did not purchase additional equipment or dining room decorations during this study.

Other facilities that have made significant changes to their foodservice operations had various outcomes regarding costs. The study by Nijs and colleagues (11) conducted in Dutch facilities also had a limited staff and budget. They did purchase tablecloths, normal drinking glasses and plates, napkins, and table decorations for family-style foodservice, but many of their interventions did not cost money. For example, besides offering menu choices, staff sat down at the table and talked to the residents while they were eating, nurses distributed medications at the start of the meal, the residents decided where they wanted to sit, there was a moment of reflection or prayer before the meal

began, and mealtime distractions were kept to a minimum. Researchers found that motivated staff made foodservice changes with minimal budget changes, and residents benefited by improving their quality of life without losing weight.

Trinity Lutheran Manor (30) in Kansas spent about \$1,500 to purchase additional equipment and hired two full-time employees to help with food and beverage preparation and service when they made changes in their foodservice operation. Besides the equipment and personnel changes, this long-term care facility made smaller changes that had big results. Portion sizes were reduced; beverages were served in glasses; and appetizers or salads were on the table at the start of each meal. Staff served colorful meals with bright garnishes on colored plates, and they added seasonings to improve the taste of the food. They felt the costs were minimal compared to the 75% decrease in resident weight loss within one year. They also noted an overall decrease in food waste, allowing them to buy higher quality food for the residents.

Even though the study by Remsberg and colleagues (33) involving 40 residents from three long-term care units did not specifically look at food costs, the facility's change from tray meal service to buffet-style meal service did result in new costs. These costs were related to the purchase of tablecloths and dining room decorations, cabinetry, small refrigerators, special electrical outlets, and utility carts. In contrast, the costs of food and food preparation remained the same. Foodservice personnel who worked with tray service were retrained and became buffet servers, creating no additional personnel costs.

Finally, the study by Hackes and colleagues (35) indicated that residents who received tray meal service discarded more food by weight than residents who received

either family-style meal service or restaurant-style meal service. Residents served family-style meals selected their own portions. Researchers observed that food portions in the restaurant-style meal service appeared to be slightly larger than food portions in the tray service. These findings indicated that residents who were offered choices ate more of the food they were served resulting in less waste, and when proper portions were served, resulted in lower cost.

Summary of Findings

Data collected from this study indicated that residents who were offered meal choices in the form of restaurant-style meal service did eat more than when they were offered traditional tray meal service. The change in meal service style did result in a weight loss for the majority of residents in the study, but these losses were not significant. Also, the change in meal service style did not generate additional raw food costs to the facility. One reason for these results may be related to allowing residents to choose what they wanted to eat, even if it was less than their nutritional requirements determined by the facility's registered dietitian. In doing this, residents may have been more satisfied with their meal and eaten more of it. Over a period of time, meal choices may have balanced out between the calories in the posted menu and the calories in the other options, resulting in no significant weight changes.

Based on several residents' comments, restaurant-style meal service did seem to bring them more satisfaction and, therefore, was a more resident-centered style of meal service than traditional tray meal service. Even though this study did not evaluate foodservice costs beyond resident food cost per day, a review of the meal service literature suggested that facilities can successfully improve their residents' meal intakes

and quality of life while slowing weight loss and limiting costs. Regardless of the style of meal service, residents in every study ate more of their food when given a choice at mealtime. Other expenses, such as equipment, personnel, and décor, should be determined based on the needs of the residents in each facility.

Limitations of the Study

Several limitations could have affected the results of this study and its future implications. The long-term care residents in this study were not chosen by random sample. Instead, all residents in the facility, except those specifically excluded as stated in Chapter III, participated. This was a small facility in Iowa with only 26 residents who were able to finish the study. Most of the residents were female and did not have a diagnosis of dementia. Study results may not apply to larger facilities with more males and/or where more residents have dementia. Nineteen percent of the residents in this study received a liquid nutritional supplement due to past weight loss or poor meal intakes. Omitting these residents may have changed the weight results, but would have reduced the number of residents available for the study. This facility offered restaurant-style meal service only at the noon meal, and staff assisted all residents with menu choices. Allowing residents to make their own choices at all three meals may have changed the results. Finally, raw food cost results may have been skewed due to the holiday meals and the end-of-the-year expenses. It may be better to make comparisons of food costs in meal service during a different time of the year or to lengthen the study so that costs can be examined for the entire year.

Recommendations

All long-term care personnel need to become aware of and embrace the concept of resident-centered care through meal choices. National organizations, such as the American Dietetic Association and Consultant Dietitians in Health Care Facilities, should offer continuing education on meal service styles, dining choices, how to get started, and success stories from facilities that have solved problems. Likewise, state and local organizations that provide continuing education to long-term care administrators, dietitians, dietary managers, and nurses should encourage and support facilities that are interested in offering restaurant-style meal service or other meal service styles that offer choices to their residents in an effort to promote resident-centered care.

Registered dietitians who either manage or consult for long-term care foodservice departments need to be proactive in educating doctors, administrators, nursing, dietary staff, and families about the benefits of restaurant-style meal service or other forms of dining that offer residents a choice at meals. Together with the dietary manager, the registered dietitian should develop menu offerings and dining experiences to increase the enjoyment of eating (1). Fortunately, the responsibility of providing resident-centered care doesn't fall solely on the dietary staff. Once long-term care providers understand the many benefits of restaurant-style meal service, additional foodservice changes may be easier to implement.

Since this study reviewed only the effects of changing one meal each day, future research should investigate outcomes when residents are offered a choice and/or served restaurant-style meal service at all three meals. It is also recommended that facilities expand their menu options beyond the choice of a chef salad each day and a

soup/sandwich combination. Facilities could promote the menu and allow residents without dementia to make their own choices instead of having staff assist them. Having staff sit and eat with residents, implementing a time for reflection or prayer before the meal starts, and limiting distractions in the dining room as well as following residents for six months to one year may also have an impact on study outcomes.

Future researchers may also want to review how restaurant-style meal service affects quality of life, laboratory data including albumin, blood sugar, and cholesterol levels, as well as nutrient intakes. Surveys and interviews with residents and their families may yield important information about the satisfaction with varied meal service options.

Finally, it is easier to offer residents their choices when everyone is on a liberalized diet. Some doctors are hesitant to order a general diet for residents who have diabetes. Future research on the effect of restaurant-style meal service on diabetic residents' blood sugar when their diet is liberalized and they can choose what they want to eat may alleviate tension between the medical staff and the facility staff.

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APPENDICES

Appendix A

Informed Consent for Dietary Intake Study

The purpose of this study is to determine the difference in meal intakes and weights between residents who eat traditional-style meal service and restaurant-style meal service. The researcher, Dee Murphy, will need to review meal intake records and will ask residents to be weighed before, in the middle of and at the end of the study. The study will begin in November and end in March.

I, _____, agree to allow Dee Murphy to review my records as needed. I also agree to be weighed at specified times. I understand that my participation in this study is completely voluntary and that I can withdraw consent at any time without penalty. I also understand that I will not be compensated or charged in any way during the course of this study. If you have questions about this study, please feel free to contact Dee Murphy at 712-225-5724, Judith Brooks, Professor in Charge at 734-487-7862 or Dr. George Liepa, CHHS College HSR Committee Chair at 734-487-2499.

Signed: _____

Date: _____

Appendix B

Facility Approval

November 30, 2007

To whom it may concern:

It is our understanding that Dee Murphy plans to study the residents at Country Side Estates. The objectives of the study include determining if residents will eat more when offered restaurant-style dining vs. traditional-style dining and to determine what, if any, changes occur in residents' weight because of the change in dining styles. During the study she plans to review resident meal intake records and weights. Dee has explained the study to all participating residents and/or their family members and has gotten permission from them to be included in the study. Dee has our full approval and support to proceed with the study.

Gary Parry, Administrator
Country Side Estates

Date

Bonnie Geise, RN Director of Nursing
Country Side Estates

Date

Appendix C

Physician Approval

November 29, 2007

To whom it may concern:

It is my understanding that Dee Murphy plans to study the residents at Country Side Estates. The objectives of the study include determining if residents will eat more when offered restaurant-style dining vs. traditional-style dining and to determine what, if any, changes occur in residents' weight because of the change in dining styles. During the study she plans to review resident meal intake records and weights. Dee has explained the study to all participating residents and/or their family members and has gotten permission from them to be included in the study. As the physician in charge of the facility, I give Dee my full approval and support to proceed with the study.

Dr. Stephen J. Veit, MD, PC

Date

Appendix D

College of Health and Human Services Human Subject Review Committee Approval



EASTERN MICHIGAN UNIVERSITY

January 9, 2008

Dee Murphy
c/o Judy Brooks, PhD, RD
School of Health Sciences
Eastern Michigan University
Ypsilanti, MI 48197

Dear Ms. Murphy

The CHHS Human Subject Review Committee has reviewed your request entitled "Comparison of nursing home resident's meal intakes and weights between traditional-style meal service and restaurant-style meal service" and it is approved for initiation.

The Committee may request further approval if secondary analysis of the data is conducted.

Sincerely,

A handwritten signature in black ink, appearing to read "Stephen A. Sonstein".

Stephen A. Sonstein, PhD
Chair, CHHS Human Subjects Review Committee

Appendix E

DAILY DIET MONITOR RECORD RESIDENT _____ MONTH ____, 2007

BR. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

FOOD			
FLUID			
INITIAL			
LUNCH			
FOOD			
FLUID			
INITIAL			
SUPPER .			
FOOD			
FLUID			
INITIAL			

BR. 18 19 20 21 22 23 24 25 26 27 28 29 30 31

FOOD			
FLUID			
INITIAL			
LUNCH			
FOOD			
FLUID			
INITIAL			
SUPPER			
FOOD			
FLUID			
INITIAL			

O=little/none 1=25% 2=50% 3=75% 4=100% 1/2c.Jello/IceCream/Custard/Pudding=120cc.

Appendix F

Weight Chart

Name	Time/ Date	Weight	Void Y/N	Time/ Date	Weight	Void Y/N	Time /Date	Weight	Void Y/N
MA									
LB									
LB									
RB									
LC									
DC									
CE									
AE									
MF									
DF									
TF									
DF									
EH									
VH									
HJ									
MAK									
ML									
BL									
EL									
HL									
ML									
CM									
MO									
AP									
JP									
LS									
ES									
DS									
FT									
SW									

