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# Meals Enhancing Nutrition after Discharge (MEND): Findings from a Pilot Randomized Controlled Trial

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## Abstract

**Background—**After older adults experience episodes of poor health or are hospitalized, they may not return to pre-morbid eating behaviors. Furthermore, poor nutrition increases hospital readmission risk, but evidence-based interventions addressing these risks are limited.

**Objective—**The pilot study's objective was to evaluate the feasibility of conducting a randomized controlled trial assessing a post-discharge home-delivered meals program's impact on older adults' nutritional intake and hospital readmissions and to assess patient acceptability and

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satisfaction with the program. The aims of the study were to 1) to evaluate successful recruitment, randomization, and retention of at least 80% of the 24 participants sought; 2) to compare the outcomes of hospital readmission and total daily caloric intake between participants in the intervention and control groups; and 3) to assess patient acceptability and satisfaction with the program.

**Design**—This study used a two-arm randomized controlled trial design, and baseline data were collected at enrollment; three 24-hour food recalls were collected during the intervention period; and health services utilization and intervention satisfaction was evaluated 45 days post-discharge.

**Participants/setting**—Twenty-four patients from the University of Alabama at Birmingham (UAB) Hospital's Acute Care for Elders Unit were enrolled from May 2014 to June 2015. They were 65 or older, at risk of malnutrition, cognitively intact, able to communicate, discharged to a place where the patient or family was responsible for preparing meals, and diagnosed with congestive heart failure, chronic obstructive pulmonary disease, acute myocardial infarction, or pneumonia. Final analysis included 21 participants.

**Intervention**—The intervention group received 10 days of home-delivered meals and nutrition education; the control group received usual care and nutrition education.

**Main outcome measures**—The main outcome was intervention feasibility, measured by recruitment and retention goals. Hospital readmissions, caloric intake, and satisfaction with the intervention were also evaluated.

**Statistical analyses performed**—Univariate and bivariate parametric statistics were used to evaluate differences between groups. Goals for success were identified to assess feasibility of conducting a full-scale study, and outcomes were measured against the goals.

**Results**—87.5% of randomized participants were retained for final data collection, indicating that this intervention study is feasible. There were no significant differences between groups for hospital readmissions; however, caloric intake during the intervention period was greater for intervention vs. control participants (1595 vs. 1235, $p$=.03). Participants were overwhelmingly satisfied (82–100% satisfied or very satisfied) with staff performance, meal quality, and delivery processes.

**Conclusions**—Conducting a randomized controlled trial to assess outcomes of providing home-delivered meals to older adults after hospital discharge in partnership with a small nonprofit organization is feasible and warrants future research.

### Keywords

Older Adult Nutrition; Nutritional Risk; Home and Community-based Services; Home-delivered Meals

## INTRODUCTION

Hospital readmissions affect one in six Medicare patients released following medical care and one in eight patients following surgery.[1] It is estimated that these readmissions cost more than 17 billion US dollars.[2] This is especially critical since Medicare "is the federal health insurance program for people who are 65 or older."[3] Effective October 1, 2012, the

Hospital Readmissions Reduction Program, mandated by the Patient Protection and Affordable Care Act, began reducing payments to hospitals that have excess readmissions.[4] Concomitant with this change, several groups, including the Academy of Nutrition and Dietetics, have joined together to form The Alliance to Advance Patient Nutrition. The Alliance has as a major emphasis the elimination of hospital malnutrition through appropriate nutritional intervention, including interventions delivered at discharge.[5]

Krumholz recently described in The New England Journal of Medicine a "post-hospital syndrome" that is characterized by poor nutrition.[6] He noted post-hospital syndrome "receives little attention" and argued that strategies for mitigating the risk should include "promoting good nutrition and addressing nutritional deficiencies."[6] Malnutrition occurs in 20–70% of older adults who are hospitalized and in up to 49% of older adults who have been recently discharged from the hospital.[7] Previous work on this issue has found that older adults who experience nutritional risk are more likely to be subsequently hospitalized[8] and that those discharged with malnutrition have higher risk of mortality within the year following their hospitalization.[9] Furthermore, prior hospitalization has also been associated with poorer nutritional status.[10] Vaudin and Sahyoun found that food anxiety was high among recently hospitalized older adults and was associated with poor health status.[11] Concerns about post-discharge nutrition-related care persist in international contexts as well as the US, including in Australia, where one study found "few patients at nutrition risk received nutrition-focused care in the post-hospital period."[12] Other studies suggest that collaboration between different health services providers is an important step to addressing these concerns.[13,14]

Hospitals throughout the United States have responded to both changes in Medicare policy and increased recognition of the role of malnutrition in contributing to poorer health outcomes and potentially avoidable readmissions. They are now initiating many nutrition interventions, including hospital-to-home transition programs that sometimes include home-delivered meals.[15,16] A systematic review evaluating whether home-delivered meals improves patient outcomes was recently published; no studies were identified that demonstrated an effect of home-delivered meals on hospital readmissions.[15]

Prior to conducting a full-scale study to test the hypothesis that providing home-delivered meals post-hospital discharge reduces older adults' risk for preventable readmissions, this pilot project was conducted with three aims: 1) to evaluate successful recruitment, randomization, and retention of at least 80% of the 24 participants sought; 2) to compare the outcomes of hospital readmission and total daily caloric intake between participants in the intervention and control groups; and 3) to assess patient acceptability and satisfaction with the program.

## MATERIALS AND METHODS

The Meals Enhancing Nutrition After Discharge (MEND) pilot study was conducted between May 2014 and June 2015 at the University of Alabama at Birmingham (UAB) in collaboration with PEER (Promoting Empowerment and Enrichment Resources), Inc.[17] The

research protocol was approved by the UAB Institutional Review Board and all participants gave written informed consent.

### Sample

Based on previous research regarding ideal sample size for the conduct of pilot studies, the investigators sought 24 participants for the study.[18] Inclusion criteria required that participants be: 1) at least 65 years old, 2) able to communicate alone or through a caregiver, 3) discharged to a private residence or a facility where the patient was responsible for preparing their own meals, 4) at risk of malnutrition, defined as scoring less than 24 on the Mini Nutritional Assessment (MNA),[19] and 5) have a diagnosis of congestive heart failure, chronic obstructive pulmonary disease, acute myocardial infarction, or pneumonia. These specific conditions were chosen because hospitals are now penalized under the Affordable Care Act for readmission within 30 days of discharge after an admission with these diagnoses. Penalties may include payment adjustments of up to 3% reduction in reimbursement.[4] Exclusion criteria were: 1) a diagnosis of dementia (based on clinical reports from medical staff in rounds), 2) a terminal illness, 3) a cancer diagnosis within the last five years, 4) end-stage renal disease, 5) feeding tubes, 6) ventilator dependence, or 7) out of delivery range (more than 20 miles from PEER, Inc.).

### Recruitment

Patients were recruited at the UAB Hospital Acute Care for Elders (ACE) Unit[20] by graduate research assistants, in collaboration with full-time clinical staff on the Unit at daily rounds. Potentially eligible patients were screened and recruited at the bedside and provided written informed consent. Participants then completed the baseline assessment which was administered by research staff.

### Randomization

Participants were assigned, based on a 1:1 allocation, to the intervention or control condition using a randomization schedule created from a computerized random number generating algorithm. To ensure allocation concealment from research staff prior to assignment, the randomization schedule was held by the PI's administrative assistant in sequentially-numbered, opaque sealed envelopes. After assignment, the graduate research assistant or principal investigator notified the community partner, PEER, Inc., of participants who were assigned to receive meals.

### Control: Nutrition Education Group

Control participants received the care or treatment as prescribed by their attending physician or nurse practitioner (usual care) and the "What's On Your Plate? Smart Food Choices for Healthy Aging" book created by the National Institute on Aging.[21]

### Intervention Arm: Nutrition Education + Home-delivered Meals Program

In addition to usual care and receipt of *What's On Your Plate?: Smart Choices for Healthy Aging*, the intervention group received three meals per day for 10 days. Ten days was selected because that is what is currently being done by some insurers who are providing

meals post-discharge. Meals were prepared by a local church and delivered by PEER, Inc., a local 501(c)3 organization which serves a low-income neighborhood in Birmingham, AL, with programming around healthy lifestyles and access to healthy foods. Among other food-related programs[22], the organization rents space from an urban church which has a health department-approved kitchen where it prepares and serves hot, nutritious meals Monday through Friday each week in a restaurant-style setting. The kitchen has two full-time cooks and a chef-consultant on-site who provides regular input into tasty, healthy meal preparation and service.

The daily meals provided to participants were from the hot lunch meal already being prepared at this location; they were delivered to participants Monday through Friday once per day, along with shelf-stable and refrigerated meals for breakfast and dinner. On Fridays, participants received two additional days of shelf-stable and refrigerated foods for the weekend. Meals were based upon National Institute on Aging's (NIA) recommendations from *What's On Your Plate: Smart Choices for Healthy Aging*[21] and the Academy of Nutrition and Dietetics 2012 Position Statement on Food and Nutrition for Older Adults living in the community.[23] Menus already being used by the kitchen were evaluated by a registered dietitian and health behavior expert, and additional meals were added to the menu for the kitchen staff to use in preparing foods for these participants. The dietitian helped design these meals to enhance the menu. The menu items were chosen with an emphasis on cultural appeal, taste, familiarity, and nutritional quality. Two dietetic interns from UAB in placements at PEER, Inc. were involved in accommodating participants with special dietary requirements. For example, participants requiring diabetic or low-sodium diets received meals prepared specifically for their needs.

### Baseline Assessment

The assessment tools were selected based on recommendations from the Institute of Medicine Committee on Nutrition Services for Medicare Beneficiaries to evaluate community-dwelling older adults[24] and on previous studies.[10,25] These instruments evaluated factors related to nutritional status (Mini Nutritional Assessment (MNA),[19]) and food insecurity (United Stated Department of Agriculture Food Security Assessment[26]) as well as the OASIS Support questionnaire which assessed caregiver support by asking participants about who provides social support, who is the person who provides lead responsibility for support, and how often support is provided. These items were obtained from a comprehensive assessment for home care patients required by Medicare to measure patient outcomes for purposes of outcome-based quality improvements.[27] Patients were also asked about available resources for in-home food preparation, health services utilization (i.e.: visits to a healthcare provider, emergency room, or hospital in the past 30 days), contact information of two relatives or friends, and demographic information, including poverty. Poverty level was assessed by asking participants if their income is greater or less than the monthly threshold set by the US Census in 2014 ($946)[28] and recorded as yes/no. Weight and height were collected from participants' charts and were used to calculate BMI which was categorized into standard categories for the general population[29] and into categories adjusted for older adults based on the work on Winter et al.[30] The assessment took an average of 30 minutes to complete. Additionally, all participants were called three

times within 10 days of discharge to collect 24-hour food recalls; each participant was called on one weekend day and two week days. Recalls were collected by certified technicians at UAB's Survey Research Unit. Data were directly entered into the Nutrition Data System for Research (NDSR) software system.[31] The NDSR multi-pass protocol was used. The NDSR Food and Nutrient Database includes over 18,000 foods with 8,000 brand name products and ingredient choices and preparation methods that provide more than 160,000 food variants. Values for 165 nutrient, nutrient ratios and other food components are generated from the database.[32–34] Total caloric intake was the primary variable of interest for this project, and data reported on caloric intake represents the mean of the three recalls for each participant.

### Follow-up Assessment

The follow-up assessment was conducted by phone from the UAB Survey Research Unit 45 days following the date the patient was discharged to home and consisted of the health services utilization questionnaire that was administered at baseline to assess for hospital readmissions. Participants who received the intervention also responded to a satisfaction assessment which included questions about satisfaction with study staff, meal quality, and the delivery process with standard Likert scale response options. Participants were also given the opportunity to identify positive aspects of the program as well as offer suggestions for how to improve the program via open-ended qualitative questions.

### Additional Process Measures

The number of meals prepared and miles driven for delivery was also recorded to aid in determining the true costs of the intervention.

### Outcomes and Analyses

After confirming that continuous level data met the assumptions of normality using the Shapiro-Wilk test, intervention and control groups were compared using the chi-square statistic and two-sample t-tests to evaluate balance in the randomization arms. Results were considered statistically significant if $p$<.05. The means and standard deviations of continuous variables and numbers and percentages of categorical variables are reported (Table 1.). The key outcomes of interest were feasibility of recruitment, randomization, and retention of participants for the study; this was evaluated using simple comparison against the goal of 80% retention. Furthermore, process measures, including data related to the delivery was also collected including the number of meals prepared, deliveries completed, and miles driven; these were calculated using simple summary characteristics. Regarding the second aim, the outcomes of hospital readmissions and caloric intake were evaluated using the chi-square test and two-sample t-test, respectively. Third, simple summary statistics were used to examine satisfaction as measured with quantitative and qualitative responses. All data management and analyses were conducted using SPSS.[35]

## RESULTS

Twenty-four participants were recruited and randomized into the study (Figure 1.) between May 2014 and June 2015. There were no differences observed between groups at baseline (Table 1.). Participants' primary diagnoses consisted of congestive heart failure, pneumonia,

and chronic obstructive pulmonary disease; patients with acute myocardial infarction were referred to a cardiac unit and are not seen on the floor where recruitment was being conducted. Other characteristics are reported in Table 1.

One of the 12 participants randomized into the intervention arm was re-hospitalized prior to meal delivery and unable to receive the meals during the intervention period. Therefore, 11 participants received 330 meals total during the intervention period. Meal delivery required driving 1459 total miles, for 76 total deliveries total at an average of 19.2 miles per delivery.

Follow-up data at 45 days was successfully collected from 11 (91.7%) participants in the intervention group and 10 (83.3%) participants in the control group, with an overall retention rate of 87.5% (See Figure 1.). Among participants in the intervention group, three (27.7%) were readmitted to the hospital within 30 days of discharge compared with one participant (8.3%) in the control group ($p$=.59). Participants randomized to the intervention group reported consuming an average of 1595 calories (SD: 312) during the 10-day post-discharge intervention period compared with an average of 1235 (SD: 456) calories reported by participants in the control group (p=.03).

PEER, Inc. charged $12 per day for the food and delivery and limited delivery to within 20 miles of their location. Between 82% and 100% of participants who received meals and completed the questionnaire reported satisfaction with multiple indicators of staff performance, meal quality, and the delivery process; one participant indicated a need for improvement with regard to the following: feeling connected to the staff, appeal of the food, healthiness of the food, level of frozen-ness of the food, and set-up of the meals (Table 2.). Furthermore, responses to open-ended questions on the satisfaction assessment revealed similar levels of satisfaction with some suggestions for improvement. One participant said, "The food was very good and they worked with me around the kinds of food I like;" another participant told interviewers that if [participant's] daughter had a doctor's appointment [daughter] did not have to come in and try to prepare something for [participant] to eat. Investigators surmised that participants may be sharing their meals with others in the household, especially among families where food insecurity levels may be high. One participant indicated this was true: "I especially liked being able to share the food with other people in my household." Another caregiver told interviewers that the participant was eating and doing very well; and [participant] felt that the meals helped to get back into the swing of things, as far as [participant's] eating. Furthermore, the caregiver said that the participant "informed the meal deliverer of the foods [participant] did not eat and they didn't bring any more" indicating that being responsive to participants' preferences is important. When asked about what should change, one participant replied: "I wish the program could continue long term." Another participant said, "The deliverer of the meals was always in a hurry, in and out." Participants also indicated a desire for more variety in the fruits and vegetables and a concern about how diabetic-friendly the meals were.

## DISCUSSION

The overarching goal of the study was met, demonstrating that partnering with a nonprofit organization to provide meals to nutritionally vulnerable older adults after hospital discharge

is feasible, and moreover, that recruiting, randomizing, and retaining participants in a study with such an intervention can be completed. Previous research has shown that among older adults being discharged from the hospital, 35% reported an inability to both prepare meals and shop for food.[36] Interventions such as this one that addresses this risk may have a significant impact on recovery and risk of readmissions, and this is especially important given the current penalties being levied against hospitals for preventable readmissions.[4] While this feasibility study did not show an impact on readmissions, Cho, et al. did so with a similar intervention; they demonstrated that provision of one home-delivered meal per day through traditional means like Meals on Wheels, beginning nearly 9 days post-discharge, can have an effect on hospital readmission rates.[37] No other studies before this one have demonstrated a partnership between an academic medical center and a community-based non-profit organization like PEER, Inc. for the purpose of providing meals to older adults immediately after discharge. In this study, participants received three meals per day, beginning within one day of leaving the hospital.

Of note, especially given the small sample size, is that the participants receiving the intervention consumed 360 more calories per day than those in the control group (p=.03). This study did not show any statistical differences in hospital readmission, however. In fact, more participants from the intervention group were readmitted to the hospital compared with the control group. While this may be explained by the small sample size, it may also, in part, be explained by other circumstances such as severity of diagnosis and complications from comorbid illnesses, which were not measured or adjusted for in this study. In fact, the primary difference may have been related to the fact that the intervention group had more persons with diabetes; after enrollment in the study, staff learned of two participants who had diabetes and suffered from related complications which led to their rehospitalization. Because investigators did not randomize or stratify according to disease severity or comorbidity, the randomization scheme did not adjust for these. Future studies would benefit from accounting for such relevant comorbidities using stratified randomization schemes.

With respect to the composition of the study sample, the investigators note that many people had to be screened and interviewed before enrolling in the study (Figure 1). The most common reason that otherwise eligible patients gave for declining to participate in the study was having adequate support at home, especially from spouses. Thus, the sample consisted of mostly widowed, divorced, or single individuals who expressed a need for additional support. Another related reason for non-participation was having sufficient financial resources for purchasing food. This led to the sample being composed of mostly individuals below poverty level. Given these observations, the program particularly addressed the needs of low-income individuals living alone in the community.

## Limitations and Considerations for Future Research

Because the purpose of this study was to demonstrate feasibility and ultimately ability to conduct a large-scale randomized controlled trial of a project like this, it is important to consider limitations and what should be done differently in future work. First, while the investigators were successful in developing and maintaining the partnership with PEER, Inc. and in recruiting the participants needed for this study from UAB Hospital's ACE Unit,

recruitment for the 24 participants in this study took more than one year, possibly due to the limited scope of the recruitment criteria. Alternative strategies for recruitment might be considered such as recruiting from multiple units in a hospital or from multiple hospitals and expanding the diagnoses for which this intervention is provided in the interest of limiting readmissions for any reason rather than just for the ones identified for this study. The pilot study helped demonstrate that low-resource patients are the ones for whom this intervention is appealing; therefore offering it based on nutritional risk, including having limited resources, may be more appropriate. Second, PEER, Inc. likely underestimated the cost of the services, which they indicated would be $12 per day. Reimbursement for mileage alone should have been $11.04 (19.2 miles per delivery * $0.575 per mile) per day based on the federal mileage reimbursement rate at the time of the study. Additional costs for each meal and delivery should be allocated in future studies. Third, PEER, Inc. was limited to traveling within 20 miles of their location, which excluded many patients from enrolling in the study who were otherwise eligible to participate. Therefore, the investigators recognize that a full-scale intervention would benefit from enlisting multiple partners in communities around the region. Additionally, while the investigators had success with data collection with the current limited selection of variables assessed, the investigators might also directly assess BMI at baseline as one indicator of nutritional health rather than relying on data in the participants' charts. Furthermore, follow-up assessment of the MNA may help measure success of the intervention as it would allow investigators to assess change from baseline. Also, given the limitations of using food recall data as an outcome variable, the investigators view this as a process variable that lends some support that the intervention was working as intended (i.e., participants who received meals actually ate them).[38,39] Finally, comments collected during the satisfaction assessment indicate that intervention participants were overwhelmingly satisfied with the resources they received. They may also need more nutrition services and additional resources after discharge from the hospital, including additional nutritional support and companion care.[40]

Of note, while these are outside the scope of this current project the full-scale study should consider examining dose response of the meals to better understand how many meals post-discharge has the optimal effect. Furthermore and finally, it will be crucial to evaluate the cost effectiveness of this intervention along with other approaches to providing post-discharge nutritional support for high risk older adults.

## CONCLUSION

Conducting a randomized controlled trial to assess the outcomes of providing home-delivered meals to older adults after discharge from the hospital in partnership with a small nonprofit organization is feasible, but not without challenges. In the pilot phase, participants agreed to participate and matriculated through the study according to its goals; responded to baseline and follow-up questions, indicating that the intervention had a positive effect on caloric intake; and for those receiving the intervention, reported overwhelming satisfaction with the home-delivered meal services. Future research should engage more inclusive recruiting strategies, including enrolling people with more diagnoses. Additionally, other community partners similar to PEER, Inc. should be engaged to ensure that people in geographically diverse areas who are otherwise eligible for participation are served.

## Acknowledgments

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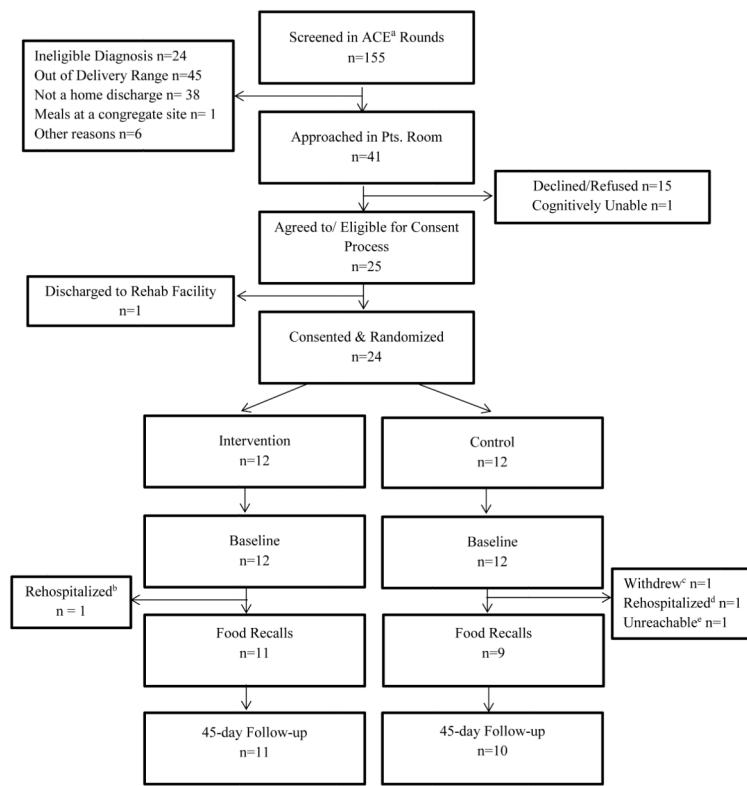
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**Figure 1.**
Flow Diagram of Study Participants throughout the MEALS ENHANCING NUTRITION
AFTER DISCHARGE (MEND) Study

[a]Acute Care for Elders Unit

[b]Rehospitalized prior to meal delivery and unable to complete recalls

[c]Withdrew and did not complete recalls

[d]Rehospitalized and unable to complete recalls

[e]Unable to reach participant to complete recalls but able to reach for 45-day follow-up

**Table 1**

Baseline Demographic Characteristics, According to Study Group for the Meals Enhancing Nutrition After Discharge (MEND) Study[a]

| Variable | Entire Sample (N=24) | Home- delivered Meals Intervention (N=12) | Standard Care Control (N=12) |
|---|---|---|---|
| Age – years | 77.2 ± 9.6 | 75.8 ± 9.1 | 78.6 ± 10.2 |
| Male Sex – no. (%) | 6 (25.0) | 2 (16.7) | 4 (33.3) |
| Race/Ethnicity | | | |
| Non-Hispanic Black/African American – no. (%) | 20 (83.3) | 10 (83.3) | 10 (83.3) |
| Non-Hispanic White – no. (%) | 4 (16.7) | 2 (16.7) | 2 (16.7) |
| Education | | | |
| Less than high school – no. (%) | 11 (45.8) | 6 (50.0) | 5 (41.7) |
| High school – no. (%) | 4 (16.7) | 3 (25.0) | 1 (8.3) |
| Some college – no. (%) | 7 (29.2) | 2 (16.7) | 5 (41.7) |
| College graduate – no. (%) | 2 (8.3) | 1 (8.3) | 1(8.3) |
| Income below poverty level[b] – no. (%) | 15 (62.5) | 8 (66.7) | 7 (58.3) |
| Marital Status | | | |
| Married – no. (%) | 3 (12.5) | 0 (0.0) | 3 (25.0) |
| Widowed – no. (%) | 12 (50.0) | 8 (66.7) | 4 (33.3) |
| Divorced – no. (%) | 8 (33.3) | 4 (33.3) | 4 (33.3) |
| Never Married – no. (%) | 1 (4.2) | 0 (0.0) | 1 (8.3) |
| Living Situation | | | |
| Lives alone – no. (%) | 11 (45.8) | 7 (58.3) | 4 (33.3) |
| Lives with spouse – no. (%) | 3 (12.5) | 0 (0.0) | 3 (25.0) |
| Lives with other family – no. (%) | 10 (41.7) | 5 (41.7) | 5 (41.7) |
| Weight in kg | 77.2 ± 18.8 | 85.7 ± 15.7 | 68.7 ± 18.3 |
| BMI | 27.2 ± 6.9 | 29.9 ± 7.3 | 24.5 ± 5.6 |
| BMI Categories | | | |
| Underweight (<18.5) – no. (%) | 2 (8.3) | 0 (0.0) | 2 (16.7) |
| Normal Weight (18.5–24.9) – no. (%) | 9 (37.5) | 4 (33.3) | 5 (41.7) |
| Overweight (25–29.9) – no. (%) | 5 (20.8) | 3 (25.0) | 2 (16.7) |
| Obese ( 30) – no. (%) | 8 (33.3) | 5 (41.7) | 3 (25.0) |
| BMI Adjusted Categories[c] | | | |
| Low (<23) – no. (%) | 8 (33.3) | 2 (16.7) | 6 (50) |
| Other (23+) – no. (%) | 16 (66.7) | 10 (83.3) | 6 (50) |
| Food Security[d] | | | |
| High or Marginal – no. (%) | 15 (62.5) | 7 (58.3) | 8 (67.0) |
| Low – no. (%) | 5 (20.8) | 3 (25.0) | 2 (16.7) |
| Very Low – no. (%) | 4 (16.7) | 2 (16.7) | 2 (16.7) |
| Medical Diagnoses | | | |

| Variable | Entire Sample (N=24) | Home- delivered Meals Intervention (N=12) | Standard Care Control (N=12) |
|---|---|---|---|
| Congestive Heart Failure – no. (%) | 9 (37.5) | 4 (33.3) | 5 (41.7) |
| Pneumonia – no. (%) | 10 (41.7) | 5 (41.7) | 5 (41.7) |
| Chronic Obstructive Pulmonary Disease – no. (%) | 5 (20.8) | 3 (25.0) | 2 (16.7) |
| Acute Myocardial Infarction – no. (%) | 0 (0.0) | 0 (0.0) | 0 (0.0) |

[a] Plus-minus values are means ± standard deviations. All demographic information was based upon self-report. There were no significant differences between the groups at a p < 0.05.

[b] Poverty level was assessed by asking participants if their income is greater or less than the monthly threshold set by the US Census in 2014 ($946)[28] and recorded as yes/no.

[c] Adjusted BMI Categories are based on the work of Winter et al. (2014)[30], suggesting that for older adults with BMI <23, there is a significant risk of mortality.

[d] Food Security was evaluated using the USDA Food Security Assessment (Food Security in the US: Survey Tools, 2012)[26].

**Table 2**

Acceptability and Satisfaction Data from Participants Randomized to Receive Home-delivered Meals After Hospital Discharge in the Meals Enhancing Nutrition After Discharge Study (N=11)

| Satisfaction with Staff | | | | | |
|---|---|---|---|---|---|
| How Knowledgeable was the staff about the study? | Very Knowledgeable (N=8, 73%) | Knowledgeable (N=3, 27%) | Neither Knowledgeable nor Unknowledgeable (N=0, 0%) | Unknowledgeable (N=0, 0%) | Very Unknowledgeable (N=0, 0%) |
| How responsive was the staff to your needs and questions? | Very Responsive (N=7, 64%) | Responsive (N=3, 27%) | Neither Responsive nor Unresponsive (N=1, 9%) | Unresponsive (N=0, 0%) | Very Unresponsive (N=0, 0%) |
| How friendly was the staff? | Very Friendly (N=8, 73%) | Friendly (N=2, 18%) | Neither Friendly nor Unfriendly (N=1, 9%) | Unfriendly (N=0, 0%) | Very Unfriendly (N=0, 0%) |
| Did you feel like you could reach the staff if you had questions? | Yes (N=11, 100%) | No (N=0, 0%) | | | |
| Were staff members responsive to your phone calls? | Very Responsive (N=8, 73%) | Responsive (N=1, 9%) | Neither Responsive nor Unresponsive (N=2, 18%) | Unresponsive (N=0, 0%) | Very Unresponsive (N=0, 0%) |
| How well did you feel that you connected with the staff? | Very Connected (N=8, 73%) | Somewhat Connected (N=2, 18%) | Neither Connected nor Disconnected (N=0, 0%) | Somewhat Disconnected (N=1, 9%) | Very Disconnected (N=0, 0%) |
| **Satisfaction with Food** | | | | | |
| How satisfied were you with the sensory appeal or presentation of meals you received with respect to smells nice, looks nice, has pleasant texture, or tastes good? | Very Satisfied (N=8, 73%) | Somewhat Satisfied (N=2, 18%) | Neither Satisfied nor Dissatisfied (N=0, 0%) | Somewhat Dissatisfied (N=1, 9%) | Very Dissatisfied (N=0, 0%) |
| How satisfied were you with the healthiness of the meals you received with respect to such things as whether you thought they contained a lot of vitamins and minerals, kept you healthy, were nutritious, were high in protein, or high in fiber or some other nutrition important to you? | Very Satisfied (N=8, 73%) | Somewhat Satisfied (N=2, 18%) | Neither Satisfied nor Dissatisfied (N=0, 0%) | Somewhat Dissatisfied (N=1, 9%) | Very Dissatisfied (N=0, 0%) |
| How satisfied were you with the familiarity of the meals you received with respect to such things as whether it is like the food you usually eat? | Very Satisfied (N=9, 82%) | Somewhat Satisfied (N=1, 9%) | Neither Satisfied nor Dissatisfied (N=1, 9%) | Somewhat Dissatisfied (N=0, 0%) | Very Dissatisfied (N=0, 0%) |
| How satisfied were you that the meals were adequately frozen when you received them? | Very Satisfied (N=9, 82%) | Somewhat Satisfied (N=1, 9%) | Neither Satisfied nor Dissatisfied (N=0, 0%) | Somewhat Dissatisfied (N=1, 9%) | Very Dissatisfied (N=0, 0%) |
| How satisfied were you with the convenience of the meal setup you | Very Satisfied (N=9, 82%) | Somewhat Satisfied (N=1, 9%) | Neither Satisfied nor Dissatisfied (N=0, 0%) | Somewhat Dissatisfied (N=1, 9%) | Very Dissatisfied (N=0, 0%) |

| received with respect to how easy it was to eat or prepare? | Very Satisfied | Somewhat Satisfied | Neither Satisfied nor Dissatisfied | Somewhat Dissatisfied | Very Dissatisfied |
|---|---|---|---|---|---|
| How satisfied were you that the meals were provided to you on the day you were discharged? | Very Satisfied (N=8, 73%) | Somewhat Satisfied (N=3, 27%) | Neither Satisfied nor Dissatisfied (N=0, 0%) | Somewhat Dissatisfied (N=0, 0%) | Very Dissatisfied (N=0, 0%) |
| How satisfied were you with any dietary restrictions or accommodations that had to be made to the meals you received, such as reduced sodium or sugar? | Very Satisfied (N=8, 73%) | Somewhat Satisfied (N=1, 9%) | Neither Satisfied nor Dissatisfied (N=1, 9%) | Somewhat Dissatisfied (N=0, 0%) | Very Dissatisfied (N=1, 9%) |