



Original article

Predictors of dietitian consult on medical and surgical wards



Heather Keller ^{a,*}, Johane P. Allard ^b, Manon Laporte ^c, Bridget Davidson ^d,
 Hélène Payette ^e, Paule Bernier ^f, Khursheed Jeejeebhoy ^g, Donald R. Duerksen ^h,
 Leah Gramlich ⁱ

^a Schlegel-UW Research Institute for Aging, University of Waterloo, 200 University Avenue, West Waterloo, ON, N2L 3G1, Canada

^b Department of Medicine, Division of Gastroenterology, Toronto General Hospital, 585 University Avenue, 9N-973, Toronto, ON, M5G 2C4 Canada

^c Réseau de sante Vitalite Health Network, Campbellton Regional Hospitals, 189 Lily Lake Road, PO Box 880, Campbellton, NB, E3N 3H3, Canada

^d 788 Avondale Avenue, Kitchener, ON, N2M 2W8, Canada

^e Université de Sherbrooke, Research Center on Aging, CSSS-IUGS, 1036, Belvedere Street, Sherbrooke, QC, J1H 4C4, Canada

^f Jewish General Hospital, 3755 ch Cote Ste-Catherine, Montreal, QC, H3T 1E2, Canada

^g Department of Medicine, St. Michael's Hospital, 30 Bond Street, Toronto, ON M5B 1W8, Canada

^h Department of Medicine, Division of Gastroenterology, C5120 409 Tache Avenue, St. Boniface Hospital, Winnipeg, MB R2H 2A6, Canada

ⁱ University of Alberta, Division of Gastroenterology, Room 214, Community Services Centre, Royal Alexandra Hospital, Edmonton, AB T5H 3V9, Canada

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SUMMARY

Background & aim: Guidelines promote dietitian consult (DC) for nutrition support. In Canada, dietitians are involved in the assessment of malnutrition and provide specialized dietary counseling. It is unknown however, what leads to a DC for patients fed orally. This study identifies independent predictors for a DC and determines what is the proportion of malnourished patients seeing a dietitian.

Methods: The Canadian Malnutrition Task Force conducted a prospective cohort study in medical and surgical wards of 18 Canadian hospitals. 947 patients who did not receive enteral or parenteral nutrition were analyzed. At admission, subjective global assessment (SGA), body mass index, patient demography were collected. During hospitalization clinical data, including dietary intake and presence of a DC were obtained. Multivariate logistic regression was completed with dietitian consult ≤ 3 days and $4 +$ days as the outcome variables.

Results: The prevalence of malnutrition (SGA B + C) was 45%. Dietitians were consulted for 23% of patients, and of these consults 44% were well nourished (SGA-A), 37% were mildly/moderately malnourished (SGA-B), and 19% were severely malnourished (SGA-C). DC missed 75% of the SGA-B and 60% of SGA-C patients. Predictors of consultation within 3 days of hospitalization were: renal diet (OR 5.75) modified texture diet (OR 5.38), metabolic diagnosis (3.91), ONS use pre-admission (OR 2.33), severe malnutrition (SGA-C, OR 1.88) and age (OR 0.98). Predictors for $4 +$ days were: dysphagia (OR 11.4), a new medical diagnosis (OR 2.3), severe malnutrition (OR 2.17), constipation (OR 2.16), more than one diagnosis (OR 1.8), antibiotic use (OR 1.6), and male gender (OR 1.6). Consuming $< 50\%$ of food in the first week was not a predictor as only 19% of those with low intake had a DC at $4 +$ days.

Conclusions: Overall predictors of DC were appropriate but SGA B and C patients and those eating $< 50\%$ were missed. Screening at admission with algorithms of care that include referral to the dietitian are needed to improve the process of nutrition care.

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1. Introduction

Malnutrition is a prevalent and costly problem in community and academic acute care hospitals. Specifically, malnutrition at

admission or developed during hospitalization results in extended lengths of stays, readmissions and mortality [1–3] and significant economic costs [2,4]. In Canada, dietitians are the professional group trained to provide comprehensive, individualized nutritional assessment and treatment [5], but this specialist resource is limited in many care settings. Physician referral is commonly used to involve specialist services like the dietitian in the care of a patient

* Corresponding author. Tel.: +1 519 888 4567x31761.

E-mail address: hkeller@uwaterloo.ca (H. Keller).

[5,6] in most regions of Canada. Yet, the dietitian's clinical expertise is often underestimated by physicians, resulting in potentially inappropriate referrals [6]. Consequently, inefficient practices, such as dietitians reviewing admissions for diagnosis and diet order, or attending clinical rounds to identify potential patients for a consult are employed [5,6].

Early involvement of the dietitian in the care of malnourished patients reduces length of stay [7], decreases infection and promotes healing [8–10]. For example, enteral nutrition prescription provided by a dietitian versus a physician, resulted in patients receiving on average 10% more energy and protein, having increased body weight and a shorter length of stay by two days [11]. A recent review [12] identified that randomized control trials on individualized nutrition treatment, typically provided by a dietitian, improved food intake, body weight [13,14], quality of life [14], and reduced complications [14], readmissions [14], mortality [15] and length of stay [16].

Nutrition screening is advocated by leading authorities as a means of improving nutrition care [3,17–19]. In addition to the use of a valid and reliable tool, an 'ethical screening program' ensures that: a) screening is targeted to the right patients, b) a positive screening is followed by assessment to diagnose malnutrition, c) monitoring for all patients occurs to ensure that developing malnutrition is identified early, and d) those malnourished are provided with efficacious treatments to improve their nutritional state. Such 'screening programs' are just beginning to occur in a systematic way in acute care [3,20–22] and are uncommon in Canadian hospitals [6]. At this point, it is unclear when the specialist service of the dietitian is consulted in Canadian hospitals. Understanding independent predictors of dietitian consults could further build the case for an ethical screening program and improved nutrition care process in hospitals. Little research has been conducted in the area of referral patterns for this specialist resource and the appropriateness of these consults. The purpose of this research was to investigate the independent predictors (e.g. patient demographics and clinical attributes, adverse events, hospital characteristics) of dietitian consults (DC) in Canadian medical and surgical units in acute care hospitals, using the data from the Nutrition Care in Canadian Hospitals cohort study, directed by the Canadian Malnutrition Task Force (CMTF).

2. Materials & methods

Data were collected by trained site-coordinators, who were either masters-level nutrition researchers ($n = 4$) or dietitians ($n = 14$), seconded to the project. Dietitians were not currently working on the units included in the study and were often recent graduates or part time employees. To avoid intra- or inter-observer variability, all study coordinators were trained in a standardized way by the national coordinator (BD), an advanced practice dietitian, using video, concrete examples and practice with SGA and other measures. Of 1022 adult (18 + years) patients recruited initially from medical or surgical units, 947 were included in the present study. Participants receiving enteral ($n = 16$) or parenteral nutrition ($n = 20$) during their stay or those transferred to an intensive care unit ($n = 37$) were excluded from analysis as this level of care usually results in an automatic DC; the remaining 2 patients not included in this analysis had no admission SGA. This was a multi-centre prospective cohort study including 18 small (<200 beds) and large (≥ 200 beds), academic and community hospitals across eight provinces; data collection occurred between August 2010 and February 2013. Patients from medical and surgical units were recruited using a consecutive admissions protocol, to avoid selection bias. Large hospitals recruited 60 patients, while smaller hospitals recruited 40; data collection took between 3 and

6 months at each hospital. Universities of Toronto, Guelph and Waterloo ethics reviews were completed, as well as the research board review at each participating hospital. Participants or their family proxies provided informed consent; demography of participants was compared to Canadian Institute for Health Information to demonstrate representativeness (data not shown).

For this study, subjective global assessment (SGA) was used as the primary measure of nutritional status, where SGA-B indicated mild or moderate and SGA-C severe malnutrition; in addition, BMI was calculated from measured weight and height. A comprehensive clinical history was obtained by interview with the patient or family and by accessing the medical chart for all recruited patients. Primary diagnosis as well as new diagnoses during hospitalization, presence/absence of cancer, and number of medications and antibiotics for the first 10 days of admission was recorded from the chart. Demographics were recorded either from the chart or by asking the patient or family. Patients were asked if they used nutritional supplements (ONS; e.g. sip feeds) prior to their admission and their admission diet was recorded. Every two days, site coordinators reviewed chart notes for adverse events (e.g. fall, new dysphagia, constipation etc.), and change in diet prescription (e.g. ONS, high calorie/protein, renal etc.). Chart notes identified if and when a DC occurred. Dietary intake was estimated by patients, families present at the meal or the site coordinators using the nutritionDay™ Form(25) for one meal on 3 days of the 1st week of stay and recorded as 0%, 25%, 50% or 100% consumption. These records were averaged and dichotomized for analysis as <50% and $\geq 50\%$ consumption of provided food during the first week of admission.

2.1. Statistical analyses

Descriptive analyses (means, standard errors, medians, quartiles; proportions) were completed on the full data set ($n = 947$). Median number of medications per day was calculated from the longitudinal follow-up data recorded for each patient during his/her first 10 days of hospitalization. The main admission diagnosis was classified under 11 broad standard categories: cardiovascular, gastrointestinal, genitourinary, respiratory, musculoskeletal, neurologic, autoimmune disease, metabolic disorder, sensory-organ impairment, trauma, hematopoietic disorder and other. For some patients ($n = 248$) a new diagnosis was also recorded during their hospital stay. Where there was more than one category of diagnosis for the same patient, a 2nd and 3rd diagnostic category were coded and the number of diagnoses (1, 2 or 3) was calculated for each patient and used in analyses to reflect severity of conditions.

Models predicting the probability of DC were created using logistic regression analysis; final sample used in analyses was slightly different from the full data set of 947 due to missing data on retained variables. It was anticipated that site and practice conventions would dictate DC at admission. It was also hypothesized that in-hospital adverse events (such as new diagnoses, identified dysphagia etc.) would stimulate DC later in the admission; thus two separate models were built, one predicting a dietitian visit within the first three days and the second, after three days of admission. The first model included 931 participants with complete data on all potential predictors. To examine the independent predictors of the first dietitian visit later than 3 days from admission, a subset of patients ($n = 717$) who stayed in the hospital 4 days or more, and **had not** seen the dietitian in the first three days was analyzed, excluding participants with missing variables of interest.

Covariates to be included in the models were chosen based on the limited literature and on the clinical experience of the investigators. The relationships between candidate predictor variables and dietitian visits were first examined in association analyses using Chi-squared, Fisher exact and *t*-tests as appropriate

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