

Assessing Fasting Plasma Glucose Change in Breast Cancer Survivors Participating in a Randomized Control Trial of Physical Activity

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BACKGROUND

- Many breast cancer survivors experience problems with cognition that persist for years, especially in those who are physically inactive.
- Physical activity (PA) improves cognition in healthy and cognitively impaired adults, but the effect on cognition in cancer survivors is unknown.
- The Memory & Motion Study (parent study of this summer project) was a randomized controlled trial to examine the effects of a 3-month PA intervention on cognition in breast cancer survivors.
- The exercise intervention significantly improved processing speed, a component of cognition, in participants who had been diagnosed within 2 years of study enrollment.
- Secondary outcomes of Memory & Motion include plasma biomarkers related to PA and cognition, including brain-derived neurotrophic factor, insulin-like growth factor-1, insulin resistance (determined using insulin and glucose), and c-reactive protein².
- Hyperglycemia is associated with carcinogenesis and is a risk factor for invasive breast cancer recurrence and distant metastasis³.

SPECIFIC AIM AND HYPOTHESIS

- Assess fasting plasma glucose change in breast cancer survivors participating in a randomized control trial of PA.
- We hypothesized that plasma biomarkers related to PA and cognition, including glucose, would be reduced in the physical activity group but not in the control group. Glucose was the focus of this summer project.

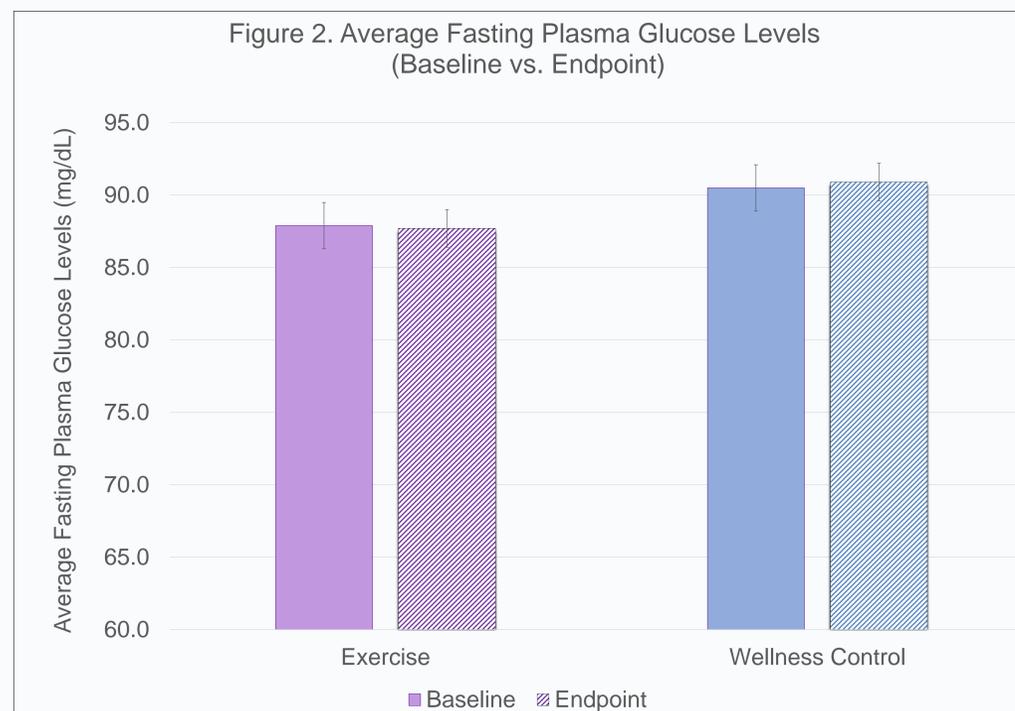
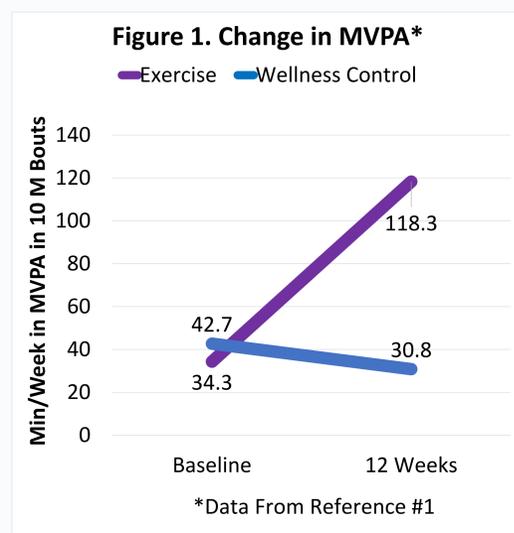
METHODS

- 87 participants were randomized to exercise or waitlist wellness control groups. The intervention period was 12 weeks.
- The PA intervention goal was engaging in ≥ 150 minutes of moderate-to-vigorous PA (MVPA) per week.
- Waitlist wellness control group received emails on women's health topics such as healthy eating, stress reduction, and general brain health.
- Using the YSI 2900 Biochemistry Analyzer, fasting glucose levels were measured in archival baseline and endpoint plasma samples from the Memory & Motion Study.
- The YSI 2900 measures glucose in the samples using an enzyme catalyzed reaction that produces hydrogen peroxide (H_2O_2), which is then electrochemically oxidized at the platinum anode of an electrochemical probe, and then produces a probe signal current.
- Glucose levels were compared using a T-test.

RESULTS

	Exercise Intervention (n=43)	Wellness Control (n=44)
Age, years, mean (SD)	58.2 (11.37)	56.2 (9.30)
Not Hispanic, n/%	35 / 81%	37 / 84%
White, n/%	36 / 84%	35 / 80%
At least college degree, n%	29 / 67%	33 / 75%
BMI, kg/m ² , mean (SD)	26.7 (6.20)	27.3 (6.40)
*Data from reference # 1		

	Exercise Intervention (n=43)	Wellness Control (n=44)
Time since dx, months, mean (SD)	30.3 (17.41)	30.0 (16.08)
Stage 1, n/%	27/63%	26 / 59%
Received chemotherapy, n/%	23/ 54%	23 / 52 %
Current AI or tamoxifen, n/%	31 / 72 %	30 / 68 %
*Data from reference # 1		



CONCLUSIONS

- PA intervention did not result in a significant change in fasting plasma glucose level.
- Other biomarker data analyses are ongoing for brain derived neurotrophic factor, insulin-like growth factor-1, insulin, and c-reactive protein.
- This study primarily consisted of participants with fasting glucose levels within the normal range.
- We are interested to combine data from the glucose data with the insulin data we have recently generated to assess whether insulin resistance was reduced by PA in this study.
- Future Questions:
 Was fasting glucose reduced in the subset of the PA participants who had had an improvement in processing speed in the Memory & Motion Study, i.e., participants who enrolled in the study less than 2 years after diagnosis?
 Would this PA intervention improve fasting glucose in breast cancer survivors with elevated fasting glucose or "prediabetes" and who are increased risk of cancer recurrence?

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