# The HEALTH4CLL study: Optimization of behavioral intervention for patients with chronic lymphocytic leukemia


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## Introduction

- Chronic lymphocytic leukemia (CLL) is the most prevalent leukemia in the US and advanced age and comorbidities increase the risk of cancer-related fatigue in patients with CLL.
- ACSM Guidelines for cancer patients: Exercise could improve common health outcomes, including anxiety and depressive symptoms, fatigue, physical functioning, and health-related quality of life.
- Lifestyle changes such as smoking cessation, healthy diet and weight, and exercise/physical activity would benefit for patients with CLL
- However, optimal health behavior intervention methods for patients with CLL are unknown.
- We conducted a pilot study of digital diet and physical activity intervention tools (HEALTH4CLL) designed to reduce fatigue in patients with CLL.

## Study Design & Methods

- A pilot study of randomized factorial design (n=37)
- 16-week of behavioral change strategies to promote physical activity and healthy diet, reduce fatigue and improve health-related quality of life and physical functions
- Multiphase optimization strategy (MOST)

- Intervention:
  - Wearable physical activity tracking device (Fitbit)
  - Weekly educational materials about exercise, diet, and weight management adapted from Diabetes Prevention Program (DPP).
  - Intervention components:
    1) Telephone vs. email coaching; 2) Text Message reminder vs. No reminder; 3) Aerobic vs. Aerobic + Resistance exercise; 4) Weekly vs. Daily self-monitoring

Table 1. Randomization: behavior change intervention components

| Group # | Coaching | Text Message | Resistance Training | Self-monitoring |
|---|---|---|---|---|
| 1 | Email | Yes | Yes | Daily |
| 2 | Email | Yes | Yes | Weekly |
| 3 | Email | Yes | No | Daily |
| 4 | Email | Yes | No | Weekly |
| 5 | Email | No | Yes | Daily |
| 6 | Email | No | Yes | Weekly |
| 7 | Email | No | No | Daily |
| 8 | Email | No | No | Weekly |
| 9 | Telephone | Yes | Yes | Daily |
| 10 | Telephone | Yes | Yes | Weekly |
| 11 | Telephone | Yes | No | Daily |
| 12 | Telephone | Yes | No | Weekly |
| 13 | Telephone | No | Yes | Daily |
| 14 | Telephone | No | Yes | Weekly |
| 15 | Telephone | No | No | Daily |
| 16 | Telephone | No | No | Weekly |

Effects coding: Email=1/Telephone=-1; Text message reminder=1/No reminder=-1; Resistance+Aerobic=1/Aerobic alone=-1;Daily=1/Weekly=-1

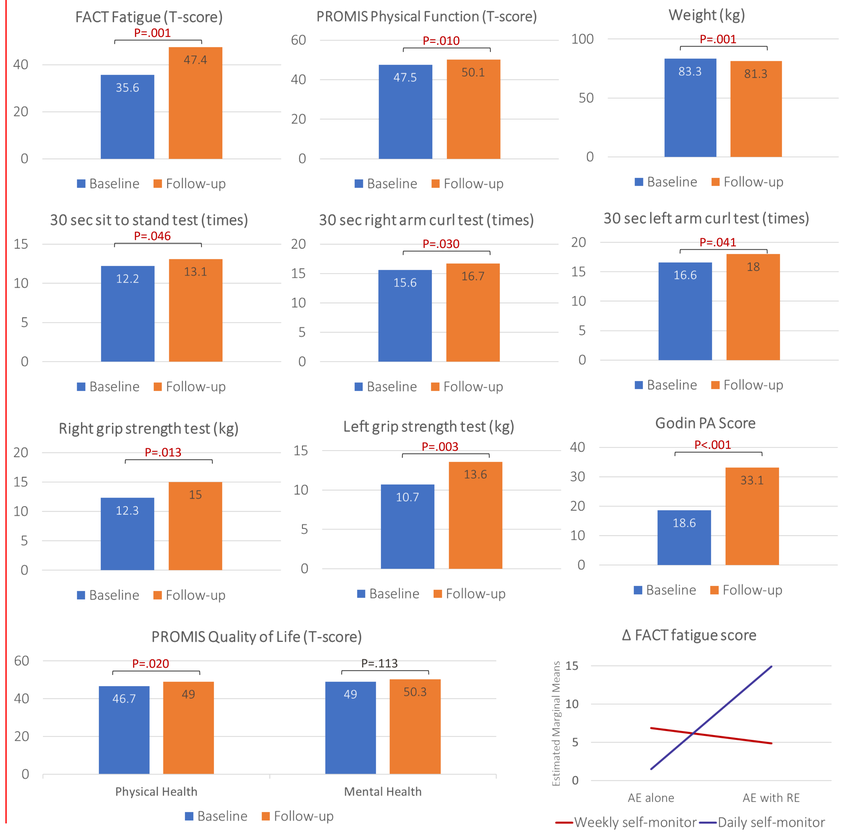
- Measures
  - Fatigue: Functional Assessment of Cancer Therapy-Fatigue (FACT-F)
  - Physical functioning: PROMIS-PF and Rikli Senior Fitness Battery tests
  - Feasibility: Attendance (%) and satisfaction (mean score)
  - Weight
  - Physical activity: Godin leisure time PA scores Fitbit, Accelerometer
  - Quality of life: PROMIS Global Health 10
  - Diet intake: Dietary History Questionnaire II
  - Program satisfaction and retention

- Statistical analysis:
  - Paired T-tests: examined changes in outcomes from baseline to follow-up
  - Factorial ANOVA: examined effective intervention components regarding improvement in fatigue and physical function scores

## Results

Total 31 patients completed. Patients' mean age was 63 yrs (SD=8.8), 61% were female, 94% were white, mean BMI was 31.6 kg/m2 (SD=13.8), 68% had Rai stage 3-4, 42% had unmutated IGHV and 6% has a TP53 aberrancy, 32% had not received prior treatment for CLL, and 76% were receiving a BTK inhibitor.

Figure 1. Improved fatigue, physical function, and weight after the intervention




- Analysis of the individual components of the MOST design demonstrated greater improvement in the physical function score with resistance plus aerobic exercise than with aerobic exercise alone (p=0.048).
- We identified telephone coaching, text message reminders, and Fitbit use as feasible interventions.

## Conclusion

- These findings demonstrated the feasibility and effectiveness of behavioral interventions in reducing fatigue and improving physical function in patients with CLL.
- Combined aerobic and resistance exercise, daily self-monitoring, and remote coaching were associated with improved physical function and reduced fatigue.

## Acknowledgement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