RANDOMIZED TRIAL OF WEIGHT LOSS ON CIRCULATING GHRELIN LEVELS AMONG BREAST CANCER SURVIVORS

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Background

- In 2017, the American Cancer Society estimated there were 3,560,570 breast cancer survivors living in the United States with this number expected to grow.
- Over 65% of breast cancer survivors are overweight or obese.
- Ghrelin, often referred to as the "hunger hormone", is a 28-amino acid peptide hormone that plays an important role in regulating appetite
- Studies have identified that plasma ghrelin levels are downregulated in patients with a Body Mass Index (BMI) ≥ 30 kg/m^2 compared to individuals with a BMI < 25 kg/m^2
- The response of circulating ghrelin to weight loss has been examined primarily in the setting of lifestyle and surgical interventions

Purpose: To examine the effect of the LEAN intervention on ghrelin levels among breast cancer survivors with a body mass index (BMI) ≥ 25 kg/m^2.

LEAN Study Intervention

Eligibility Criteria:

Stage 0-III breast cancer, BMI ≥ 25 kg/m^2, able to exercise

Weight Loss Counseling Group:

- Eleven 30-min counseling sessions over 6 months, conducted in-person or via telephone
- RD certified in Oncology Nutrition led sessions
- Focused on reduction of energy intake, plant-based diet and a physical activity goal of 150 minutes per week of moderate-intensity activity

Usual Care Group:

- Provided American Institute for Cancer Research nutrition and physical activity brochures
- Referred to Yale Cancer Center Survivorship Clinic
- One 30-minute counseling session at 6 months

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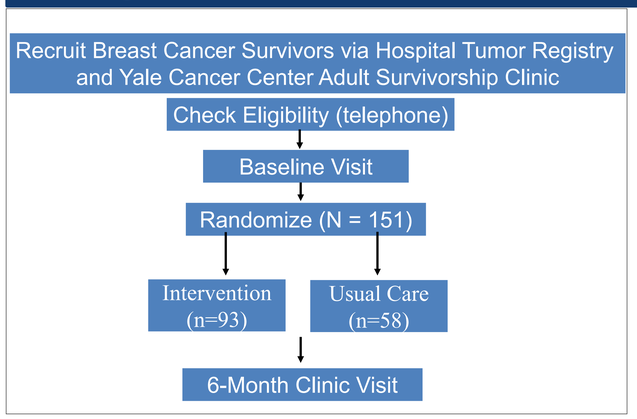
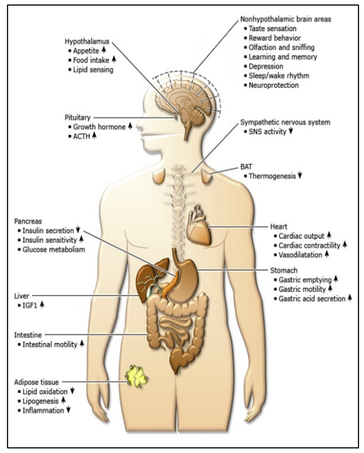
Design and Data Collection



Methods

- Fasting blood samples were collected at baseline and 6-months and ghrelin was measured using enzyme-linked immunosorbent assays (ELISA).
- Measured height and weight, and DEXA scans done at baseline and 6 months to assess BMI and body fat.
- Pearson correlation coefficients examined baseline associations.
- General linear models and least square means compared changes in ghrelin levels from baseline to 6-months between randomization groups.



LEAN Study Participants Characteristics

Characteristics	Intervention n=91	Usual Care n=58
Age (y)* (mean ± SD)	59.0 ± 7.3	56.3 ± 8.4
Postmenopausal, n (%)	77 (84.6)	47 (81.0)
Race/Ethnicity, n (%)		
White Non-Hispanic	82 (90.1)	49 (84.5)
Black or African American	5 (5.5)	5 (8.6)
Hispanic	3 (3.3)	3 (5.2)
Other	0 (0.0)	1 (1.7)
Declined to report	1 (1.1)	0 (0.0)
Education, n (%)		
High school degree	10 (11.0)	9 (15.5)
Some college degree	22 (24.2)	17 (29.3)
College degree	29 (31.9)	9 (15.5)
Graduate degree	30 (33.0)	23 (39.7)
Time from diagnosis (y) (mean ± SD)	2.7 ± 2.0	3.2 ± 3.1
Body weight, kg* (mean ± SD)	85.0 ± 16.9	92.3 ± 18.1
Percent body fat (mean ± SD)	43.3 ± 4.5	42.9 ± 5.5
Baseline BMI, kg/m^2* (mean ± SD)	32.2 ± 6.0	34.6 ± 6.7
BMI (kg/m^2)*		
Overweight BMI <30	44 (48.4)	17 (29.3)
Obese BMI >= 30	47 (51.7)	41 (70.7)

* Indicates p-value for t-test (continuous variables), χ^2 test (categorical variables), or Fisher's exact test (cell counts < 5) is p<0.05.

Results

Adjusted baseline, 6-month, and change in Ghrelin (pg/mL)

	Baseline	6 Months	Change 6-m	% Change
Usual Care (mean, SE)	1588.98 (285.72)	1223.84 (258.70)	-493.30 (258.70)	-31.05
Intervention (mean, SE)	1804.84 (235.26)	1935.25 (212.96)	218.10 (212.96)	12.08
p-value	0.56	0.04	0.04	

Adjusted for age, baseline BMI and baseline ghrelin

Results

Baseline Pearson correlation coefficients

	Correlation	p-value
Age	0.28	0.001
Weight (kg)	-0.18	0.03
BMI (kg/m^2)	-0.14	0.08
Total Body fat (kg)	-0.13	0.11
Lean Body Mass (kg)	-0.18	0.02
Leptin (ng/mL)	-0.18	0.03
Insulin (µU/mL)	-0.13	0.11
Adiponectin (µg/mg)	0.05	0.54
CRP (mg/L)	-0.04	0.60

- At baseline, ghrelin and age were positively correlated (r=0.28, p≤ 0.001), while weight (r=-0.18, p=0.03), lean body mass (r=-0.18, p=0.02), and leptin (r=-0.18, p=0.03) were negatively correlated.
- 54% of women in the intervention group lost greater than 5% of their body weight over 6-months
- Ghrelin levels increased by 12.08% over 6-months among women randomized to intervention vs. a decrease of 31.05% among usual care.
- Greater weight loss was associated with increased ghrelin concentrations among the intervention group.

Conclusion

- Weight loss achieved through a diet and exercise intervention is associated with increased ghrelin levels in overweight or obese breast cancer survivors.
- Further research is warranted to understand whether higher ghrelin is beneficial in helping maintain healthy weight among breast cancer survivors.