Real-World Evidence on Clinical and Health Economic Outcomes among Adult Patients in Post-Acute Care Receiving Commercial Blenderized Tube Feeding Formulas

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BACKGROUND

- Enteral nutrition (EN) is an important, life-sustaining treatment for individuals with functional gastrointestinal (GI) tracts who are unable to consume adequate food orally.[1-3]
- EN may be an option for outpatients requiring a long-term alternative to oral nutrition, but who are otherwise able to live away from a hospital facility.[4]
- EN is often initiated in the hospital setting and may continue as part of post-acute care, as indicated and tolerated.[4]
- Healthcare professionals, patients, and caregivers are requesting tube feeding formulas including easily recognized ingredients and more real food.[1,5]
- Due to its clinical and economic benefits, the use of home enteral nutrition (HEN) as part of post-acute care is increasing in the US.[6]
- Intolerance of enteral formulas can be a challenge in adults receiving HEN and can lead to increased healthcare resource utilization (HCRU) and costs.[7]

OBJECTIVES

- To describe demographic and clinical characteristics of adult patients receiving a commercial blenderized tube feeding (CBTF) formula in post-acute care.
- To evaluate clinical and health economic outcomes among these patients up to 168 days after hospital discharge.

METHODS

- This was a retrospective observational study using nationally representative US claims data obtained from the Decision Resources Group Real World Evidence Data Repository; this database covers 98% of US health plans, including medical and pharmacy claims.[8]
- Inclusion criteria were age ≥14 years and prescription of CBTF (Compleat® Organic Blends, Nestlé HealthCare Nutrition, US) as sole-source nutrition for at least 7 days in post-acute care.
- Patients treated for any medical condition between 1 January 2018 and 30 December 2020 were included.
- The index date was defined as the date of hospital discharge. Patient characteristics, concomitant medication use, GI intolerance symptoms, HCRU, and cost of care were recorded within one year before discharge and up to 168 days post-discharge.
- Outcomes were compared between the pre-index period (within 1 year before discharge) and the post-index period (latest records at 28, 84, and 168 days post-discharge).
- Demographics, clinical characteristics, and concomitant medications were analyzed using descriptive statistics (median, mean, and standard deviations) and the appropriate univariate statistical test (chi-square, t-test, or non-parametric test) at the alpha=0.05 level of significance to compare pre-index and respective post-index outcomes at 28, 84, and 168 days post-discharge.

RESULTS - PATIENT CHARACTERISTICS (TABLE 1)

- The study included 124 patients using the CBTF formula in the post-acute setting (52% female; mean [standard deviation (SD)] age at index date 41.8 [23.9] years) from all regions of the US.
- Pre-index, the most common diagnoses were diseases of the digestive system (89%), nervous system (79%), and respiratory system (76%).
- The most common comorbidities were paraplegia and hemiplegia (39%), chronic pulmonary disease (35%), and cancer (27%).
- Among 108 patients (87%) with at least one additional comorbidity, 59% had a Charlson Comorbidity Index (CCI) score of 1 or 2 (mild comorbidity), 19% had a score of 3 or 4 (moderate) and 22% had a score of ≥5 (severe). The mean (SD) CCI score among patients with comorbidities was 3.4 (3.3).
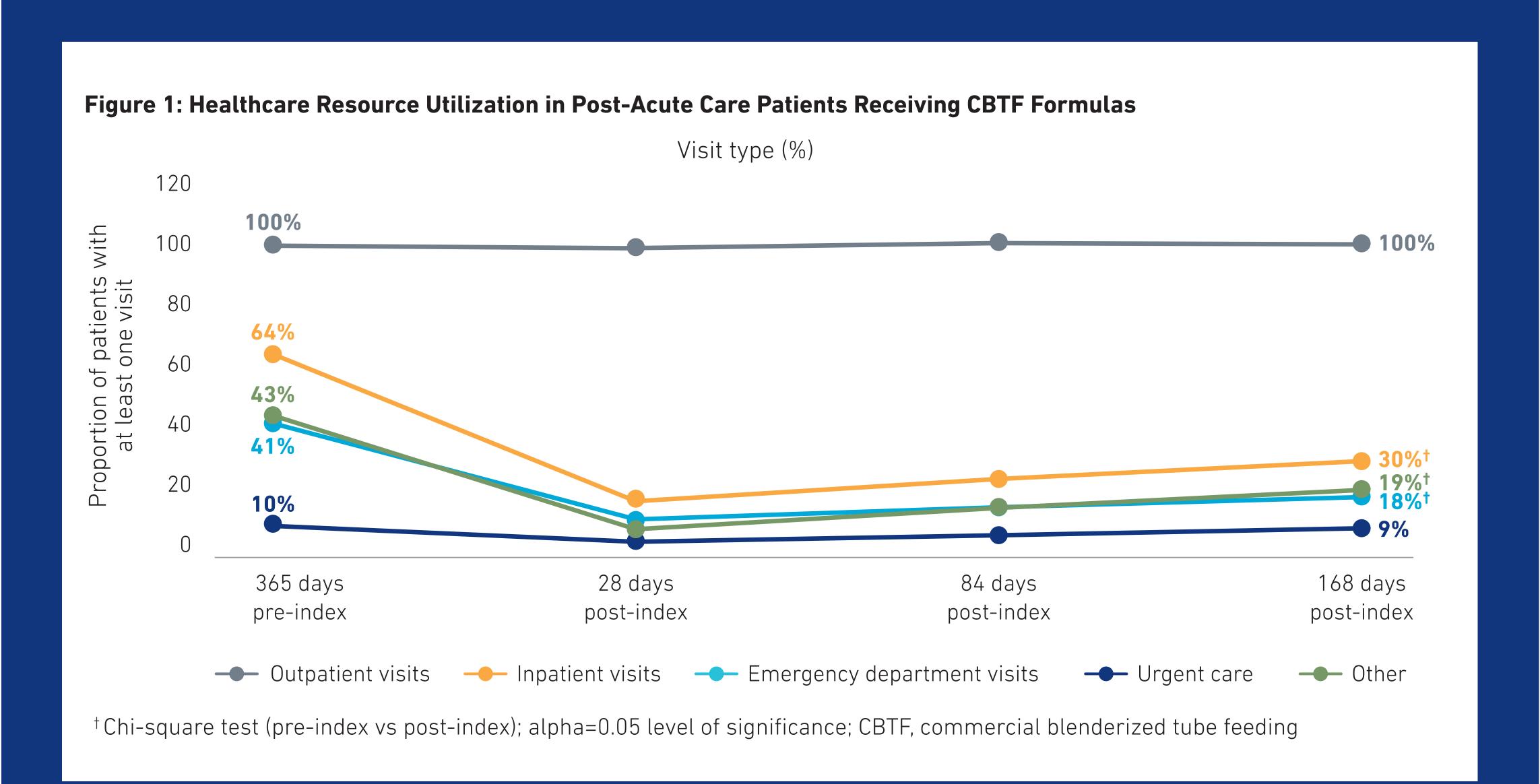
Table 1: Patient characteristics (N=124)

Mean age, years (SD)[†]		41.8 (23.9)
Gender, n (%)	Female	64 (52)
Charlson comorbidities occurring in at least 10% of patients, n (%)[‡]	Paraplegia and hemiplegia	48 (39)
	Chronic pulmonary disease	43 (35)
	Cancer	33 (27)
	Metastatic carcinoma	17 (14)
	Peripheral vascular disease	15 (12)
	Cerebrovascular disease	14 (11)
	Diabetes without complications	14 (11)
Mean CCI score (SD)[†]		3.4 (3.3)

Abbreviations: SD, standard deviation. [†] Calculated at hospital discharge. [‡] Assessed during the year prior to hospital discharge.

Commercial blenderized enteral formulas are **well tolerated** and **associated** with **significant reductions** in **clinical, HCRU** and **economic burden** in post-acute care **adult patients**

Figure 1: Healthcare Resource Utilization in Post-Acute Care Patients Receiving CBTF Formulas

[†]Chi-square test (pre-index vs post-index); alpha=0.05 level of significance; CBTF, commercial blenderized tube feeding

RESULTS

GI INTOLERANCE SYMPTOMS (TABLE 2)

- Pre-index, 78 (63%) adults experienced GI intolerance symptoms, including constipation (38%), nausea and vomiting (23%) and abdominal pain (26%).
- Use of CBTF was associated with a significant decrease in GI intolerance symptoms – a 63% decrease in number of patients at 28 days post-discharge.
- Significantly fewer patients experienced overall and individual GI intolerance symptoms at 28 days post-index while receiving the CBTF formula than pre-index (p<0.05).
- Relative to pre-index, significantly fewer adults experienced overall GI intolerance symptoms as well as constipation, nausea and vomiting, abdominal pain, diarrhea and flatulence at 84 days and 168 days post-index (p<0.05).

HCRU BY VISIT TYPES

- While all patients required outpatient visits post-discharge, significantly fewer patients required emergency department visits, inpatient visits, and other services (such as assisted living, intermediate care, and care at other facilities) at all time points post-index compared with pre-index (p<0.05) **(Figure 1)**.
- Mean inpatient (p=0.001), outpatient (p<0.001), urgent care (p=0.027) and other (p=0.024) visits per patient were significantly lower at 168 days post-index compared with pre-index **(Figure 2)**.
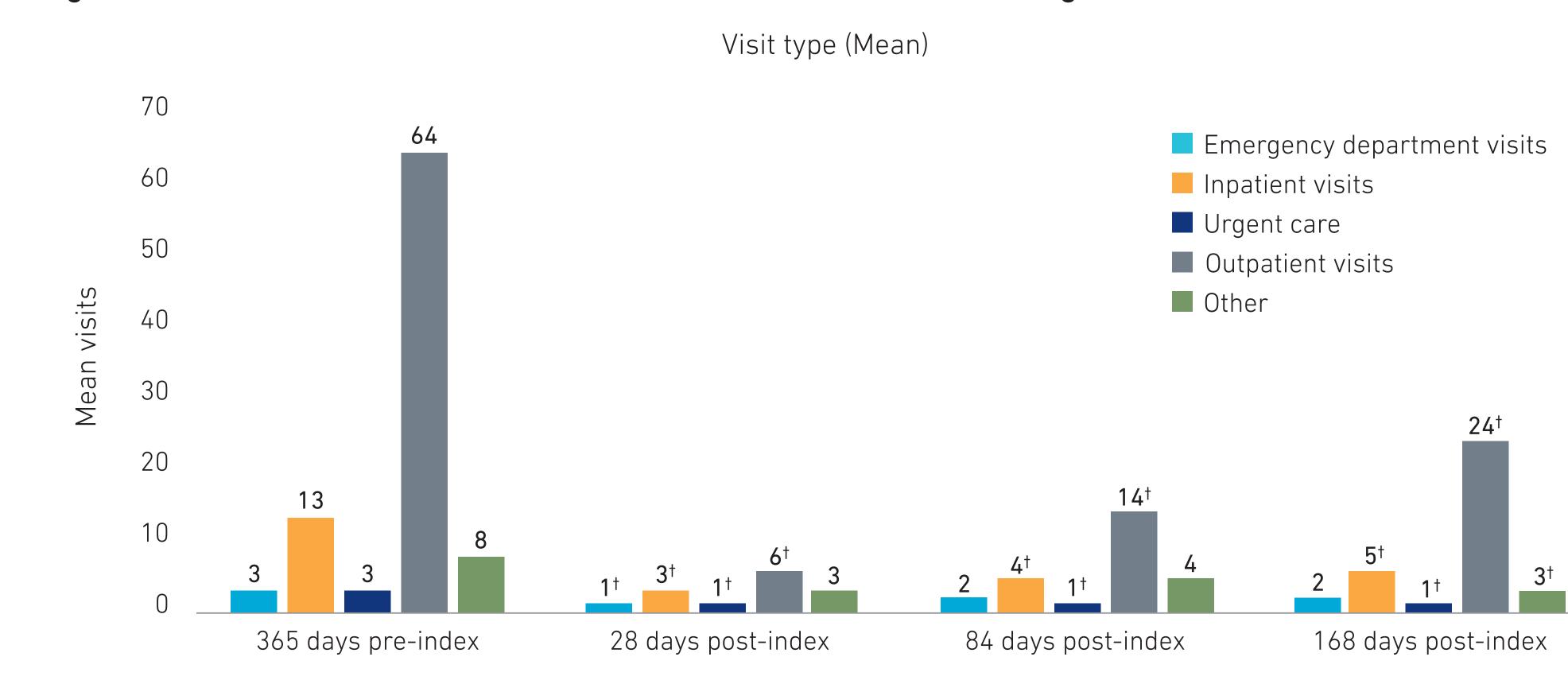
COST OF CARE BASED ON VISIT TYPES

- Reductions in HCRU at 168 days post-index resulted in significantly lower unadjusted mean total costs per patient for inpatient (p=0.007), outpatient (p<0.001), urgent (p=0.014), and other visits (p<0.001) compared with pre-index **(Figure 3)**.

Table 2: Patients experiencing GI intolerance symptoms, pre-index and post-index (N=124)

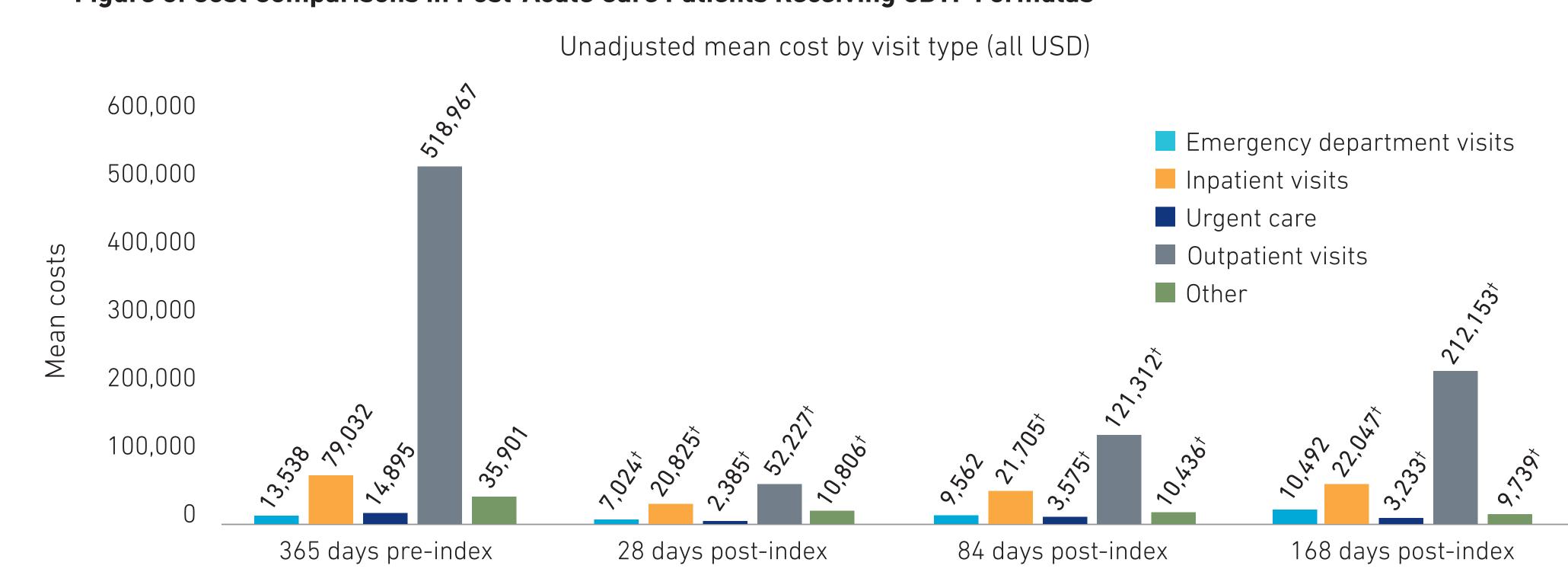|	Pre-index	28 days post-index		84 days post-index		168 days post-index	
	N (%)	N (%)	p[†]	N (%)	p[†]	N (%)	p[†]
Experience of GI Intolerance Symptoms	78 (63)	29 (23)	<0.001	36 (29)	<0.001	39 (31)	<0.001
Intolerance Symptoms							
Constipation	47 (38)	18 (15)	<0.001	22 (18)	<0.001	25 (20)	0.002
Nausea & vomiting	29 (23)	7 (6)	<0.001	11 (9)	0.002	14 (11)	0.012
Abdominal pain	32 (26)	7 (6)	<0.001	10 (8)	<0.001	13 (10)	0.002
Diarrhea	14 (11)	2 (2)	0.002	2 (2)	0.002	3 (2)	0.006
Flatulence	12 (10)	2 (2)	0.006	2 (2)	0.006	4 (3)	0.039
Gagging & retching	10 (8)	2 (2)	0.018	4 (3)	0.099	5 (4)	0.183
Abdominal distension	11 (9)	2 (2)	0.010	2 (2)	0.010	4 (3)	0.062

[†] Chi-square test (pre-index vs post-index); alpha=0.05 level of significance

Figure 2: Healthcare Resource Utilization in Post-Acute Care Patients Receiving CBTF Formulas

[†]t-test (pre-index vs post-index); alpha=0.05 level of significance; CBTF, commercial blenderized tube feeding

Figure 3: Cost Comparisons in Post-Acute Care Patients Receiving CBTF Formulas

[†]t-test (pre-index vs post-index); alpha=0.05 level of significance; CBTF, commercial blenderized tube feeding

CONCLUSION

- A CBTF formula prescribed for post-acute care patients was well tolerated and associated with significant reductions in GI intolerance symptoms.
- HCRU and associated costs were significantly lower post-index compared with pre-index, suggesting that CBTF formulas may have a potential role in improving clinical and health economic outcomes among patients in post-acute care.

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