Oral Nutrition Supplement Use and Nutritional Status among Patients with Chronic Kidney Disease in British Columbia

Michelle M.Y. Wong[1], Dani Renouf[2], Yuyan Zheng[3], Zainab Sheriff[1], Adeera Levin[1,2]

1. The University of British Columbia, Vancouver, BC, Canada
2. St. Paul's Hospital, Vancouver, BC, Canada
3. BC Provincial Renal Agency, Vancouver, BC, Canada

Introduction

Patients with chronic kidney disease (CKD) are at higher nutritional risk resultant from the complications of chronic disease and comorbidities, and therefore, also at higher risk for morbidity and mortality as compared to the general population. Oral nutritional supplements (ONS) are often recommended as a first line and cost-effective approach to help mitigate protein energy wasting and prevent further complications of malnutrition on overall health outcomes.

In British Columbia, the Provincial Renal Agency's Nutritional Supplement Policy sets out specific criteria for ONS financial coverage and prescription for patients with CKD, under the stewardship of registered dietitians.

Objectives

1. To characterize nutrition status and ONS prescription patterns in patients with CKD enrolled in a kidney care clinic (KCC)
2. To describe ONS longitudinal prescription patterns and usage in patients with CKD
3. To compare nutritional trajectories of patients taking ONS compared with non-ONS users
4. To characterize prescription patterns by health authority

Methods

Study Design

We conducted a retrospective analysis of CKD patients who entered Kidney Care Clinics between January 2013 to December 2018 (n =15,859).
We compared baseline nutrition and inflammation parameters within 6 months of entry into the Renal Program and with at least one ONS prescription within 1 year (Wilcoxon Signed Rank Test). We described longitudinal ONS prescription patterns over 3 years using a Sankey Plot (n = 7611).Multivariable logistic regression was used to assess differences in prescription by health authority and by # dietitian full-time equivalents per 1000 CKD patients.

Cohort

Retrospective cohort study using registry data in BC

15,859 non-dialysis CKD patients from multidisciplinary CKD clinics

Within 1 year of KCC entry:

1389 (9%) **ONS Prescriptions**

14,470 (91%) **No ONS Prescriptions**

Measurements

Nutrition-related:
- Body Mass Index (BMI)
- Serum albumin
- Serum phosphate
- Serum bicarbonate
- Neutrophil-to-lymphocyte ratio
- Serum total cholesterol
- Serum ferritin
- Iron saturation
- Hemoglobin
- Parathyroid hormone

ONS prescription patterns:
- Within 1 year of CKD clinic entry
  - By health authority
  - By # dietitian full-time equivalents (FTE) per 1000 CKD patients
- Longitudinally over 3 years

Results

ONS users vs. non-users:
At baseline, patients prescribed ONS were older, with lower eGFR, BMI, & had more metabolic complications of CKD compared to patients not prescribed ONS

ONS Rx patterns:

Most received 1-2 ONS Rx/year but more frequent ONS users maintained use longitudinally. Attenuation in ONS prescriptions is related to stable dietitian stewardship and monitoring of the Nutrition Supplement Program. (Figure 1)

9% of patients received ONS within the first year of CKD clinic follow-up.
Most patients prescribed ONS are infrequent users, while another subset has regular ONS use longitudinally (Figure 1).

Figure 1. ONS Prescription Patterns over a 3-Year Period

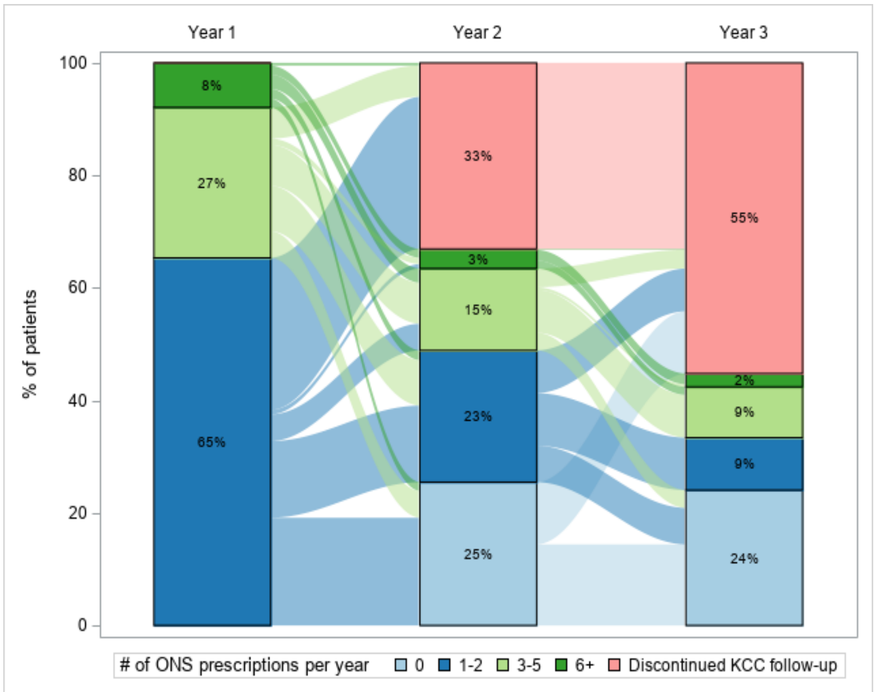

Table 1. ONS Prescriptions Vary By Health Authority

Health Authority	% of patients prescribed ONS	Unadjusted Odds Ratio (95% CI) N=15,859	*Adjusted Odds Ratio (95% CI) N=7641
Vancouver	9.7%	Reference	Reference
Interior	7.1%	0.71 (0.61-0.83)	1.25 (0.92-1.70)
Fraser	10.5%	1.08 (0.94-1.25)	1.62 (1.22-2.15)
Island	9.0%	0.91 (0.75-1.10)	1.49 (1.08-2.06)
Northern	2.7%	0.26 (0.17-0.41)	0.51 (0.30-0.87)

*Adjusted for age, sex, diabetes, hypertension, eGFR, BMI, serum albumin, serum phosphate, serum bicarbonate, neutrophil-to-lymphocyte ratio

Adjusted* Odds Ratio for ONS prescription :
1.32 (95% CI: 1.16-1.50)
per 1 dietitian full-time equivalent (FTE) per 1000 CKD patients

ONS prescription varied by health authority in BC, and this may be partially mediated by dietitian resources. A patient qualifying for ONS would be 32% less likely to receive ONS in the absence of dietitian FTE (Table 1).

Conclusion

This is the first Canadian study to describe the prevalence and determinants of ONS use in patients with CKD. Our data suggests that ONS use is indicated when prescribed, and although the Nutritional Supplement Program is funded, ONS use remains stable at under 10% over time. Significant variation by health authority and by dietitian resources was observed. Further studies are needed to better understand the factors that impact ONS use on outcomes, including patient-focused and cost-effectiveness outcomes. Future analyses will be conducted in hemodialysis and peritoneal dialysis patients.

Providence HEALTH CARE
How you want to be treated.
BCRenal
Provincial Health Services Authority
MICHAEL SMITH FOUNDATION FOR HEALTH RESEARCH
BC's health research funding agency