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Improving Dining for People with Dementia

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Improving Dining for People with Dementia

Jennifer A. Brush, M.A., CCC/SLP

Abstract

The physical and social environments are important but often not actualized resources that can have a significant impact on the overall goals of nutritional intake and quality of life for people with dementia. The purpose of this pilot study was to examine the effect of improved lighting and enhanced table setting contrast on residents' meal consumption, social interaction, independence, and behaviors during meals in both assisted living and long term care environments serving people with dementia. A three-day nutritional intake record, footcandle measures, the Meal Assistance Screening Tool, and the Communication Outcome Measure of Functional Independence were administered at baseline and posttest four weeks after the intervention. Twenty-five residents with dementia at two long term care facilities participated in the pilot study. After a lighting and contrast intervention, there were improvements in oral intake, communication, and functional abilities at both facilities.

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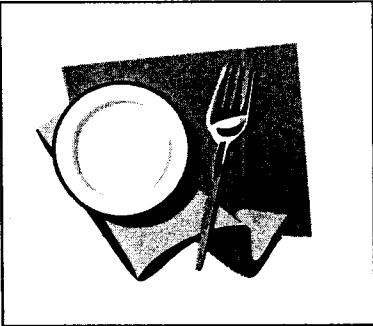
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Executive Summary



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Executive Summary

Physical and social environments are important but often not actualized resources that can have a significant impact on the overall goals of food consumption and quality of life. The purpose of this pilot study was to examine the effect of improved lighting and table setting contrast on residents' meal consumption, communicative interaction, independence, and behaviors during meals in both assisted living and long term care environments serving people with dementia. A three day calorie count, footcandle measures, the Meal Assistance Screening Tool (Steele, 1996), and the Communication Outcome Measure of Functional Independence (Santo Pietro & Boczo, 1997) were administered at baseline and posttest four weeks later. Twenty-five residents with dementia at two long term care facilities participated in the study.

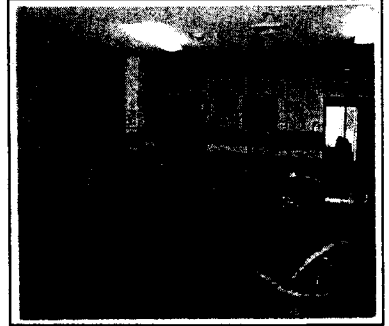
Two distinct aspects of the lighting environment were assessed. The first was light intensity at the table surface. The second included light level readings around the perimeter of the room, to determine the contrast ratio in lighting in the dining rooms. The contrast ratio is the ratio between the lightest and darkest part of a room. Navy blue tray liners were added under the plates to increase contrast at the table setting, and additional dark green table cloths were added at one facility (to cover a peeling finish). Lighting at Facility 1 was increased to a mean footcandle level of 35.05 Fc from 24.68 Fc, and the ratio between the lightest and darkest part of the room was reduced from 12:1 to 3:1. At the second facility, light intensity levels were increased significantly from 8.82 Fc to 22.96 Fc.

After a lighting and contrast intervention, there were significant improvements in both oral intake and functional abilities at both facilities. There were statistically significant increases from baseline to posttest in the frequency with which the residents engaged in and started conversations with staff, and answered questions with on topic responses. This result suggests that nursing home staff and designers should consider modifying the barriers in the dining environment, such as dim lighting and poor contrast, to increase clients' ability to participate in meals. Doing so will facilitate favorable therapeutic outcomes by supporting independence.

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In many long term care facilities the room in which people eat is also the room in which they participate in social, therapeutic, and recreational activities. It is even more important that multipurpose rooms have adequate lighting, as many of the residents read, create crafts, play games, visit with friends and family, and eat in these rooms, all of which require the ability to see details.

Background and Significance



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Introduction

Meals are much more than an opportunity to consume necessary calories and nutrients. They are social experiences that can be pleasant or unpleasant. Inviting friends and family to share a special meal is central to social occasions. Holiday events are often organized around a main meal of the day. However, the long term care literature describes most nursing home dining rooms as noisy places where residents are seated long before meals are served, with companions chosen for comparable level of dependence rather than social compatibility (Griffin, 1995). It is argued that modifying the dining environment and making mealtime a pleasurable experience can enhance the quality of life of nursing home residents. The environment can change the dining experience supporting the rehabilitation process and contributing to overall nutrition (Hiatt, 1981). There are clearly situations in which residents do not perform to their full potential because the environment is not supportive. The environment should ultimately help to compensate for impairments and be easily modifiable to compensate for future impairments as residents' needs change.

For example, as a person ages one experiences alterations in the eye such as a thickening and yellowing of the lens, a decrease in pupil size, a decrease in pupil reaction time, and a loss in elasticity of the lens that make it more difficult to negotiate the environment (Baucom, 1996; Pentecost, 1984). As the surface of the eye lens thickens, the amount of light the eye receives is reduced. This thickening also increases glare, as the light is diffused as it passes through the lens (Baucom, 1996). Glare from windows is a common problem and can be blinding to residents, especially those with existing vision deficits. This glare can make it difficult for the residents to see the food in front of them, as the eyes of an older adult are more sensitive to glare than a younger person's eyes (Baucom, 1996). Simple actions such as drawing blinds or angling a table so that no one faces the light can be helpful. Indirect dining room lighting, rather than direct recessed down light luminaries are an easy solution to avoiding glare (IESNA, 1998). Tablecloths can also be helpful to reduce glare caused by light hitting a shiny table surface, as well as orient to mealtime versus another activity.

The long term care literature describes most nursing homes as noisy places where residents are seated long before meals are served, with companions chosen for comparable level of dependence rather than social compatibility

Glare from windows is a common problem and can be blinding to residents

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Aging eyes receive less light spectrum wavelengths for color, which affects how color is perceived. Therefore, Baucom (1996) recommends that color selection focus on color clarity as defined by brightness and environmental contrast. In addition, people with Alzheimer's disease have difficulty judging colors and contrast, depth perception, and spatial orientation (Zgola, 1999; Calkins & Chafetz, 1996). Research has demonstrated that people with Alzheimer's disease are able to read more quickly and easily when contrast is increased (Koss & Gilmore, 1998), and that lighting has a significant role in the character of the visual environment (Calkins & Chafetz, 1996). Dim lighting is equally difficult for residents, as all food items may appear to blend together, making it difficult to identify or put food onto utensils.

Lighting has a significant role in the character of the visual environment.

Physical and social environmental characteristics contribute to making mealtime one of the most challenging activities for the institutionalized elderly (Hiatt, 1981; Griffin, 1995). The number of residents in the dining room, level of assistance available, noise, odors, colors and contrasts of table setting, height, shape, and configuration of tables can challenge an individual's level of functioning (Perez et al. in press; Hiatt, 1981). For example, for people with impaired cognition and attention who are easily affected by auditory and visual distractions, the frequency and volume of stimulation in the dining room is critical to their functioning. It is much more difficult for them to concentrate on a task if there is background noise or movement. Therefore being in a dining room with 30 or 40 other individuals (common number of people in dining areas) may be overwhelming. In addition, staff has an impact on residents' intake, as evidenced by research that has found that eating improves in the elderly when staff provides directed verbal prompts and positive reinforcement (Coyne and Hokins, 1997).

Physical and social environmental characteristics contribute to making mealtime one of the most challenging activities for the institutionalized elderly.

Characteristics of a pleasant dining environment include proper ventilation (Brooks, 1994), small, sturdy tables of the proper height (Brook, 1994; Beck, 1981), appropriate lighting that prevents glare, avoids shadows, and balances ambient light (Rutledge, 1987; Beck, 1981; Griffin, 1995), and tranquility (Griffin, 1995). The Illuminating Engineering Society of North America recommends light intensity levels of 50 Fc for a senior dining room. Rogers

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and Snow (1982) examining the eating behaviors of the institutionalized elderly, noted that dining environments that were crowded, noisy, poorly lit, containing unpleasant odors, and in which residents were seated with nothing to do one hour before the meal did not support good eating habits.

A study by Steele et al. (1997) recorded the presence of mealtime difficulties in 349 nursing home residents. The researchers found that 87% of the residents had difficulties that included chewing and swallowing problems, poor oral intake, positioning problems, or challenging behaviors. Further, sixty-eight percent of the residents presented with difficulty swallowing, which compromises one's ability to enjoy the meal experience and consume the necessary calories for nutrition. Clearly, there are significant issues for a large percentage of residents, and food intake is critical to health and quality of life.

Food intake is critical to health and quality of life.

Although researchers and health care professionals frequently point out that dining environment contributes to food intake (Griffin, 1995; Hotlaing, 1990; Beck, 1981; Brooks, 1994) there is little research demonstrating that changes in the environment will directly and positively affect intake, behaviors, or independence during meals. A program called "Caring Hands" was instituted at a nursing facility in Connecticut to ensure food intake and weight gain (Griffin, 1995). Staff were trained about the stages of dementia, communication skills, modification of the dining environment, development of a dysphagia team, and pureed food formation. Griffin reported several favorable outcomes such as reduction of behavior problems and increased independence. Griffin (1995) noted that some caregivers might interpret an increase in challenging behaviors during meals as a disinterest in food, when in fact the resident may resume eating if excess environmental noise is reduced. Denney (1997) found that playing music described as peaceful, quiet, and relaxing during meals can reduce agitation and aggressive behaviors. "Facilitating a quieter, more harmonious mealtime environment may have unexplored nutritional benefits" (Denney, 1997).

A recent study by Koss and Gilmore (1998) evaluated 13 resident's food consumption during the evening meal before and after improving the table setting lighting and

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visual contrast. Based on a scale from 1 to 10 (0 indicated nothing was eaten and 10 indicated everything was eaten), intake was measured by the nursing staff, and only residents who ate independently were considered in the study analysis. The number of agitated behaviors that occurred in the day, evening, and night was also reported by nursing staff. The researchers found that by moving the tables directly under existing ceiling fixtures and providing table settings with maximum visual contrast during dinner, residents with dementia ate more and fewer displayed negative behaviors than during baseline. These encouraging results indicate that simple environmental interventions can indeed have a positive impact on mealtime experiences and oral intake of persons living in long term care settings.

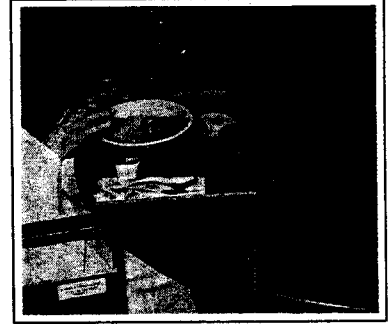
Building on the research by Koss and Gilmore, the purpose of this pilot study was to examine the impact of improved lighting and table setting contrast on residents' oral intake, communicative interaction, ability to feed themselves, and behaviors during meals in both assisted living and nursing home environments serving people with dementia. This study applied the intervention to all three meals, rather than just dinner, followed a strict calorie counting procedure as established by a clinical dietitian, and used screening instruments developed for use in long term care. It was our goal to identify aspects of the environment that are both easy to modify and that may facilitate increased mealtime caloric intake.

Improving the amount of food residents consume has not only obvious health benefits, but financial benefits as well. Residents who are able to receive their needed nutrients during meals are less likely to require costly nutritional drink supplements. Nutritional drinks are provided for residents who do not meet their daily required nutrition through intake during meals, or to those who require additional nutrients for medical reasons. It is not uncommon for nursing homes to provide supplements to one quarter to one third of their residents. When choosing long term care facilities for this study, each facility stated that supplement costs were a significant part of the dietary budget, an expense they would like to curtail.

Simple environmental interventions can have a positive impact on mealtime experiences and oral intake of institutionalized elderly.

Residents who are able to receive their needed nutrients during meals are less likely to require costly supplements.

Methodology



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Sample

Twenty-five residents with dementia, living in two long term care facilities, participated in the study. Inclusion criteria were a diagnosis of dementia, ability to feed oneself with no or minimal assistance, and consistent attendance in the dining room for at least two meals a day. The population included three men and twenty-two women over the age of sixty-five.

Twenty-five residents with dementia, living in two long term care facilities, participated in the study.

Eleven residents lived at Facility 1, a nursing home that provided care both to people with and without dementia. At this facility, many residents ate meals in their rooms, but only residents who ate at least two meals a day in the dining room were included in the study. During baseline, six residents ate all three meals in the dining room and five residents ate two meals in the dining room. At the time of posttest data collection, attendance in the dining room had increased. Nine residents ate three meals in the dining room and two residents ate two of their meals in the dining room. Review of all subjects' Minimum Data Set (MDS) for Nursing Home Resident Assessment and Care Screening indicated impaired decision making ability for each person in the study. At Facility 1, three residents were noted as demonstrating difficulty in new situations only, seven residents demonstrated poor decision making and required supervision, and one resident was said to never/rarely make decisions.

Facility 2 was an assisted living facility that provided care exclusively to people with dementia. All fourteen residents in the study ate every meal in the dining room. All were diagnosed as having dementia as indicated by their medical chart. MDS information indicated that eleven of the participants were considered to be moderately impaired in their decision-making skills and three of the participants were classified as severely impaired.

Instruments

Caloric Intake

The research team recorded caloric intake of breakfast, lunch, and dinner during three consecutive days. A

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licensed and registered dietitian analyzed each menu item and assigned them a caloric value. At the end of each meal, intake was recorded separately for each item based on the percentage of the item eaten.

Lighting

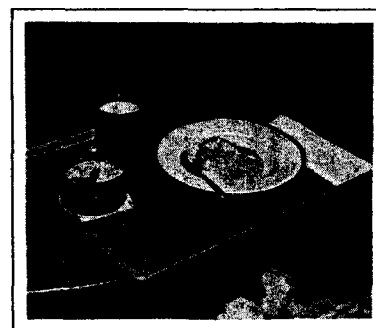
Two distinct aspects of the lighting environment were assessed. The first was light intensity (measured in foot-candles) at the table surface. The second included light level readings around the perimeter of the room, to determine the contrast ratio in lighting in the dining rooms. Because elderly individuals experience increased time to adjust to difference in light levels, it is important for lighting to be fairly even throughout a room (a 1:3 ratio is considered acceptable). Significant differences between the lightest and darkest parts of a room make it more difficult for elderly to function. The Illuminating Engineering Society of North America (1998) recommends a minimum ambient lighting of 50 Fc for a senior living facility dining room.

Foot candle measures were taken with an Extech Instruments Datalogging Light Meter with a range settings of 20, 200, and 2,000 Fc. The light meter is accurate to + .65 Fc between 0-20 Fc and + 2 Fc between 0-50 Fc. Repeatability specifications are + 2%. Readings were taken at each table top in the dining room as well as at the perimeter of the room during breakfast, lunch, and dinner. At baseline, Facility 1 had eight four feet long 4-bulb (40 watt) florescent light fixtures with two bulbs in each fixture, and three ten-bulb (25 watt) chandeliers. The staff did not turn on the chandeliers during meals. This site had windows that allowed natural light to come into the room. Lighting was poor on the perimeter of the room, where tables were close to the wall. The lighting mean at baseline (all tables) was 24.68 Fc and the contrast ratio was 12:1. During baseline, food was served on light gray trays with white or cream colored plates.

Facility 2 had two four feet long 2-bulb (40 watt) florescent light fixtures, and four recessed down light luminaries with 60 watt bulbs that were not over any tables, but placed in the surrounding area. There were no windows in the dining area. The residents' food was served on pink trays with white plates. The tables had a glossy finish that

Caloric intake of breakfast, lunch, and dinner was recorded during three consecutive days.

Light levels were measured at the table surface and around the perimeter of the room.



Baseline contrast at table setting, Facility 1.

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created glare and parts of the finish were peeling off, resulting in distracting color and texture variations. The lighting mean at baseline was 4.82 Fc and contrast ratio was 21:1.

Functional Abilities

Residents' abilities and behaviors were assessed using the Meal Time Assistance Screening Tool (MAST) (Steele, 1996) and the Communication Outcome Measure of Independence (COMFI) (Santo Pietro & Boczko, 1997) during nine meals for 3 consecutive days. To ensure inter-rater reliability all researchers were trained in accurate data collection for the calorie count, MAST, and COMFI. The MAST examines the following 8 areas related to mealtime: mealtime prerequisites, seating/positioning, positioning problems, dentition and oral hygiene, type of diet provided, type of assistance provided, intake, challenging behaviors, and eating problems. Items on the MAST are weighted to reflect severity of a problem or condition. An item score of 0 is indicative of functioning within normal limits, whereas a higher score is indicative of difficulties in one or more of the areas.

The COMFI Scale includes 20 items that measure performance in the following four areas: psychosocial interaction, communication and conversation, mealtime independence, and cognition. Items are given a score between 0 and 5, and subjects receive a total score between 0 and 100. An individual item score of 0 indicates that a behavior never occurs and an item score of 5 indicates that a behavior occurs always or 100% of the time. A higher score indicates higher functioning. Scores were based on what was observed during nine consecutive meals. Items on the COMFI Scale have demonstrated inter-rater reliability, and construct and content validity among persons with dementia (San Pietro & Boczko, 1997).

Intervention

At Facility 1, two 75-watt halogen floodlight reflectors were added to the darkest wall, and angled toward the ceiling. All of the chandeliers were turned on during meals, and two additional florescent 40 watt bulbs were placed in the 4-bulb florescent fixtures (which originally contained

Residents' abilities and behaviors were assessed using the Meal Time Assistance Screening Tool (MAST) and the Communication Outcome Measure of Independence (COMFI).



Contrast at table setting after intervention, Facility 2.

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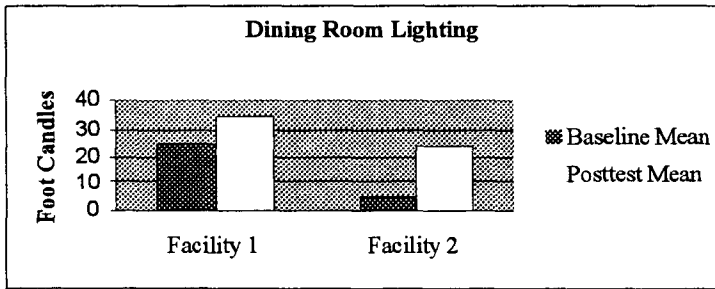
two bulbs). Navy blue tray liners were added under the plates to increase contrast at the table setting. Lighting was increased to a mean footcandle level of 35.05 Fc from 24.68 Fc (see Figure 1). The ratio between the lightest and darkest part of the room was reduced from 12:1 to 3:1.

At the second facility, the two 2-bulb florescent fixtures were removed and replaced with two four feet long 4-bulb (40 watt) fixtures. 3M brand clip on reflector panels were added to the 4-bulb fixtures to increase the light output (3M packaging states that the panels will increase light output up to 50%). In addition, two 75-watt halogen floodlight reflectors were attached to the wall and positioned to reflect off the ceiling. The tables were covered in dark green matte finish tablecloths to cover the peeling table surface and reduce glare, and navy blue tray liners were added to create contrast with the white plates. Light intensity levels were increased significantly from 8.82 Fc to 22.96 Fc. Although the lighting changes that were able to be made within the time schedule and budget did not increase the light intensity to the recommended minimum level of 50 Fc, the improvement in lighting was immediately noticeable as one entered the room. The ratio between the lightest and darkest part of the room was reduced from 21:1 to 13:1.

The changes that were made in the dining rooms were easy to implement and cost approximately \$300 for each facility. The lighting challenges in the two dining rooms were caused by typical problems that can be found in many older long term care facilities across the country.

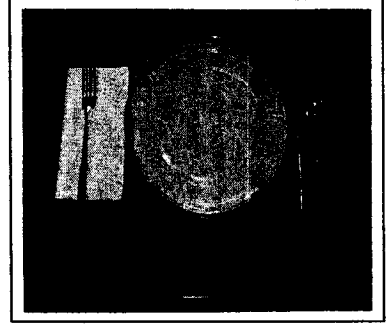
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Figure 1. Mean baseline and posttest light intensity at table level.



The lighting and contrast changes were completed four days after the baseline data was taken. All assessment measures were repeated with the lighting and contrast changes in place. Since the facility menus were on four-week cycles, posttest data collection was conducted four weeks after baseline with the same menu items. Periodic checks were made at the facilities to ensure that all of the lights were turned on and that the tray liners and/or table cloths were being used during each meal.

Results



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Functional Outcomes

Results were analyzed using both ANOVA and independent t-tests (see Figure 2). Some of the challenging behaviors observed during the baseline and posttest conditions included yelling, spitting, distractibility, disturbing others, aggression, eating nonfood items, hoarding, and taking food from others. At Facility 1, there was more than a 1,000-calorie increase in the average 3-day calorie count from 3,277 at baseline to 4,338 calories at posttest. Although this did not achieve statistical significance ($p < .16$), the fact that the group improved was encouraging. Total COMFI score increased significantly ($p < .05$) from 54 at baseline to 74 at posttest, indicating an improvement in communication, function, and independence during meals. It is noteworthy to mention that within the COMFI measure, there were statistically significant increases from baseline to posttest in the frequency with which the residents engaged in conversations with staff members ($p < .05$), the frequency with which residents started conversations with staff ($p < .01$), and the frequency with which questions were answered with on topic responses ($p < .01$). An improvement ($p < .16$) was also observed in the residents' ability to find and use their napkin. MAST scores at Facility 1 remained consistent from baseline (10.7) to posttest (10.8).

At Facility 2, the average total calories consumed increased significantly ($p < .01$) from 3,571 to 4,475 calories. In addition, COMFI scores increased from 48 to 60 ($p < .115$), and MAST scores decreased from 6.2 to 4.8 ($p < .331$). These scores are indicative of overall improvement in measures of intake and functional independence related to mealtime experiences. With regard to the COMFI, residents demonstrated a statistically significant reduction in anxiety ($p < .01$), a decrease in assistance needed ($p < .01$), and an improved ability to follow simple directions ($p < .01$). Average scores for distractibility as rated by the MAST decreased significantly ($p < .05$) after the intervention.

Some of the challenging behaviors observed during the baseline and posttest conditions included distractibility, yelling, spitting, disturbing others, aggression, eating non-food items, hoarding, and taking food from others.

There were statistically significant increases from baseline to posttest in the frequency with which the residents engaged in and started conversations with staff, and answered questions with on topic responses

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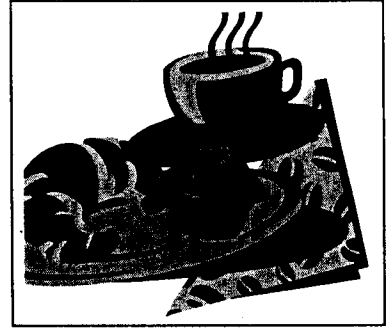
Figure 2. Independent T-test results from baseline to posttest for calorie count, MAST, and COMFI.

	N	Baseline (mean)	Posttest (mean)	Significance (2-tailed)
3 day caloric intake				
Facility 1	11	3277.3182	4338.7000	.160
Facility 2	14	3571.3571	4475.8750	.013
Total MAST score				
Facility 1	11	10.72	10.81	.977
Facility 2	14	6.21	4.85	.331
Total COMFI score				
Facility 1	11	54.00	72.09	.018
Facility 2	14	48.28	60.71	.115

Facility staff were asked their opinion of the changes in lighting. In particular, if they felt that the changes had an effect on the residents. Surprisingly, at Facility 2, where the lighting changes were most dramatic, the staff felt that they themselves had experienced the most positive changes. Comments included, “Now I can see what I am doing,” “It is a lot nicer to work in here now,” “It’s more cheery in the dining area,” and “Family members noticed the change right away!” The implementation of the dining room changes enticed several residents and staff to participate in arranging the table clothes. Their interest in the improvements being made highlights that fact that staff and residents enjoy enhancing their surroundings and like to be included in activities that affect their environment.

Staff commented, “Now I can see what I am doing!”

Summary



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Summary

As with many ecologically based studies, there were a number of variables beyond the control of our researchers. For example, after studying the facilities' menu cycles, the research team returned for post intervention data collection four weeks after baseline. This was done so that the baseline and post intervention records of intake would be comparing the same meal items. However, at both facilities meal items indicated on the menu were not always the food items served. For example, the scheduled entree may have been baked chicken, but a casserole was served instead. Menu items also differed across residents. One resident may have had bacon, eggs and toast for breakfast, and another resident may have been served toast and cereal. Both facilities had food item omissions and substitutions as a result of kitchen staff error. Therefore, all calorie counts were based on what the resident actually received rather than what they were supposed to receive.

A staffing policy change midway through the research may have affected outcome measures. At Facility 1 there were one or two staff members present in the dining room during baseline. There was very little staff interaction with the residents, therefore the residents received little assistance and had few opportunities for conversation with staff. Two or three of the residents sat alone for meals, having no opportunity to interact with other residents. Between the baseline and posttest data collection the facility instituted a new policy that resulted in an average of four staff members in the dining room at posttest mealtime. This increased the opportunities for interactions with staff and could have contributed to the increased COMFI scores at this site. None of these issues were under the control of the researchers.

Despite these control limitations, there were clear and marked improvements in both intake and functional abilities as measured by calorie counts the MAST and the COMFI at both facilities. This suggests that staff and designers should consider modifying the barriers in the dining environment, such as dim lighting and poor contrast, to increase residents' ability to participate in meals. This will facilitate favorable therapeutic outcomes by supporting independence. Our plans for future research include examining not only lighting and contrast, but noise levels, social density, staffing patterns, and other factors that are inherent mealtime issues in long term care facilities.

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