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The Effect of the Presence of Others on Caloric Intake in Homebound Older Adults

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Abstract

Background—Undernutrition in homebound older adults is a significant problem. The purpose of this study was to investigate the effect of the presence of others, both within the household and during meals, on caloric intake in homebound older adults.

Methods—In-depth interviews and three 24-hour dietary recalls were obtained from 50 older adults who were receiving home health services. Descriptive statistics were used to characterize participants, and hierarchical linear modeling was performed to evaluate predictors of caloric intake per meal.

Results—Participants' mean age was 77. Females composed 65% and African Americans composed 42% of the sample. Analyses are based on 553 meal observations. The majority (84%) of participants consumed all meals for each of the 3 days of data collection; however, they consumed an average of only 1305 calories per day. Hierarchical linear modeling analysis indicated that persons who had others present during meals consumed an average of 114.0 calories more per meal than those who ate alone ($p = .009$) and that women consumed 76.7 fewer calories per meal than did men ($p = .045$). The presence of others within the household had no effect on caloric intake.

Conclusion—This research suggests that a simple and inexpensive way to increase caloric intake in homebound older adults is to make arrangements for family members or caregivers to eat with them.

The purpose of this study is to investigate the effect of the presence of others on caloric intake in homebound older adults. Undernutrition in older adults is a common problem with significant health, social, and economic consequences (1–3). It is estimated that between 5% and 12% of community-dwelling older adults, 11% of medical outpatients, 20% of higher risk community-dwelling older adults, and between 32% and 50% of hospitalized older patients

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experience undernutrition (4). Consequences of undernutrition in older adults include increased morbidity and mortality, functional decline, decreased quality of life, and increased likelihood of health care utilization and institutionalization (1,2,5–8).

There are many diverse factors associated with eating behaviors in older adults (1,9–11). The present study is concerned with social factors related to eating habits. Previous researchers have focused either on the effect of social networks or support on eating behaviors (such as having someone present in the household or being married) or on the microlevel analysis of meals and whether the presence of others during meals has an effect on caloric intake.

Presence of Others in the Household

The positive benefits conferred to those who live with others or who are married have been repeatedly demonstrated in regard to nutritional health in older adults. In one study of those who received meals from home-delivered or congregate meal programs, the investigators found that men who lived alone were more likely to have not eaten for one or more days and were at greater nutritional risk (12). In a qualitative study of elderly widows residing in rural communities, Quandt and colleagues (13) reported that older women who no longer have anyone to cook for may be less inclined to cook only for themselves and may have compromised dietary intake. Another study of community-dwelling older adults found that those with mixed living–eating arrangements as well as those who both live and eat alone, most often women, were at nutritional risk based on an examination of their “usual” pattern of meal consumption (14).

Other studies of eating habits among older adults using 24-hour dietary recalls report similar findings. Using data from National Health and Nutrition Examination Survey (NHANES) I (1971–1974), Davis and colleagues (15) found that men who lived with a spouse had better diets for specific nutrients. For women, the highest quality dietary intakes were found among those who lived with others, especially with a spouse. Using data from NHANES III (1988–1994), Davis and colleagues (16) found that men and women who lived with a spouse had the fewest number of low nutrient intake levels and that this effect was especially robust among non-Hispanic whites.

McIntosh and colleagues (17,18) also relied on a 24-hour dietary recall to examine the association between social support and dietary intake in a sample of older adults from 1 of 13 rural federally funded nutrition sites. In the initial report of their work, the authors found that marital status was associated with better nutritional intake. In a later analysis of the data, the authors reported that, when controlling for companionship (i.e., either having companionship at mealtimes or help with cooking provided by friends and relatives), marital status no longer had an effect on caloric intake, although companionship did have an affect on caloric intake.

Presence of Others During Meals

John de Castro and colleagues (19–23) examined the effect of social facilitation of eating by collecting data from 7-day food diaries from participants who were healthy community-dwelling men and women, including older adults. In several reports of their research, they found that persons who ate with someone ate more than those who ate alone. Additionally, they found a power function associated with the presence of others such that the number of calories consumed increases as a function of the number of persons present and that the effect of others’ presence was strongest when those present were family members or friends. De Castro’s interpretations of his findings are that the presence of others during meals increases caloric intake because the duration of the meal is extended and, thus, intake is increased. Other researchers who have not studied older adults find additional support for the social facilitation of eating (24).

In several experimental investigations stemming from the modeling literature, early researchers found that persons eat more when those with whom they are dining eat more and eat less when those with whom they are dining eat less (25,26). More recent work, including that done collectively or separately by Herman, Roth, and Polivy (24), has manipulated different characteristics of the experiment and reports the same general findings. The interpretation of this literature is that individuals' food intake is dependent on social cues.

Other studies emanating from the impression management perspective maintain that individuals' food intake is based on their attempts to project a desirable image of the self (27). These studies emphasize the inhibitory effect of others' presence, such that persons will consume less in the presence of a noneating observer, or women will consume less in the presence of a desirable man (26,28,29). The impression management perspective has not identified an occasion when food intake might be enhanced by the presence of others (24).

Homebound older adults may benefit from having others in the household as well as having others eat with them. We hypothesize that both the presence of others in the household and the presence of others during meals will increase caloric intake.

Methods

A sample of 50 older adults who recently experienced an acute illness or an exacerbation of a chronic condition and who were receiving home health services were referred to the study by home health agencies, the University of Alabama at Birmingham (UAB) Geriatric Medicine Clinic, UAB Hospital, and local churches. Institutional Review Board approval was received by the UAB.

Participants were interviewed in the home and administered a structured questionnaire that used a standard interview format. The interview assessed eating behaviors and social factors associated with those behaviors. Three 24-hour dietary recalls were collected. One of these was collected during the baseline interview. The additional two were obtained some time over the next 3 weeks, including 1 weekend day. Dietary recall data was entered directly into the Minnesota Nutrition Data System, a nutrition analysis program that computes detailed dietary information, including calories per meal (30).

Descriptive statistics were used first to characterize participants. Hierarchical linear modeling was performed to evaluate the variables that might predict caloric intake per meal (31). In this analysis, meals (level 1) are nested within participants (level 2). The presence of others during meals was coded as 1 (yes) or 0 (no), and the mean of this variable across all meals for each person represents the proportion of meals consumed in the presence of others. Subtracting this proportion from each meal results in a person-centered score for the presence of others during each meal, which was entered as a level 1 (meal-to-meal) predictor. Level 2 (person-level) predictors were living arrangement (living with someone = 1, living alone = 0), sex (women = 1, men = 0) (because women consumed fewer calories than men (322.4 vs 416.1), and the proportion of all meals consumed in the presence of others. Ethnicity was not controlled for because African American and white participants consumed nearly the same number of calories per meal (356.0 vs 352.2). The model took the following form:

$$Y = \beta_0 + \beta_1(o - \tilde{o}_p) + r$$
$$\beta_0 = \gamma_{00} + \gamma_{01}(\text{living arrangement}) + \gamma_{02}(\text{sex}) + \gamma_{03}(\tilde{o}_p) + \upsilon_0$$
$$\beta_1 = \gamma_{10} + \upsilon_1,$$

where Y = calories per meal, β_0 is an intercept effect, β_1 = regression effect for presence of others during the meal, o = 1 when others were present during the meal or 0 when eating alone, $\tilde{o}_p$ = mean of o for each person p, r = a meal-to-meal residual or error term, γ_{01} = regression

effect for living arrangement, γ_{02} = regression effect for sex, γ_{03} = regression effect for $\tilde{o}_p$, υ_0 = a between-subjects error term, and υ_1 = a between-subjects error term or random effect term for the effect of others present during the meal.

Results

Participants ranged in age from 60 to 95 years (mean, 77.1; standard deviation, 8.7). Females composed 64% and African Americans composed 42% of the sample. Women were more likely than were men (39.0% vs 13.2%, $p < .005$) and African Americans were less likely than were white (18.9% vs 38.1%, $p < .005$) to live alone.

Main findings are based on 553 meal observations, including 150 breakfasts, 136 lunches, 145 dinners, and 122 snacks. Five snacks were excluded from analyses because the number of calories was less than 10 (all diet soft drinks).

Eighty-four percent of participants (42/50) consumed breakfast, lunch, and dinner for each of the 3 days of data collection. Two participants consumed only breakfast and lunch for each of the 3 days. Four participants skipped one meal (either lunch or dinner), and two participants skipped two meals (one skipped two lunches and one skipped two dinners). Eighty-four percent of participants ate snacks, with the mean number of snacks consumed per day being 1.0. Slightly more than half (55.5%) of all meals were consumed in the presence of others; this proportion was fairly consistent across meals (Table 1).

Participants consumed an average of 1305 calories per day with 406 consumed at breakfast, 372 at lunch, 412 at dinner, and 114 during snacks (Table 2). Forty percent of participants consumed all of their meals alone, 28% consumed all of their meals with someone, and 32% ate some meals with and some meals without others present. Of those persons who lived alone, 71.4% consumed all of their meals alone, while 28.6% consumed some of their meals alone and some with others. No participants who lived alone consumed all of their meals in the presence of others. Of those persons who lived with someone, 58.3% consumed all of their meals with someone, 11.1% consumed all of their meals alone, and 30.6% consumed some of their meals with others and some of their meals alone. Participants consumed more calories for all meals while in the presence of others compared with when eating alone (Table 3).

Results of the hierarchical linear modeling analysis indicate that persons who ate meals in the presence of others consumed an average of 114.0 calories more per meal than did those persons who ate alone ($p = .009$) (Table 4). Additionally, women consumed 76.6 fewer calories per meal than did men ($p = .045$). After controlling for others' presence at meals, the presence of others in the household had no significant effect on caloric intake.

Discussion

Data from our study indicate that, although mean caloric intake was quite low, few participants were skipping meals. Previous studies similarly report inadequate nutritional intake in homebound older adults (32–34). Future investigators might consider that using skipped meals as an indicator of nutritional risk for homebound older adults may underestimate undernutrition.

Findings from this study are unique in that the presence of others in the household did not have an effect on caloric intake, but the presence of others during meals did have an effect by an average of 114.0 calories per meal. Previous studies finding an effect for living arrangement on greater food intake did not look at intake at the level of the meal. The research by McIntosh and his colleagues (17,18) suggests that mealtime companionship is a better predictor of higher caloric intake compared with marital status. Our findings lends support to this work and to the

research conducted by de Castro and colleagues (19–23) in that the presence of others during meals had quite a significant effect on caloric intake.

It is not simply the presence of others in the household that has an impact on caloric intake; rather, it is whether someone eats with someone else present. Having someone in the household, though, does increase the natural opportunities that persons will consume their meals with others. This may explain the association others have found between living arrangement and nutritional intake. Quite a few participants in our study who lived with someone ate some of their meals alone. Additionally, those who lived alone consumed some of their meals with others present. Controlling for the proportion of meals for each participant where others were present, caloric intake was higher for the meals that were consumed in the presence of others.

There are a number of reasons why caloric intake is greater in the presence of others. We can speculate that the duration of the meal is extended when others are present, and, therefore, persons have greater exposure to food and are more likely to eat more. Indeed, participants in our study might intentionally have prolonged the meal to increase social interaction with others. Unfortunately, the data are limited in that we did not collect information on the length of each meal. Future research in this population might more carefully document time spent eating.

Another reason why food intake might be higher in those persons who eat with others is because the persons with whom they are eating eat more. This interpretation would lend support to the modeling theory that posits that persons' intake is dependent on social cues. We did not collect dietary recalls from persons who ate with participants. This may be an impractical matter difficult to evaluate in real world situations. Persons were called on random days, and it was not known in advance who would be present during meals.

Another reason why persons might have eaten more in the presence of others is suggested by the impression management literature. Several participants volunteered the information that they did not always like or want the food that their family members or friends brought them, but they admitted to either being more likely to eat it or eating more of it if the preparer or deliverer of the food sat down and ate with them. Participants may have wanted to please caregivers by eating the food that was prepared or brought for them if the caregiver was present. Additionally, some participants may have wanted to express their gratitude for the receipt of the food by eating it. In either case, if the caregiver was not present, they could have just as easily thrown the food away, especially if they did not like what was presented them. Our own previous work has documented that older adults receiving Meals on Wheels did throw away or give away food they did not like (35).

A final reason why intake may have been increased in the presence of others is that caregivers may have provided encouragement to eat or they may have provided other forms of social support that improved intake. Suda and colleagues (36) found that providing a social support intervention improved the nutritional condition of home-delivered meal recipients.

This research has implications for food interventions and policies directed toward older adults, especially women, who are consuming fewer calories. First, persons who are the most sick are those who receive the most care. It was not surprising that these participants were eating three meals a day because the meals were being prepared or brought by others. Family and friends who are available to provide nutritional support when someone is ill might also be available to provide meals while someone is not quite so debilitated.

This research has applicability in community settings where meals are dropped off by relatives or friends or by home-delivered meal programs and in institutional settings where older adults may be dining without meaningful social interaction. This research suggests that a relatively

simple and inexpensive way to increase caloric intake in homebound older adults is to make arrangements for family members or caregivers to sit down and eat with them.

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Table 1

Presence of Others During Meals

Meal	No. of Meals	Others Present (%)
Breakfast	150	55.3
Lunch	136	58.1
Dinner	145	62.1
Snack	122	45.1
Total	553	55.5

Table 2

Mean Daily Caloric Intake

Meal	Mean No. of Calories	Standard Deviation	Range
Breakfast	406.3	170.4	155–880
Lunch	371.9	202.9	24–906
Dinner	412.2	169.9	99–915
Snack	114.2	93.3	11–385
Total	1304.6	387.6	652–2506

Table 3

Caloric Intake With and Without Others Present During the Meal

Meal	Others Present (Mean, Standard Deviation)	Others Not Present (Mean, Standard Deviation)
Breakfast	424.1, 180.9	384.3, 195.2
Lunch	440.5, 220.6	342.5, 243.4
Dinner	454.0, 241.2	363.1, 185.6
Snack	169.8, 104.8	152.0, 126.3

Table 4

Hierarchical Linear Model of the Effect of Others' Presence on Caloric Intake

Effect	Regression Coefficient Gamma	T	*df*	*p*
Level 1: Meal-to-meal effects				
Intercept	371.6	8.042	46	.000
Others present—centered	114.0	2.737	49	.009
Level 2: Between-participants effects				
Living with someone	32.7	0.701	46	.487
Female	−76.6	−2.056	46	.045
Others present—overall proportion	29.7	0.604	46	.549