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Early malnutrition screening and low cost protein supplementation in elderly patients admitted to a skilled nursing facility

Krystal M. Harding, DNP, RN, ANP-BC, CCRN [a], Melissa Dyo, PhD, RN, AGNP-C [b,*], Joy R. Goebel, PhD, RN [b], Nik Gorman, MPH, EdD [c], Julia Levine, MS, RD [d]

[a] RM Butlig, MD, Inc., Torrance, CA, USA
[b] California State University, Long Beach, CA, USA
[c] California State University, Fullerton, CA, USA
[d] Driftwood Healthcare and Wellness Center, Torrance, CA, USA

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ABSTRACT

Background: Malnutrition among skilled nursing facility (SNF) patients can lead to hospital readmissions and multiple complications.
Purpose: To evaluate the effect of an existing malnutrition screening and management program on prealbumin levels of patients in skilled nursing facilities.
Methods: A retrospective design was used to evaluate baseline admission data including a prealbumin level. Patients with malnutrition received an oral protein supplement according to protocol. A comparison prealbumin level was obtained at 30 days.
Results: Nearly half of the patients were severely malnourished on admission. Patients receiving the prescribed protocol had significantly increased prealbumin levels at 30 days than those patients that did not receive the protocol as prescribed.
Conclusion: A prealbumin level upon admission at a SNF could represent a reliable tool to evaluate malnutrition. Initiation of an early malnutrition screening and protein supplement program in this setting is essential to identifying and treating at-risk patients before complications occur.

1. Introduction

Malnutrition in the skilled nursing facility (SNF) setting is a common occurrence for the geriatric population, affecting more than half of the residents in these homes (Cereda et al., 2011; Verbrugghe et al., 2013). Failure to properly screen and treat this condition in the elderly population occurs far too often, causing a variety of unfavorable outcomes such as increased mortality, length of stay, risk for falls, depression, delirium, as well as reduced physical functioning and quality of life (Ahmed, Leurent, & Sampson, 2014; Kane, Shamliyan, Talley, & Pacala, 2012; Neyens et al., 2013; Rasheed & Woods, 2013; Singh et al., 2014). Research suggests that the most critical time to screen and implement treatment for malnutrition in geriatric patients admitted to a SNF is within the first 24–48 hours of admission (Drescher et al., 2010; Vischer et al., 2012).

Several nutritional screening tools are available to evaluate risk for malnutrition. Some of these are based on biochemical and clinical indices, while others focus on anthropometry, mobility, cognitive state, and self-report of health and nutritional indicators (Drescher et al., 2010; Meijers, Halfens, Wilson, & Schols, 2012; Neyens et al., 2013; Poulia et al., 2012; Stratton, Green, & Elia, 2003; Verbrugghe et al., 2013; Vischer et al., 2012). Existing tools found in the literature vary in length and complexity with no gold standard yet established for diagnostic purposes (Elia & Stratton, 2011). Skill level or accuracy between persons collecting the data can lead to inconsistent results in malnutrition screening (Bell, Bauer, & Capra, 2013).

Biochemical measurements can provide an objective measurement of malnutrition. Serum prealbumin is a marker of visceral protein status, though it can be affected by inflammatory variations, particularly in acutely ill patients. Recent guidelines from the Academy of Nutrition and Dietetics/American Society for Parenteral and Enteral Nutrition recommend its use only when acute inflammation has been ruled out (White, Guenter, Jensen, Malone, & Schofield, 2012). Prealbumin has a relatively shorter half-life (2–3 days) and can be a useful screening tool for identifying malnutrition in those at nutritional risk (Devoto et al., 2006), especially once patients transition out of the acute inflammatory stage of illness.

In the SNF setting, geriatric weight loss and malnutrition are predominantly triggered by a decline in food intake. Nursing home elderly often have a low intake of energy rich foods and micronutrients, which leads to malnutrition and decreased serum protein. The development of malnutrition may be prevented by improving dietary intake with an

* Corresponding author at: CSULB School of Nursing, 1250 Bellflower Blvd., Long Beach, CA, 90840. Tel.: +1 562 773 7830.
E-mail address: melissa.dyo@csulb.edu (M. Dyo).

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oral enriched nutritional supplement (Manders et al., 2009). Oral nutritional supplementation can improve the nutritional status of institutionalized elderly and enhanced patient outcomes such as cognitive function and quality of life (Christensson, Ek, & Unosson, 2001).

Motivated by a shared commitment to identify and ameliorate malnutrition, a team of health care providers in the SNF setting re-examined existing practices related to admission screening of geriatric patients and subsequent nutritional interventions. The usual nutritional care of patients within these facilities included an evaluation on admission by a registered dietitian for dietary issues (e.g. impaired swallowing), reassessment in two weeks for weight loss, and protein supplementation depending on actual weight loss. Based on the research evidence (Cawood, Elia, & Stratton, 2012; Manders et al., 2009; Potter & Luxton, 1999), a malnutrition screening and treatment protocol that included prealbumin testing and protein supplementation was implemented in four SNFs through a collaborative effort between one internal medicine primary physician, one nurse practitioner, four physician assistants, and a dietitian. Prior to the current study, no formal analysis of patient data or evaluation of the malnutrition protocol had been completed by the facilities. Thus, the purpose of this pilot study was to determine the prevalence of malnutrition among SNF residents and to evaluate the efficacy of a malnutrition screening and treatment protocol on prealbumin levels in an elderly population within the long-term care setting.

2. Methods

2.1. Setting

The selected facilities were freestanding and Medicare/MediCal approved with bed capacity from 80–99 with an occupancy range of 80–95%. These facilities provide short and long term care, from rehabilitation services to complex medical care for patients with reduced physical functioning. Serving a diverse population of male and female patients, the typical age range in this setting is 65–84 years old. Demographic characteristics for the elderly population served in the SNFs vary by age, race, ethnicity, and socioeconomic background.

2.2. Study design and aim

Following institutional review board approval from the SNFs and the researcher's affiliated university, a retrospective chart review was conducted at the SNFs to evaluate the existing protein supplement program. According to facility protocol, prealbumin levels were obtained on all patients within the first 24–48 hours of admission to the SNF. Blood specimens were analyzed at the local laboratory at each nursing home. A normal prealbumin level was defined as 17–35 mg/dl, according to the assay manufacturers. Patients with low prealbumin levels were started on an oral enriched protein supplement, *Prostat 64*, a high calorie complete protein liquid, with added nutrients. Prostat contains "17 grams of hydrolyzed complete protein to reduce protein energy/calorie malnutrition, build muscle, repair tissue, fight infections, and reduce overall morbidity/mortality" (Pro-Stat). Prostat was available at all four SNFs as a house stock supply consisting of 887 ml per bottle. At approximately $20 per bottle, Prostat 64 costs an estimated $0.66/dose. With dosage depending upon initial prealbumin level, patients were prescribed Prostat by the physician, physician assistant, or nurse practitioner. Nursing staff administered Prostat as part of the patient's medication pass and documented all Prostat supplements in the medication administration record. The cost of the laboratory tests and Prostat supplementation was covered by the patient's insurance as part of the care received while in the SNF.

The treatment protocol for malnutrition with implementation of Prostat 64 was as follows:

- Prealbumin level between 15–17 mg/dl, Prostat 64 30 ml, twice a day
- Prealbumin level between 11–14 mg/dl, Prostat 64 30 ml, three times a day
- Prealbumin level <10 mg/dl, Prostat 64 30 ml, four times a day

The prealbumin level was measured 30 days after the initial screening and implementation of the oral enriched protein supplement protocol.

The data were obtained from the electronic medical records (EMRs) of patients admitted between October 1, 2012 and October 1, 2013. The primary study aim was to compare patient prealbumin levels on admission with levels obtained after 30 consecutive days of receiving the protein supplement as ordered. A secondary aim was to compare patients who received the protocol versus those who were eligible, but did not receive the protocol treatment.

2.3. Study population and inclusion criteria

Patients were eligible to receive protein supplementation if their admission prealbumin was 17 mg/dl or below. To be included in this study, patients receiving supplementation were eligible if prealbumin levels were drawn twice: within 24–48 hours of admission and after 30 consecutive days on protein supplementation. Potential patients were excluded for the following reasons: readmission to the hospital or early discharge home from the SNF prior to a 30-day stay that prevented a 30 day comparison prealbumin level from being drawn. Patients with normal prealbumin levels at baseline were also excluded.

2.4. Data collection procedure

The following information was collected on patients from EMRs: demographic information (age, gender, ethnicity), height, weight, body mass index (BMI), SNF (labeled 1, 2, 3, 4), and length of stay. Oral protein supplement dosage and prealbumin level at baseline and 30 days were also recorded. Some SNF patients ($n = 9$) did not receive the protocol due to variations in staff implementation. This group of patients who met the criteria for malnutrition and did not receive the protein supplement as prescribed became the non-protocol group.

2.5. Statistical analysis

Sample characteristics were examined with descriptive statistics. Comparisons between protocol and non-protocol participants were conducted via a series of chi-square tests of independence, independent samples *t*-tests, and Fisher's exact test. In addition, the sample characteristics of participants and non-participants were examined via an attrition analysis using a series of chi-square tests of independence, independent samples *t*-tests, and Fisher's exact test.

Statistical significance for all analyses was defined as $p < .05$, and all analyses were conducted using SPSS for Mac version 20.0.

3. Results

Fifty-nine of 107 patients admitted between October 1, 2012 and October 1, 2013 received the nutritional protocol due to a low admission prealbumin level. Twenty-one of these patients were excluded from the study due to discharge prior to the 30-day reevaluation of the prealbumin level, leaving a total of 38 patients in the final study sample. An attrition analysis revealed two statistically significant differences in characteristics of those who remained in the study versus those who could not be included in the analysis (Table 1), length of stay and SNF.

Demographic and clinical characteristics of the sample are summarized in Tables 1 and 2. Nearly half (47.4%) of participants were severely malnourished (Table 1). There was no significant difference in demographic characteristics between the protocol and non-protocol groups with the exception of SNF status (Table 2); one of the SNFs accounted for most (7 out of 9) of the patients who did not complete the protocol.