Protein Intake, Exercise, and Chemotherapy-Related Fatigue in Women with Breast Cancer

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Background

- Protein rich diet may help reduce side effects and improve outcomes during chemotherapy.
- Emerging evidence links protein intake with reduced cancer related fatigue, but data in non-metastatic breast cancer is limited.
- The role of physical activity alongside protein intake remains unclear.
- **Objective:** To examine the relationship between protein intake, physical activity, and fatigue in women with Stage **I-III** breast cancer undergoing chemotherapy.

Methods

- **Study design:** Analysis of the *Genetics, Molecular Mechanisms, and Symptom Science (GEMMS)* study — a longitudinal cohort of women with Stage **I–III** breast cancer receiving curative-intent chemotherapy and surgery.
- **Protein intake:** Assessed at baseline via ASA-24; <0.80 g/kg bodyweight classified as suboptimal.
- **Exercise:** Measured using the Recent Physical Activity Questionnaire (RPAQ); participants ranked into quartiles.
- **Fatigue:** Measured at baseline and end of chemotherapy using PROMIS Fatigue Short Form 8a; T-score >55 = clinically significant fatigue.
- **Statistical analysis:** Linear and logistic regression assessed associations between protein intake, exercise, and post-chemotherapy fatigue.

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Results

Table 1: Participant Characteristics

	Optimal Protein Intake [>0.80 g/kg] (n=58)	Suboptimal Protein Intake [<0.80 g/kg] (n=37)	P
Mean Age [SD]	51.1 [10.9]	54.8 [12.3]	0.122
Cancer Stage I II III	 31.0% 51.7% 17.2%	 21.6% 56.8% 21.6%	0.587
Chemotherapy Less Intensive More Intensive	 46.5% 53.5%	 43.2% 56.8%	0.752
Mean Caloric Intake [SD]	1937 [698]	1387 [506]	< 0.001
Mean Percent of Caloric Intake from Protein [SD]	18.9% [5.6%]	15.0% [5.2%]	0.001
Exercise Quartile 1 Quartile 2 Quartile 3 Quartile 4 (highest)	 25.9% 19.0% 27.6% 27.6%	 21.6% 35.1% 21.6% 21.6%	0.370
Mean T-Score of Fatigue at Baseline [SD]	41.7 [8.3]	44.5 [8.0]	0.126
Mean T-Score of Fatigue following Chemotherapy Completion [SD]	53.2 [10.6]	53.1 [8.5]	0.986
Clinically Significant Fatigue following Chemotherapy Completion	39.7%	43.2%	0.729

Table 2: Regression Results

	Linear Regression*			Logistic Regression*		
	β	95% CI	P	Odds Ratio	95% CI	P
Inadequate Protein	0.33	-3.47-4.13	0.866	1.36	0.50-3.68	0.544
Exercise Quartile 2	**5.98**	**0.78-11.2**	**0.027**	**4.03**	**1.03-15.8**	**0.045**
Exercise Quartile 3	-1.67	-6.78-3.44	0.523	1.08	0.28-4.19	0.907
Exercise Quartile 4	3.21	-1.97-8.39	0.229	2.55	0.67-9.80	0.172

* Models adjusted for Age, Cancer, Stage, Chemo Intensity, and Baseline Fatigue

Figure 1

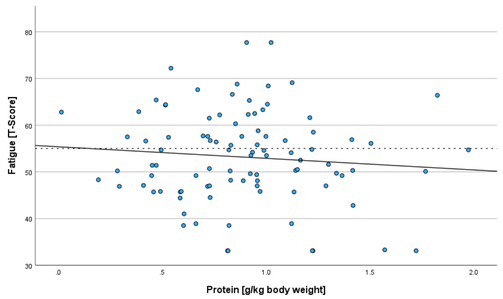


Figure Caption: There was a trend for lower reported fatigue among patients with higher protein intake.

Figure 2

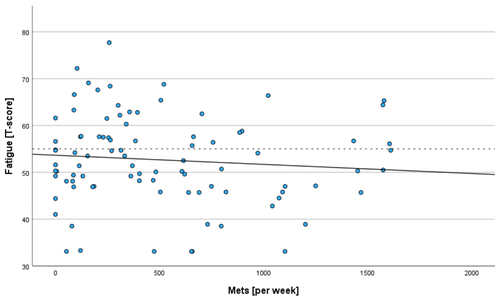


Figure Caption: There was a trend for lower reported fatigue among patients with higher levels of exercise.

Conclusions

- Median protein intake was 0.88 g/kg [IQR 0.60–1.12] and 39% reported suboptimal intake.
- Forty-one percent reported clinically significant fatigue at chemotherapy completion.
- No statistically significant association between fatigue and protein intake observed.

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