Original Study

Prevalence and Determinants of Poor Food Intake of Residents Living in Long-Term Care

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A B S T R A C T

Objective: Poor food intake is known to lead to malnutrition in long-term care homes (LTCH), yet multi-level determinants of food intake are not fully understood, hampering development of interventions that can maintain the nutritional status of residents. This study measures energy and protein intake of LTCH residents, describes prevalence of diverse covariates, and the association of covariates with food intake.
Design: Multisite cross-sectional study.
Setting: Thirty-two nursing homes from 4 provinces in Canada.
Participants: From a sample of 639 residents (20 randomly selected per home), 628 with complete data were included in analyses.
Measurements: Three days of weighed food intake (main plate, estimated beverages and side dishes, snacks) were completed to measure energy and protein intake. Health records were reviewed for di-agnoses, medications, and diet prescription. Mini-Nutritional Assessment-SF was used to determine nutritional risk. Oral health and dysphagia risk were assessed with standardized protocols. The Edinburgh-Feeding Questionnaire (Ed-FED) was used to identify eating challenges; mealtime in-teractions with staff were assessed with the Mealtime Relational Care Checklist. Mealtime observations recorded duration of meals and assistance received. Dining environments were assessed for physical features using the Dining Environment Audit Protocol, and the Mealtime Scan was used to record mealtime experience and ambiance. Staff completed the Person Directed Care questionnaire, and managers completed a survey describing features of the home and food services. Hierarchical multi-variate regression determined predictors of energy and protein intake adjusted for other covariates.
Results: Average age of participants was 86.3 ± 7.8 years and 69% were female. Median energy intake was 1571.9 ± 411.93 kcal and protein 58.4 ± 18.02 g/d. There was a significant interaction between being prescribed a pureed/liquidized diet and eating challenges for energy intake. Age, number of eating

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challenges, pureed/liquidized diet, and sometimes requiring eating assistance were negatively associated with energy and protein intake. Being male, a higher Mini-Nutritional Assessment–Short Form score, often requiring eating assistance, and being on a dementia care unit were positively associated with energy and protein intake. Energy intake alone was negatively associated with homelikeness scores but positively associated with person-centered care practices, whereas protein intake was positively associated with more dietitian time.

Conclusion: This is the first study to consider resident, unit, staff, and home variables that are associated with food intake. Findings indicate that interventions focused on pureed food, restorative dining, eating assistance, and person-centered care practices may support improved food intake and should be the target for further research.

Poor food intake and subsequent malnutrition are pervasive among older adults living in long-term care homes (LTCHs).[1–5] Weight loss and poor nutritional status of these elders have been implicated in falls, chronic wounds, poor wound healing, hospital admission, disproportionate use of health services, and reduced quality of life.[6–10] Poor food intake is the primary mechanism for malnutrition in this population and is potentially preventable for some residents.[4,11] To better understand how to improve food intake among these elders, we first need to understand what resident, home, and staff characteristics are most prevalent and associated with food intake. Prior work based on small sample sizes has resulted in limited understanding of the prevalence of various risk factors and which modifiable variables are relevant. A comprehensive assessment of factors and how they are associated with food intake is absent in the literature. The Making the Most of Mealtimes (M3) conceptual model suggests 3 domains of (1) meal access (eg, dysphagia, self-feeding capacity), (2) meal quality (eg, nutrient density, sensory appeal), and (3) mealtime experience (eg, ambiance) that can influence food intake in residential settings. This model notes that all of these domains can be influenced by resident (eg, diagnosis of dementia), staff (eg, number, skill), home (eg, policy, philosophy of care), and regional factors (eg, regulation).[12] This conceptual model demonstrates how complex food intake can be in LTCHs, but also provides a map for further understanding these complex relationships.

To date, research on determinants of food intake in residential environments has focused on only 1 or 2 levels of influence (eg home, resident)[13]; few key factors, often not modifiable (eg, dementia, eating difficulties)[14,15]; or data from relatively few residents and/or homes.[4,6] Furthermore, few studies have rigorously measured food intake[4] or considered the cluster effect of units within homes, and residents within units, when determining associations.[13] This study was designed to overcome these limitations and will (1) describe energy and protein intake (as proxies of total and quality food intake, respectively) and prevalence of a comprehensive list of resident, unit, and home covariates and (2) identify the factors associated with total energy and protein intake in a large, diverse sample of LTCH residents when adjusted for other covariates.

Methods

Subjects and Setting

The complete protocol for this cross-sectional, multisite study is described in detail elsewhere.[16] In brief, 32 purposively selected LTCHs from 4 Canadian provinces participated. Two to 3 units within each home were randomly selected (dementia care unit included if available) for recruitment. With the assistance of a trained home staff member, residents were randomly selected and recruited to reach a quota of 20 residents per home. Eligible residents were ≥65 years of age, provided (or alternate decision-maker [ADM]) informed consent and were medically stable (no hospital admission in previous month or palliative),

had been in the home for at least 1 month, ate an oral diet, and typically ate in the dining room. The home staff member approached the resident/ADM to determine interest in learning more about the study. Research staff obtained informed consent to participate.

Research Staff

Provincial research leads in each province are experts in dietetics/nutrition or nursing with extensive experience in the conduct of research in LTCHs; they provided study oversight and quality control in each province. A coordinator (background in dietetics/nutrition, 3 were practicing dietitians) was responsible for all data collection within each home in their province and day-to-day management of the project. Provincial research leads and coordinators attended an in-person, 3-day training session for all procedures, including practicing of all data collection measures to promote standardization. Provincial coordinators and research leads trained 2 further research assistants (post baccalaureate health studies/nutrition) in their province for meal observations (eg, length of meal, observation of eating behaviors/challenges), food intake assessment, and nutrient analysis. A dental hygienist for each province was contracted to complete the standardized oral health exams; they were trained by a coinvestigator with this expertise. Monthly teleconferences were completed throughout the study to address data collection issues and further promote consistency in measurement and procedures.

Food Intake

Three nonconsecutive days of weighed food intake (before and after consumption of items on main plate and estimated beverages, side dishes, and snacks) were collected for each resident. Food Processor Nutrition Analysis Software, version 10.14.1 (ESHA Research, Salem, OR), was used with home recipes to estimate intake; average intake of energy and protein were dependent variables for this analysis. A detailed procedure[16] was followed to promote accuracy in assessment of food intake and nutrient analysis. Specifically, home recipes were used to complete the nutrient analysis concurrently with data collection to provide opportunity for clarification with the home staff. Research assistants checked each other's work, and rules were followed with respect to food substitution for nutrient analysis when a recipe was unavailable.[16] The Canadian Nutrient File was used for foods/ingredients where fortification practices would influence nutrient content.

Resident Covariates

Resident variables (eg, medication, use of supplements, diet prescription, 6-month weight history) were collected from the health record by the provincial coordinator. Modified food texture diets were classified for analysis using the International Dysphagia Diet Standardisation Initiative as there were a wide variety of modified food