Nutritional Status and Considerations for Patients Diagnosed with a Gastroenteropancreatic Neuroendocrine Tumour: Nutrition in NETs study

E. Kennedy[1,2], N. Kiss[2,3,4], M. Michael[5], K. Gough[4], M. Krishnasamy[1,6]

[1]Department of Nursing, The University of Melbourne, [2]Department of Nutrition and Speech Pathology, Peter MacCallum Cancer Centre, Melbourne, [3]Institute of Physical Activity and Nutrition, Deakin University, Melbourne, [4]Department of Cancer Experiences Research, Peter MacCallum Cancer Centre, Melbourne, [5]Division of Cancer Medicine and Neuroendocrine Unit (ENETs CoE), Peter MacCallum Cancer Centre, Melbourne, [6]Victorian Comprehensive Cancer Centre, Melbourne

Contact: Erin.Laing@petermac.org

THE UNIVERSITY OF MELBOURNE

PeterMac — Peter MacCallum Cancer Centre, Victoria Australia

INTRODUCTION

Gastroenteropancreatic neuroendocrine tumours (GEP NET) can adversely affect nutritional status due to their symptoms and treatment. Cross-sectional studies report up to 25% of GEP NET patients are malnourished, and 38% at nutritional risk, and dietary change may be prevalent. Nevertheless, clinical guidelines lack advice on nutrition management. Nutrition in NETs is a prospective longitudinal study aiming to describe the impact of GEP NETs on patient's nutritional status and quality of life.

METHODS

Adult patients (≥18yo) with a confirmed diagnosis of a GEP NET were recruited upon initial attendance to the Upper GI/NET units at Peter MacCallum Cancer Centre (ENETS CoE) and Austin Health (Melbourne, Australia).

Data was collected at 2-month intervals over a 6-month period: Baseline (T0), 2-months (T2), 4-months (T4), 6-months (T6) (Table 1).

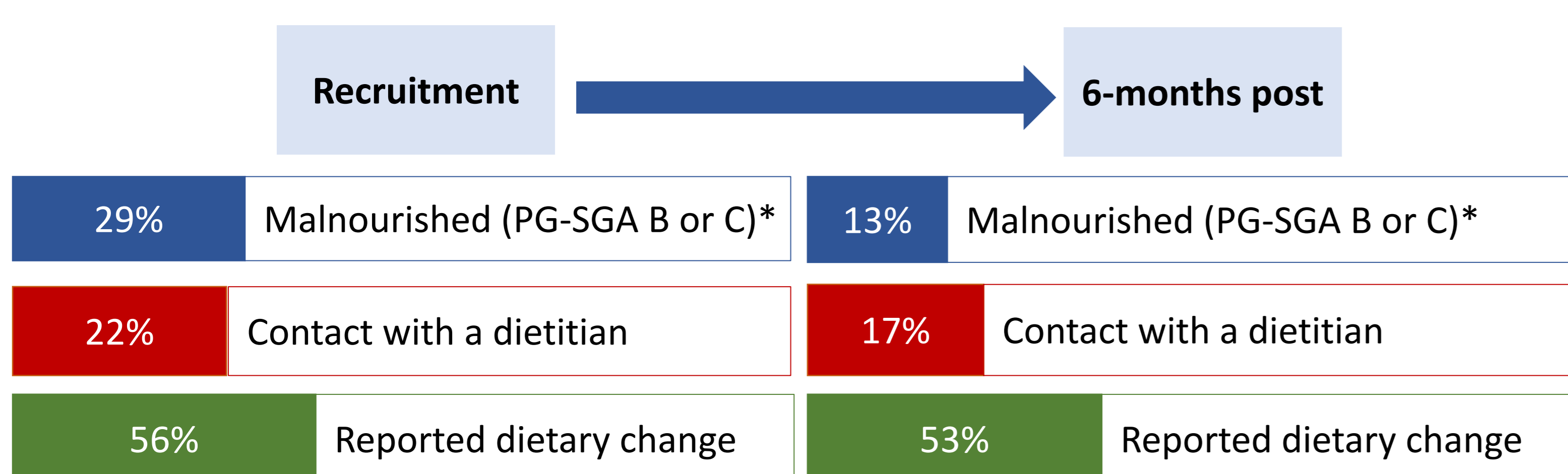| Table 1. Data collection procedures		Time			
Data Type	Method	T0	T2	T4	T6
HRQoL	EORTC QLQ-C30 EORTC QLQ-GINET21	X			X
Symptoms	EORTC QLQ-C30 EORTC QLQ-GINET21	X	X	X	X
Nutritional status	PG-SGA score	X	X	X	X
Weight	Scales	X	X	X	X
Fat-free mass (FFM)	BIA scales	X	X	X	X
Dietitian contact	Study-specific questionnaire	X	X	X	X
Dietary habits	Study-specific questionnaire	X	X	X	X
Vitamin status	Blood/urine testing	X			X

RESULTS

Participant characteristics

Of the 75 patients assessed as eligible, 59 were recruited (M = 62 years; 66% male) over a period of 12 months (June 2017 to June 2018). The participant group was heterogeneous, with varied tumour site (46% small intestine, 36% pancreas, 10% colon) and NET grading (29% NET G1, 37% NET G2, 17% NET G3).

The majority of participants (59%) had received treatment for their NET at another health service prior to recruitment, including somatostatin analogues (41%), Surgery (22%), chemotherapy (14%) and PRRT (8%). Most (90%) reported experiencing symptoms prior to recruitment, ranging from <6 months (10%), 6 months to 2 years (49%) and >2 years (20%). The prevalence of symptoms amongst participants is shown in Table 2.

Table 2. Most prevalent symptoms, %	T0	T2	T4	T6
Tired/fatigue	80	87	86	82
Abdominal discomfort	76	71	64	77
Pain	68	65	54	57
Bloating	64	64	61	73
Wind/gas	53	52	50	32
Diarrhoea	46	49	51	46

Figure 1. Prevalence of malnutrition, dietitian contact and dietary change

Recruitment	→	6-months post
29% Malnourished (PG-SGA B or C)*		13% Malnourished (PG-SGA B or C)*
22% Contact with a dietitian		17% Contact with a dietitian
56% Reported dietary change		53% Reported dietary change

*PG-SGA scoring, A: well-nourished, B: moderately malnourished, C: severely malnourished

Health-related quality of life (EORTC QLQ-C30 and QLQ-GINET21)

Self-reported changes in global health status and functioning at 6 months from recruitment (T0) were trivial to small-sized and not statistically significant. Larger statistically significant differences were observed for social function (M change = -6.5, 95% CI [-11.9, -1.2], p = 0.016) and disease-related worries (M change = -10.4, 95% CI [-17.0, -3.8], p = 0.0024).

Vitamin deficiency

The proportion of participants with measured low serum or urine values of vitamins are shown in Table 4. A vitamin was defined as deficient if the measured value was lower than the optimal reference range. The prevalence of vitamin deficiencies was low in this study, except for Vitamin D (n = 15, 28% at T0; n = 39, 33% at T6) (Table 4). Several participants declined niacin testing due to the burden of a 24-hour urine sample, and some participants declined blood testing for vitamins status at T0 and T6.

Table 4. Vitamin deficiency	T0		T6	
	N	n (%)	N	n (%)
Niacin (B3)	24	2 (8)	14	0 (0)
Vitamin D	54	15 (28)	39	13 (33)
Vitamin E	51	1 (2)	37	0 (0)
Vitamin A	51	3 (6)	37	1 (2)
B12	55	1 (2)	39	2 (4)
Folate	55	1 (2)	39	0 (0)
Iron	55	2 (4)	39	0 (0)

Nutritional status and weight loss

More participants were malnourished at recruitment (T0) than 6-months later (29% versus 13%, p = 0.23) (Figure 1). Despite lower malnutrition rates at T6, 48% lost weight and 44% lost FFM over this time (Table 5).

Table 5. Change in weight and fat free mass (FFM) from recruitment (T0)	T2 (n = 45)	T4 (n = 37)	T6 (n = 44)
Weight loss, n (%)			
Any	20 (44)	19 (51)	21 (48)
>5% body weight	8 (18)	4 (11)	9 (20)
>10% body weight	2 (4)	2 (5)	5 (11)
FFM loss, mean (SD)	2.4 (1.8)	2.8 (2.1)	2.8 (2)

Dietary change

Dietary change was prevalent over the data collection period (Figure 1 and Figure 2). Alcohol, red meat, milk, yoghurt and nuts were common foods avoided.

Figure 2. Reported type of dietary change
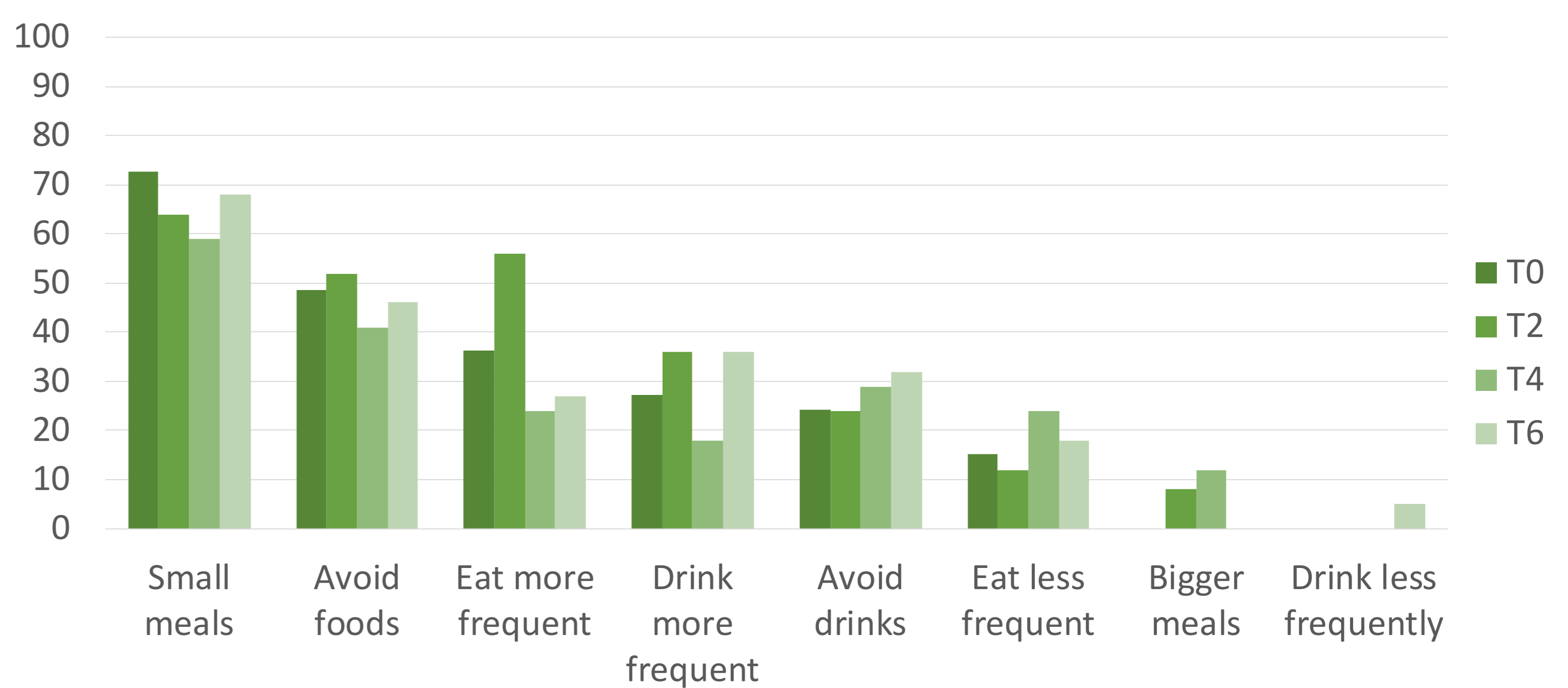
DISCUSSION/CONCLUSION

- Malnutrition, weight loss and dietary change are prevalent and under-recognized. Dietary change is more prevalent than malnutrition.
- Existing validated malnutrition assessment tools may not identify all nutrition issues, including body composition change and diet change, in NET patients
- Participant social function worsened, and disease-related worries improved, over-time.
- Results provide a description of nutritional issues and QOL in NETs and can contribute to the development of nutrition guidelines