

Physician and Dietitian Prescribing of a Commercially Available Oral Nutritional Supplement

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Abstract

We examined whether a policy change transferring prescribing privileges for oral nutritional supplements to dietitians resulted in fewer inappropriate outpatient prescriptions. This was a pre/post study design using a retrospective review of physician and dietitian prescribing for ambulatory patients during two separate time periods: physician prescribing, October to December, 1994; dietitian prescribing, April to June, 1995. Inappropriate prescriptions during each period were defined as those given to patients with normal nutritional status or with a contraindication to a high-energy, electrolyte-containing solution. The study was conducted in outpatient clinics at a Veterans Affairs teaching hospital. We found that dietitians gave fewer prescriptions to outpatients who were not malnourished or to outpatients who had a contraindication to receiving a supplement (11% vs 34%; $P = 0.002$). In addition, dietitians more often completed relevant laboratory assessments (75% vs 43%; $P = 0.001$) and more frequently arranged follow-up dietetic evaluations (84% vs 30%, $P < 0.001$) for ambulatory patients receiving supplements. We conclude that transferring nutritional supplement prescribing privileges to dietitians led to fewer inappropriate outpatient prescriptions and to more comprehensive nutritional assessments, as measured by relevant laboratory use and dietetic follow-up. Physicians more frequently prescribed supplements to outpatients who were not malnourished or who had contraindications to receiving supplements. Our results suggest that physicians would benefit from assistance with and/or education concerning oral nutritional supplements.

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Malnutrition is associated with increased morbidity and mortality. Poor nutrition status impairs physical function, complicates surgical outcomes, and reduces survival rates.¹⁻⁴ Malnutrition often goes unrecognized,^{5,6} even though dietary intervention can reduce morbidity and mortality.⁷⁻¹⁰

One common intervention is the use of prepackaged, oral nutritional supplements to provide extra calories and nutrients. This intervention has been used effectively for selected institutionalized patients,^{7,9,10} but information about the use of supplements for ambulatory patients is sparse.⁸ This information is important because prepackaged supplements are not only costly, but they can adversely affect certain patients, such as those with diabetes mellitus or renal disorders.

Our institution transferred outpatient prescribing privileges for oral nutritional supplements from physicians to dietitians. This change in policy allowed us to examine how the two groups prescribed oral nutritional supplements for ambulatory patients.

... METHODS ...

In February, 1995, the West Los Angeles Veterans Affairs Medical Center issued a policy stating that outpatient prescriptions for oral nutrition supplements could be written by dietitians only. Prior to that time, physicians prescribed outpatient supplements with secondary authorization by a division or department chief. Prescribing physicians were also required to request follow-up by a dietitian for a formal dietetic evaluation.

To determine if this policy change altered utilization of oral nutritional supplements, we evaluated prescribing patterns before and after the change. Specifically, we investigated the possibility that dietitian-based prescribing could lead to more appropriate use of oral nutritional supplements than physician-based prescribing. To reduce the possibility that other

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external factors (eg, changes in personnel) would influence prescribing habits, we evaluated prescribing practices in the fiscal quarters before and after the policy was instituted.

Within each quarter, all patients that received outpatient prescriptions for an oral supplement were identified through the computerized pharmacy database. We excluded patients who had feeding tubes or who were using alternative supplements to the primary oral nutritional supplement, as these patients were required to have a preliminary assessment by a dietitian, and patients who received prescriptions at affiliated facilities, as these medical records were not available to us.

Physician prescribing (period one), was evaluated from October 1, 1994, to December 31, 1994. Prescribers included staff physicians and residents practicing in ambulatory clinics within the facility. Since the designated prescriber was the cosigner of the prescription, individual prescribers could not be readily identified. Dietitian prescribing (period two) was evaluated from April 1, 1995, to June 30, 1995. During this time, prescribers included seven dietitians serving the same ambulatory clinics as the physician prescribers. During both periods, the primary oral nutritional supplement on formulary was Ensure[®], although other supplements were available under special circumstances.

During period one, 92 patients received at least 1 prescription for an oral supplement. Seventy-one patients (77%) were eligible for inclusion in the study. During period two, 79 patients received a prescription; 59 patients were eligible (75%) for inclusion in the study. Patients who did not have enough data documented to assess nutritional status (ie, had <4 indicators) were excluded from further analysis (period one, n = 10; period 2, n = 4). This resulted in the following sample sizes: Period one, n = 61 patients; period two, n = 55 patients.

Nutritional assessment was based on an previously validated algorithm.¹¹ The algorithm was based on seven variables: nutritional history, unintentional weight loss as a percentage of usual body weight, weight as a percentage of ideal body weight, diagnosis, diet, serum albumin, and total lymphocyte count (see Appendix). Each variable was scored from 1 (normal nutritional status) to 4 (severely compromised nutritional status). The highest possible score was 28 points if all 7 factors were available for review. For a valid score, however, at least 4 of the 7 indicators were needed. For example, using 4 variables (maximum score, 16 points), patients could be classified as having normal (3 to 5 points), mildly compromised (6 to 8 points), moderately compromised (9 to 11 points), or severely compromised nutritional status (12 to 16 points).

All charts were assessed and data collected by the same reviewer (a dietitian). To assess the reviewer's reliability for nutritional status calculations, we asked another dietitian who was blinded to the study's intent and to the first dietitian's findings to evaluate nutritional status for a convenience sample of 10 patients using the same nutritional assessment algorithm. Ten of 10 results (100%) concurred with the reviewer's nutritional classifications, although one patient's total score was later determined to indicate mild rather than moderate impairment.

Prescriptions were considered appropriate when given to patients with any compromise in nutritional status (mild, moderate or severe). Prescriptions were considered inappropriate when they were written for patients with normal nutritional status, or when given to patients who might suffer an adverse effect from a high-calorie, electrolyte-containing solution. These patients included those with diabetes mellitus, renal insufficiency (not on dialysis), and/or chronically elevated potassium levels.

To better characterize the comprehensiveness of nutrition care, we used a standardized abstraction form to collect information about laboratory use and dietetic follow-up appointments. Although there are no universally recognized guidelines concerning laboratory assessment, serum albumin is an independent marker for malnutrition.¹²⁻¹⁴ Knowledge of serum electrolytes is also important to avoid adverse clinical outcomes in patients who might have a contraindication to supplements. We therefore defined appropriate laboratory use as obtaining serum albumin and electrolytes within 2 months of prescribing a supplement. During both time periods, our institution's protocol required a dietitian to formally assess patients who received a supplement before and after the supplement was given. To allow providers some latitude, we defined appropriate dietetic follow-up as occurring within 2 months of receiving a new prescription for an oral supplement.

Data input and analysis were performed, and between-group comparisons regarding demographics, prescribing, laboratory use, and dietetic follow-up were made using chi-squared and Student's *t*-tests.

... RESULTS ...

Table 1 illustrates basic demographic and medical data for the two eligible patient cohorts. In terms of these measures, the two patient groups were similar.

Table 2 shows the prescribing practices for both groups, as well as the results of the between-group statistical comparisons. During period one, more patients

were prescribed oral nutritional supplements inappropriately, as compared with period two (89% vs 66%, $P = 0.002$). Dietitians prescribed supplements to patients who had contraindications less frequently than physicians (2% vs 16%, $P = 0.01$). The most common contraindication to supplements was diabetes. Eight diabetic patients received a prescription during period one, and 1 diabetic patient received a prescription during period two.

Further, dietitians more often completed relevant laboratory testing for patients than physicians (75% vs 43%, $P = 0.001$). Dietitians also arranged for patients to undergo a follow-up dietetic evaluation more often than physicians (84% vs 30%, $P < 0.001$).

... DISCUSSION ...

Our study indicates that the policy change giving dietitians prescribing privileges for oral nutritional supplements reduced the number of inappropriate prescriptions for these products. The important corollary to this finding was that physicians often prescribed nutritional supplements to patients who were not malnourished or to patients who could have been harmed by supplement use.

There are probably several overlapping reasons for the difference in prescribing practices. One problem likely stems from a poor recognition of malnutrition by physicians.^{5,6} According to a recent survey, physicians rarely use any type of formal nutritional assessment.¹⁵ Identification of malnutrition may be hampered by a lack of understanding about the subtle ways in which early dietary deficiencies may present clinically, such as failure to thrive.¹ Although our study did not directly address physicians' ability to recognize malnutrition, our data suggest that physicians may have difficulty differentiating between normal and subnormal nutritional status. This may account for some proportion of their inappropriate prescribing.

Second, physicians may not realize the potential risks associated with supplements. Although these products tend to be heavily marketed as beneficial

dietary adjuncts, supplements can have adverse effects on certain patients. We did not survey physicians to gauge their knowledge about the composition of supplements, but inadequate understanding about product content might explain why some diabetics were given the nutritional equivalent of three candy bars a day. For example, 1 can of Ensure[®] provides 255 calories with 35 grams of carbohydrates, 9 grams of

Table 1. Characteristics of Eligible Patients*

Patient Characteristic	Period 1: Physicians (61 patients)	Period 2: Dietitians (55 patients)	P Value
Average age (\pm SD)	62.5 (\pm 15.2)	61.9 (\pm 12.5)	.81
Gender (% male)	98%	100%	.34
Died within 2 years of receiving prescription (%)	11 (18%)	11 (20%)	.75
Primary diagnosis (disease): [†]			.52
Malignancy or HIV	27 (44%)	24 (44%)	
Cardiopulmonary	10 (16%)	6 (11%)	
Gastrointestinal or metabolic	8 (13%)	9 (16%)	
Neurological/psychiatric	9 (15%)	13 (24%)	
Surgical/Other	7 (12%)	3 (6%)	

*Percentages have been rounded and may not total 100%. Comparisons by Student's *t*-test (age) and chi-square tests

[†]Primary diagnosis determined by admission diagnosis prior to receiving supplement. If the patient did not have an admission, diagnosis was based on record review.

Table 2. Oral Supplement Prescribing Practices

Patient Characteristic	Period 1: Physician Prescribing (61 patients)	Period 2: Dietitian Prescribing (55 patients)	P Value
Prescription appropriate*	40 (66%)	49 (89%)	0.002
Prescription contraindicated	10 (16%)	1 (2%)	0.01
Serum albumin and electrolytes obtained	26 (43%)	41 (75%)	0.001
Dietetic follow-up scheduled	18 (30%)	46 (84%)	<0.001

*Appropriate prescribing is defined as giving a supplement to nutritionally impaired patients; inappropriate prescribing is defined as giving a supplement to patients without a nutritional deficit or to those with a contraindication to supplement. Percentages have been rounded. Comparison between groups by chi-squared test.

protein, and 9 grams of fat. One Pay Day Bar® provides 250 calories with 30 grams of carbohydrates, 7 grams of protein, and 13 grams of fat.

Dietitians appeared to prescribe oral nutritional supplements more effectively overall, but did not always prescribe them appropriately. They also missed opportunities to obtain laboratory tests and to provide follow-up. We are unsure why this occurred.

Nonetheless, our study implies that allowing dietitians to prescribe oral nutritional supplements may have a beneficial impact on healthcare organizations that provide these products, when medically indicated. On the other hand, dietetic assessments have costs and those costs must be balanced against the benefit of using supplements more effectively. This study did not assess overall cost-effectiveness of prescribing behaviors. Thus, healthcare organizations may wish to more closely evaluate this issue before initiating a substantive policy change.

Another implication of our study is that some physicians may need guidance on prescribing nutritional supplements. Recognition of malnutrition, the primary medical reason for using supplements, could be improved by evaluating ideal body weight, assessing unintended weight loss, or measuring serum albumin.¹⁶⁻¹⁸ These simple methods need not be used universally. Rather, they can be targeted to patients with an increased risk of malnutrition, such as those with chronic wasting diseases (eg, AIDS) or elderly people who live alone.¹⁹ Prescribers might also benefit from information on product composition (grams of fat, carbohydrates, and protein), caloric content, and contraindications of a few common prepackaged nutritional supplements. Finally, physicians should be aware of several alternatives to commercially available nutritional products, as patients having increased dietary needs may have to pay out of pocket and may not be able to afford these supplements.

Our findings should be viewed in the context of the study's limitations. The data are drawn from prescribing practices that occurred in 1994 and 1995 and are limited to a single health center. Our results may not apply to other settings. Further, we could not determine the total number of malnourished outpatients during either time period. It is possible, though unlikely, that physicians gave supplements to fewer malnourished patients at the expense of overtreating others, and that dietitians hesitated to give malnourished patients access to supplements. As with any retrospective study utilizing a pre/post design, unmeasured bias could have occurred. For example, dietitians or physicians may have acted differently during the chosen time periods than during other

time periods. Lastly, the primary reviewer was a dietitian and this may have introduced bias, although the use of a standardized nutritional assessment algorithm and the verification of results during the blinded review helps assure reliability.

In conclusion, the policy change at our institution transferring prescribing privileges for oral nutritional supplements to dietitians led to a higher proportion of appropriate outpatient prescriptions for a commercially available oral nutritional supplement. We would encourage other organizations to examine prescribing practices for these widely available and relatively expensive nutritional products.

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... REFERENCES ...

1. Sarkisian CA, Lachs MS. Failure to thrive in older adults. *Ann Intern Med* 1996;124:1072-1078.
2. Corti MC, Guralnik JM, Salive ME, Sorkin JD. Serum albumin levels and physical disability as predictors of mortality in older persons. *JAMA* 1994;272:1036-1042.
3. Sullivan DH, Wals RC, Lipschitz DA. Protein-energy undernutrition and the risk of mortality within 1 year of hospital discharge in a select population of geriatric rehabilitation patients. *Am J Clin Nutr* 1991;53:599-605.
4. Mullen JL, Gertner MH, Buzby GP, Goodhart GL, Rosato EF. Implications of malnutrition in the surgical patient. *Arch Surg* 1979;114:121-125.
5. Mowe M, Bohmer T. The prevalence of undiagnosed protein-calorie undernutrition in a population of hospitalized elderly patients. *J Am Geri Soc* 1991;39:1089-1092.
6. Rudman D, Feller A. Protein-calorie undernutrition in the nursing home. *J Am Ger Soc* 1989;37:173-183.
7. Larsson J, Unosson M, Ek A-C, et al. Effect of dietary supplement on nutritional status and clinical outcome in 501 geriatric patients—A randomized study. *Clin Nutr* 1990;9:179-184.
8. McKinley MJ, Goodman-Block J, Lesser ML, Salbe AD. Improved body weight status as a result of nutrition intervention in adult, HIV-positive outpatients. *J Am Diet Assoc* 1994;94:1014-1017.
9. Olin AO, Osterberg P, Hadell K, Armyr I. Energy-enriched hospital food to improve energy intake in elderly patients. *J Parenteral Enteral Nutr* 1996;20:93-97.
10. Unosson M, Larsson J, Ek A-C, Bjurulf P. Effects of dietary supplement on functional condition and clinical outcome measured with a modified Norton scale. *Clin Nutr* 1992;11:134-139.
11. Lowery JC, Hiller LD, Davis J, Shore CJ. *Reliability of Two Methods in Nutrition Status Assessment* WP95-002.

Ann Arbor, MI: VA HSR&D Field Program; 1995.

12. Bistrian BR, Blackburn GL, Vitale J. Prevalence of malnutrition in general medicine patients. *JAMA* 1976;235:1567-1570.

13. Mullen JL, Buzby GP, Smale BF, Rosato EF. Reduction of operative morbidity and mortality by combined preoperative and postoperative nutritional support. *Ann Surg* 1980;192:604-613.

14. Reily JJ, Hull SF, Alber N. The economical impact of malnutrition: A model system for hospitalized patients. *J Parenteral Enteral Nutr* 1988;12:371-376.

15. Glanz K, Tziraki C, Albright CL, Fernandes J. Nutrition assessment and counseling practices: Attitudes and interests of primary care physicians. *J Gen Intern Med* 1995;10:89-92.

16. Winborn A, Banaszek NK, Freed BA, Kaminski MV. A protocol for nutritional assessment in a community hospital. *J Am Diet Assoc* 1981;78:129-34.

17. Cheskin LJ, Fontaine KR, Lasner LA, Stridiron C, Katz PO. Improved detection of malnutrition by medical house-staff following focused-teaching intervention. *J Gen Intern Med* 1996;11:548-550.

18. Posner BM, Jette AM, Smith KW, Miller DR. Nutrition and health risks in the elderly: The nutrition screening initiative. *Am J Publ Health* 1993;83:972-978.

19. Johnson RM, Kaiser FE, Kerstetter JE, Reuben DB. Maintaining good nutrition in the elderly. *Patient Care* 1995;29(18):46-60.

See Appendix on next page

Appendix. Nutritional Status

Criteria	1 Normal Nutritional Status	2 Mildly Compromised Nutritional Status	3 Moderately Compromised Nutritional Status	4 Severely Compromised Nutritional Status
A. Nutritional History Factors	<ul style="list-style-type: none"> - Good appetite - Independent ADLs - No eating/digestion problems 	<ul style="list-style-type: none"> - Fair appetite - Chewing problem - Nausea - Constipation - Limited ADL - Restricted ambulation - Requires assistance with feeding 	<ul style="list-style-type: none"> - Poor appetite - Swallowing problems - Diarrhea - Vomiting 	<ul style="list-style-type: none"> - No appetite
B. Unintentional weight loss measured as % of usual body weight	None	<10% in 6 mo 89-81%	10 - 15% in 6 mo. or <7.5% in 3 mo. or <5% in 1 mo. or <2% in 1 wk	≥16% in 6 mo. or ≥7.5% in 3 mo. or ≥5% in 1 mo. or ≥2% in 1 wk.
C. Weight (% IBW)	100-90% IBW Stable weight or planned alteration or <119% IBW	89-81% IBW or 120-129% IBW	80-75% IBW or 130-149% IBW	≤74% IBW or ≥150% IBW
D. Diet	<ul style="list-style-type: none"> - Regular - Mechanical 	<ul style="list-style-type: none"> - ADA/weight reduction - Sodium restriction - Lactose free - Dysphagia - Low fat/low cholesterol - Drug-nutrient interaction - Any consistency other than mechanical 	<ul style="list-style-type: none"> - Protein restriction - Fluid restriction (<1000 cc) - Mineral restriction other than sodium - Stable tube feeding 	<ul style="list-style-type: none"> - Clear liquid ≥3 days - NPO ≥3 day - Total parenteral nutrition - Peripheral parenteral nutrition - Unstable tube feeding
E. Diagnosis	<ul style="list-style-type: none"> - All others including surgeries not mentioned - HIV+ - HTN - Psychological disorders 	<ul style="list-style-type: none"> - Alzheimer's disease - Amputation - Cancer - Cardiac disease - CVA - Diabetes - Endocrine disorders other than diabetes - Gastrointestinal disease - Neurological disorders - Nutritional anemia - Psychological eating disorder - PVD - Renal disease - Stable COPD - Substance abuse (ETOH/Drug) 	<ul style="list-style-type: none"> - AIDS - Burns (less than 25% BSA) - Cancer involving gastrointestinal tract - Cardiomyopathy - Chemotherapy, radiation therapy - CHF - CRF (dialysis) - Decubitus ulcers - Dysphagia - Gastrointestinal disease causing malabsorption or maldigestion - Head trauma - Liver disease - New SCI - Neurological coma - Pulmonary insufficiency, O₂ dependent - Stable transplantation - Traumatic fracture - Uncontrolled diabetes 	<ul style="list-style-type: none"> - ARF - Gastrointestinal obstruction ileus - Hepatic coma - Hepatic encephalopathy - Malnutrition - Pre and post-op transplant of major organ system - Pulmonary failure, ventilator dependent - Sepsis
F. Albumin	>2.9	2.2-2.8	1.6-2.1	≤1.51
G. TLC	≥1500	1200-1499	1199-800	<800

*IBW = ideal body weight; ADL = activities of daily living; ADA = American Dietetic Association; TLC = total lymphocyte count; HTN = hypertension; CVA = cardiovascular accident; PVD = peripheral vascular disease; COPD = chronic obstructive pulmonary disease; ETOH = alcohol; CHF = congestive heart failure; CRF = chronic renal failure; SCI = spinal cord injury; NPO = nothing by mouth; ARF = acute renal failure.