The Impact of an Online Theory-Based Bone Health Program on Setting Health Goals

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Supported by National Institute of Nursing Research (R01NR011296, 08/01/2009 – 05/31/2013)
**Ongoing study:**
“Dissemination of a Theory-Based Bone Health Program in Online Communities”

- To examine the impact of two social cognitive theory (SCT) based online bone health programs on the **RE-AIM dimensions** among members (> 50 years) of two large online communities (*SeniorNet; MyHealtheVet*)
Aim

• To examine the initial impact of the SCT-based online bone health intervention on the participants setting health goals
Background
Background: Bone Health

- An estimated 10 million Americans age 50 and older are living with osteoporosis (8 million women).

- Approximately 50% of women and 25% of men over age 50 will experience an osteoporosis-related fracture in their remaining lifetime (direct care costs, $12 to $19 billion per year).
  - For older adults, hip fractures are the most devastating type of fracture (mortality rates, 18-33% at 12 months; subsequent fractures, 10-20%).
Background: *Bone Health*

- **Multiple effective measures** to improve and maintain bone density and to prevent fractures have been identified.
- Only **3–23%** of adults at high risk for osteoporosis have received a bone mineral density (BMD) test, and only **11–44%** take calcium and vitamin D supplements.
- More research must be conducted to **identify effective dissemination strategies** in the field of bone health.
- The Internet, by nature **an excellent dissemination medium**, can be an effective tool in this endeavor.
Background:

*Online Bone Health Websites*

- Online interventions have unique additional benefits
  - Ability to reach large numbers of individuals
  - Distribute uniform interventions to multiple sites
- Currently, a great deal of health information is available on the web (e.g., the National Institutes of Health [NIH]; the National Osteoporosis Foundation [NOF]).
- Adult online users are particularly interested in online health information.
- Many studies have tested the effects of online interventions (e.g., smoking, exercise, and obesity).
Background: 
Challenges in Dissemination Efforts

- Many laypersons are either unaware of helpful health websites or overwhelmed by the amount of information available.
- A great opportunity exists to improve dissemination strategies to effectively package and deliver the available online health resources to large numbers of laypersons.
- Most online intervention studies have focused on assessing short-term effects of specific online programs rather than investigating methodologies to disseminate those online resources to yield long-term outcomes.
Background: *Dissemination*

- “Dissemination” in our study emphasizes a mechanism that will package and deliver resources to target populations and encourage them to make positive changes in specific health behaviors.

- How to package and deliver the online intervention?
  - **Theory-based Approach**

- How to assess the outcomes of the dissemination study?
  - **REAIM Framework**
Theory-Driven Online Health Programs: 
Social Cognitive Theory

• **Social Cognitive Theory**: A guiding framework in the development and implementation of the study
  – **Goal setting**
  – Motivation
  – Outcomes expectation (OE)
  – Self-efficacy (SE)
    * Mastery experience
    * Vicarious experiences
    * Verbal persuasion
    * Physiological and emotional states
Currently Ongoing Study

Bone Power

An Interactive Online Bone Health Program
“Dissemination of a Theory-Based Bone Health Program in Online Communities”

- To examine the impact of two SCT-based online bone health programs on the RE-AIM dimensions among members (> 50 years) of two large online communities

1. 8-week SCT-based Online Bone Health (TO-BoneHealth) program
2. 12-month TO-BoneHealth Plus program:
   TO-BoneHealth program followed by bi-weekly SCT-based eNewsletters with follow-up of each individual’s maintenance of bone health behaviors for 10 months.
Design

- A randomized controlled trial (RCT) using a 3-group comparison design with repeated measures (8 weeks, 6, 12, and 18 months)
- Data collection: Online surveys
- **Intervention Conditions:**
  1. 8-week TO-BoneHealth program
  2. 12-month TO-BoneHealth Plus program
  3. Control group: No intervention
Outcome Measures

**Reach:** The number of individuals in each of the two online communities who participate in the trial

**Effectiveness dimension:**

a. Knowledge of osteoporosis (calcium and vitamin D intake and exercise) and environmental safety
b. Self-efficacy and outcome expectations for calcium intake and exercise
c. Health behaviors (i.e., calcium and vitamin D intake and exercise)
d. eHealth literacy
e. Incidence of falls
f. Initiation of a discussion about bone health with a primary care provider

**Implementation:** The extent of the intervention usage

**Maintenance (long-term effects on individuals):** The extent to which the two intervention groups’ participants maintain their planned bone health behaviors.
Sample/Settings

Settings

- MyHealtheVet
- SeniorNet

Sample

- Age 50 years or older
- Access to the Internet/e-mail (at home or other places such as public libraries, computer labs, etc)
- Able to use the Internet/e-mail independently
- Reside in a community setting in the United States
- Able to read and write English
Recruitment


- A total of 866 participants were recruited online.
- Mean age: 62.8 ± 8.5
- A cohort of approximately 60 participants were randomized into 3 groups and started interventions at the same time.
  (1) BonePower; (2) BonePower_Plus; (3) Control
- 48 groups (32 separate web intervention sites)
Current Study Progress

• All participants completed the EOT (8-week) survey
• 6-month and 12-month surveys are in progress.
## Sample Demographics (N = 866)

<table>
<thead>
<tr>
<th>Variables</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>549 (63.4%)</td>
</tr>
<tr>
<td><strong>Age</strong> (mean: 62.8 ± 8.5)</td>
<td></td>
</tr>
<tr>
<td>50 – 65</td>
<td>578 (66.8%)</td>
</tr>
<tr>
<td>65-74</td>
<td>194 (22.4%)</td>
</tr>
<tr>
<td>≥75</td>
<td>93 (10.8%)</td>
</tr>
<tr>
<td><strong>Ethnicity</strong></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>776 (89.6%)</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
</tr>
<tr>
<td>HS or Below</td>
<td>111 (12.9%)</td>
</tr>
<tr>
<td>Some College</td>
<td>309 (35.7%)</td>
</tr>
<tr>
<td>College or higher Degree</td>
<td>140 (51.5%)</td>
</tr>
<tr>
<td><strong>WEB Experience</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;5 years</td>
<td>37 (4.3%)</td>
</tr>
<tr>
<td>5-10 Years</td>
<td>107 (12.4%)</td>
</tr>
<tr>
<td>&gt;10 Years</td>
<td>721 (83.4%)</td>
</tr>
</tbody>
</table>
Intervention
Theory-Based Online Bone Power Program

Platform

• Online learning management program as an overarching infrastructure (Blackboard)
• Web pages

Program Components:

• Learning modules / Self assessment quizzes
• Discussion board
• Ask-the-Experts
• Video lectures
• Virtual libraries
• Toolkit
• Theory-based eHealth newsletters
The username and password are the same.

Welcome to the Bone Health Study ("Bone Power") website. This program was developed by a group of multidisciplinary healthcare professionals and researchers from the University of Maryland Schools of Nursing and Medicine and from the Johns Hopkins School of Medicine. This study is supported by the National Institutes of Health.

If you have any questions or comments, please call us toll-free at 1-866-902-6563 or send an email to bonepower@son.umaryland.edu.
Welcome to the Bone Power Web Site!

Bone Power

The purpose of this program is to provide adults age 50 and over with important bone health information, practical tools, and other resources.

Eun-Shim Nahm, PhD, RN, the primary researcher for this project and Ms. Jeanine Brown, RN, the project manager, are here to assist you in using this program.

For any questions or comments at any time, call us toll-free at 1-866-902-6563 or send an email to bonepower@son.umaryland.edu. We will respond as quickly as possible.

Before you start the program, please click on the button below and view a short set of instructions (it plays like a movie and contains audio). Once it is done, close that window to return.
Learning Modules

Instructions

Please check off the “Mark reviewed” button when you complete reviewing the module. After completing a module, please go to the Discussion Board section and participate in the corresponding module forum. Thank you.

Module 1: Osteoporosis Overview

Module 2: Importance of Bone Health
Instructions

Please check off the “Mark reviewed” button when you complete reviewing the module. Thank you.

Module 1: Osteoporosis Overview
- Reviewed

Module 2: Importance of Bone Health
- Reviewed

Module 3a: Calcium
- Reviewed

Module 3b: Vitamin D
- Reviewed

Module 4: Falls
Calcium Physiology

Calcium is absorbed in the small intestine both passively and actively. The active mechanism needs vitamin D in order to work. Although vitamin D is necessary for the absorption of calcium, it does not need to be taken at the same time as a calcium supplement. Chewable and liquid calcium supplements dissolve well because they break down before entering the stomach.

Calcium, whether from diet or supplements, is best absorbed when taken in amounts of 500-600mg or less. Your body does not absorb more than about 600mg at a time. If you are taking 1200mg a day of calcium you must split the dose in order for the calcium to be most effective.

Try to get your calcium-rich foods and/or supplements in smaller amounts throughout the day, preferably with a meal. Many calcium supplements should be taken with food. One example is the supplement, calcium carbonate. Eating food produces stomach acid that helps your body to absorb calcium. Supplements of calcium citrate can be taken at any
According to the U.S. Preventive Services Task Force (USPSTF), who should have a Bone Mineral Density (BMD) screening test?

a. All women age 65 and older
b. All women age 50 and older
c. All older adults with sedentary life style
d. Adults who suffer from back pain

actively
Characterized by action; not passive.

adverse drug event
Any incident in which the use of a medication (drug or biologic) at any dose, a medical device, or a special nutritional product (for example, dietary supplement, infant formula, medical food) may have resulted in an adverse outcome in a patient.

aerobic
Activity that increases the body's demand for oxygen, resulting in an increase in respiration and heart rate.

anorexia
Loss of appetite and inability to eat, especially as a result of a disease.

anticoagulants
Substances that slow down or prevent the clotting of blood.
Dear Participants,

I am Ms. Jeanine Brown and I will moderate the discussions. This discussion board is designed for you to share your thoughts about various topics on bone health with your group members. Please post your responses to the selected topic and comment on other members’ postings. For confidentiality purposes, do not include any personal information on your message.

Click on the button below to view brief instructions on how to use the discussion board (it plays like a movie and contains audio). Once it is done, close that window to return.

Click here To_Print_Instructions.pdf

Thank You,
Jeanine Brown RN

Click the link to the left to join in the discussion.
<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Total Posts</th>
<th>Unread Posts</th>
<th>Total Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Module 1 – Osteoporosis</td>
<td>Click the link to the left to join in the discussion.</td>
<td>32</td>
<td>32</td>
<td>11</td>
</tr>
<tr>
<td>Module 2 – Importance of Bone Health</td>
<td>Click the link to the left to join in the discussion.</td>
<td>21</td>
<td>21</td>
<td>7</td>
</tr>
<tr>
<td>Module 3a – Calcium</td>
<td>Click the link to the left to join in the discussion.</td>
<td>20</td>
<td>20</td>
<td>7</td>
</tr>
<tr>
<td>Module 3b – Vitamin D</td>
<td>Click the link to the left to join in the discussion.</td>
<td>13</td>
<td>13</td>
<td>6</td>
</tr>
<tr>
<td>Module 4 – Falls</td>
<td>Click the link to the left to join in the discussion.</td>
<td>10</td>
<td>10</td>
<td>5</td>
</tr>
<tr>
<td>Module 5 – Physical Activity and Exercise</td>
<td>Click the link to the left to join in the discussion.</td>
<td>14</td>
<td>14</td>
<td>6</td>
</tr>
<tr>
<td>Module 6 – Osteoporosis Treatment</td>
<td>Click the link to the left to join in the discussion.</td>
<td>8</td>
<td>8</td>
<td>4</td>
</tr>
<tr>
<td>Module 7 – Medicine Safety</td>
<td>Click the link to the left to join in the discussion.</td>
<td>17</td>
<td>17</td>
<td>5</td>
</tr>
<tr>
<td>Module 8 – Osteoporosis and Fractures</td>
<td>Click the link to the left to join in the discussion.</td>
<td>6</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Module 9 – Balanced Diet</td>
<td>Click the link to the left to join in the discussion.</td>
<td>5</td>
<td>5</td>
<td>2</td>
</tr>
<tr>
<td>Module 10a – Effects of Smoking</td>
<td>Click the link to the left to join in the discussion.</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Module 10b – Quit Smoking</td>
<td>Click the link to the left to join in the discussion.</td>
<td>2</td>
<td>2</td>
<td>1</td>
</tr>
</tbody>
</table>
The content below is outside of the Blackboard Learn environment.

**Toolkit**

Welcome to the Toolkit section of the Bone Power web site! A tool is something that can help you assess your situation or achieve a goal. Many tools are interactive and require you to fill in your information. Tools can be fun to use!

Here we have compiled a list of tools, by category, you may have seen in the learning modules you've been viewing.

Below you will see a link for a category. Click on the subject you're interested in to go to a list of tools related to that subject. Once there, click on the icon to go to the tool.

- Activity/Exercise
- Balanced Diet
- Drinking/Smoking
- Fall/Fracture
- Medicine Safety
Expert Videos

Module 1 – Osteoporosis Overview

How to use the FRAX® tool
Dr. Michele Bellantoni
Click here to watch, Transcript
Runtime: 9 minutes

Module 1 – Osteoporosis Overview

Demonstration of a BMD test
Dr. Michele Bellantoni
Click here to watch, Transcript
Runtime: 6 minutes

Module 2 – Importance of Bone Health

Overcoming barriers to exercise
Dr. Barbara Resnick
Click here to watch, Transcript
Runtime: 5 minutes
Introduction

Welcome to the 4th issue of our Bone Power Newsletter. We hope that you are doing well with your health goals. Staying on your exercise and diet plans may not be easy, but the important thing is to keep working at it!

Featured Health Topic

Arthritis and Exercise

Regular, moderate exercise is important for managing arthritis. Exercise reduces joint pain and stiffness, and strengthens muscles and bones. If you choose water exercise, keep in mind that you also need weight-bearing exercises, like walking to help build stronger bones. Even five

Did You Know...

About the Benefits of Aqua-Exercise?

Exercise in a pool is great, especially if you have arthritis. Warm water helps to stretch your muscles gently. Water supports your weight, so there is less stress on your joints. Water also provides 12 times the resistance of air, so you get a good muscle strengthening workout as you move. To read more, click here.

Your Health Goals

Please let us know about your progress on your health goals by clicking here.
Methods
Procedures

• A cohort of approx. 60 participants
• Baseline survey
  – Goal Attainment Scale: setting health goals for calcium and vitamin D intake, exercise, other goals
• Randomization (BoneHealth; BoneHealth Plus; Control)
• 8-week Online Bone Power program
  – Upon review of the Overview module (1st week), intervention group participants were given an opportunity to revise their health goals (voluntary option)
• End-of-treatment (EOT) survey
• Plus group: Biweekly eHealth newsletters for 10 months
• 6-, 12-, and 18-month follow-up survey
• Control group – Receive Bone Power CD-ROM
Goal Attainment Scale (GAS)

- GAS assesses the effect of the intervention on **individualized goals** that would not typically be addressed by most standardized measurement scales.

- The scaling procedure involves:
  - defining a unique goal
  - Specifying a range of possible outcomes for the goal on a 6-point Likert scale (“meeting the goals all of the time,” +5; “did not follow the plan at all,” 0)

- Some evidence of construct validity of the measure by correlating other measures.

- In this study, participants set their **individualized goals for calcium and vitamin D intake, activity/exercise, and other individualized health behaviors.**
Bone Health Goal Attainment

[In Baseline Survey]

Now we would like you to set your health goals for calcium/vitamin intake and activity/exercise, as well as other goals for the next 4 weeks.

In the next row please list goals (1-3 goals) that are appropriate for you and your situation.

<table>
<thead>
<tr>
<th>Category</th>
<th>Calcium intake</th>
<th>Vitamin D intake</th>
<th>Activity/Exercise</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>My goals for the next 4 weeks are:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Bone Health Goal Attainment

**[In Follow Up Survey]**

Previously, you set your health goals for calcium/vitamin intake and activity/exercise, as well as other goals.

Now please evaluate your goal achievement for each category by using the chart below. You may need to review the goals you set before.

<table>
<thead>
<tr>
<th>Since the last time I set my goals, I...</th>
<th>Did not meet the goals</th>
<th>Seldom met the goals</th>
<th>Met the goals slightly less than half of the time</th>
<th>Met the goals half of the time</th>
<th>Met the goals most of the time</th>
<th>Completely met planned goals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Calcium intake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin D intake</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Activity/Exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other (your personal goal)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you could not meet your goals, briefly describe...

<table>
<thead>
<tr>
<th>The reasons:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Plans to meet your goals:</td>
<td></td>
</tr>
</tbody>
</table>

(continues)
Intervention Groups: BoneHealth & BoneHealth Plus

Learning Modules

Instructions

Please check off the “Mark reviewed” button when you complete reviewing the module. After completing a module, please go to the Discussion Board section and participate in the corresponding module forum. Thank you.

Module 1: Osteoporosis Overview

M1: Importance of bone health; Confidence /adherence to health plans
- Goal setting: a. Calcium/vitamin D consumption; b. Activity/Exercise
Now we would like you to set your health goals for calcium/vitamin intake and activity/exercise, as well as other goals for the next 4 weeks.

In the next row please list goals (1-3 goals) that are appropriate for you and your situation.

<table>
<thead>
<tr>
<th>Category</th>
<th>Calcium intake</th>
<th>Vitamin D intake</th>
<th>Activity/Exercise</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>My goals for the next 4 weeks are:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Let's Set Our Health Goals!

Now we would like you to set your health goals for calcium/vitamin intake and activity/exercise, as well as other goals for the next 4 weeks.

Examples of possible goals.

<table>
<thead>
<tr>
<th>Calcium intake</th>
<th>Vitamin D intake</th>
<th>Activity/Exercise</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Fat free milk – 1 cup x 2 / day</td>
<td>- Take Vitamin D supplement daily</td>
<td>- 20 min of power walking daily</td>
<td>Discuss bone density screening with my doc</td>
</tr>
<tr>
<td>- 1 serving of cheese product per day</td>
<td></td>
<td>- 15 min of strengthening and balancing exercises every other day</td>
<td></td>
</tr>
<tr>
<td>- Calcium supplement (XXX mg)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

In the next row please list goals (1-3 goals) that are appropriate for you and your situation.

<table>
<thead>
<tr>
<th>My goals for the next 4 weeks are:</th>
<th>Calcium intake</th>
<th>Vitamin D intake</th>
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</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Data Analysis

• GAS data at baseline and Post-module 1 were matched and assessed by 3 coders,
  – Coder 1 & 3: An experienced researcher who had conducted multiple content analyses
  – Coder 2: A doctoral student who had conducted similar analyses in other studies
• Coder 1 & 2 separately evaluated the content using the same rating guidelines.
  – Findings were compared and discrepancies were discussed.
• The third coder validated the final coding.
Data Analysis

Coding rules: Criteria to be considered as improved goals

- More detailed goal setting (e.g., amount of calcium) that is toward the right direction
- Amount of calcium, vitamin D, or exercise that became more consistent with the national and/or professional organizational guidelines.
- Start discussion about bone health with the primary providers
- BMD test – discuss with the primary care provider, plan, and schedule
Results
# Bone Health Goals (Intervention Groups)

<table>
<thead>
<tr>
<th></th>
<th>Calcium intake</th>
<th>Vitamin D intake</th>
<th>Activity/Exercise</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BL</strong></td>
<td>milk</td>
<td>ok</td>
<td>will try</td>
<td>Maybe</td>
</tr>
<tr>
<td><strong>Post-Overview</strong></td>
<td>1000mg calcium supplement per day</td>
<td>800 mg vitamin D supplement until I get to go out doors into the sun. It has been a loooong winter in MN</td>
<td>attend Yoga class and walk out doors</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Learn more about non-dairy sources of calcium rich foods to incorporate into our meals</td>
<td>Have blood learn where my vitamin D scores are now, and adjust vitamins/diet as needed</td>
<td>Walk 30 min/day -do yoga 20 min 3x/wk, focusing on balance stances</td>
<td>Remove items from stairs!</td>
</tr>
<tr>
<td><strong>BL</strong></td>
<td>~6oz non-fat yogurt 2x/wk ~calcium supplement 600mg/day ~add 1 serving various greens/day</td>
<td>Add 1000mg/day Vitamin D supplement</td>
<td>Yoga 1 hr 4x/wk ~walk 2 ml/day 5x/wk hilly terrain</td>
<td>Review bone density with my doctor</td>
</tr>
<tr>
<td><strong>Post-Overview</strong></td>
<td>Add 1 serving of dark green leafy vegetable per week beside kale, broccoli and spinach</td>
<td>Have 25-hydroxy vitamin D level measured again</td>
<td>15 min of strengthening and balancing exercises each day</td>
<td>Discuss bone density screening with physician</td>
</tr>
<tr>
<td><strong>BL</strong></td>
<td>Fat free milk (at least 8 oz 3x/day), green leafy veggies and 500mg calcium</td>
<td>Take 1000 mg vitamin D per day, at least one serving of fatty fish per week</td>
<td>Continue 3 (50 min) exercise classes per week, daily muscle strengthening, gardening and walking</td>
<td>Have scheduled dexascan for May 20.</td>
</tr>
</tbody>
</table>
## Bone Health Goals (Intervention Groups)

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<td></td>
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</tbody>
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# Bone Health Goals (Intervention Groups)

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<th>Vitamin D intake</th>
<th>Activity/Exercise</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL</td>
<td>1 cup 2% mile daily</td>
<td>80 min. p/wk outside</td>
<td>walk 3 times p/wk</td>
<td></td>
</tr>
<tr>
<td>Post-Overview</td>
<td>2 cups of milk p/day</td>
<td>1/2 hr. of sunshine outside</td>
<td>walk 30 min p/day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Calcium supplement</td>
<td>Daily supplement</td>
<td>Yoga</td>
<td>Use the resources presented here to improve my diet (e.g. Spark People URL).</td>
</tr>
<tr>
<td>Post-Overview</td>
<td>1200 mg/day</td>
<td>1000 IU/ day</td>
<td>Low-Impact Yoga (I'm disabled)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>up calcium intake to 2 pills</td>
<td>up to 400 IU</td>
<td>20 mins walk daily 20 mins yoga 4 x week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1000mg - 1 cup of fat free milk per day</td>
<td></td>
<td>chart food i eat every day</td>
<td></td>
</tr>
<tr>
<td></td>
<td>get 600 mg from real food</td>
<td></td>
<td>walking 45 mins 5 days week balance exercise 15 mins 3x week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>milk, cheese, yogurt other 600 from supplement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>continue one a day vitamins</td>
<td>continue supplements</td>
<td>continue current four days a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>and more calcium foods</td>
<td>and more d richer foods</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2-3 cups soy milk per day</td>
<td>vitamin d supplement milk one a day vitamin</td>
<td>swim 1/2 mile twice a week circuit weight train twice a week physical therapy once a week</td>
<td></td>
</tr>
<tr>
<td></td>
<td>yogurt for breakfast one a day vitamin</td>
<td></td>
<td>two doctor visits next two weeks</td>
<td></td>
</tr>
<tr>
<td></td>
<td>drink 2 8 oz glasses of fat free milk. I already eat cheese, but can cut down on this.</td>
<td></td>
<td>Add at least 2 times weekly to walk at least 2 miles.</td>
<td></td>
</tr>
<tr>
<td>Post-Overview</td>
<td>1200</td>
<td>800</td>
<td>at least 30 minutes of activity (e.g., walking or other exercise)</td>
<td>try to clear obstacles from walking areas in my home per day</td>
</tr>
</tbody>
</table>
Results

• Among 604 intervention group participants, 418 (69.3%) submitted the revised goals.

• Improved goals:
  – Calcium intake - 196 (46.9%) participants
  – Vitamin D intake - 117 (30%) participants
  – Exercise - 184 (44%) participants

• Discuss their bone health with their healthcare providers: 96 participants
  – including 45 who set a goal to discuss the BMD test or have scheduled the BMD
Results

• Worsened goals:
  – Calcium intake: 1 participant (decreased calcium intake amount)
  – Exercise: 4 participants (decreased exercise amount)
Discussion: Further Analyses Needs (selected)

- Differences in demographical characteristics of the participants whose goals were improved vs. not improved
- Relationship between the improvement in goals and intervention usage
- Participants’ self-evaluation of goal attainment in follow up surveys
- The impact of the improvement in goal setting on health behavioral outcomes (e.g., self efficacy, changes in behaviors)
- Changes in health goals overtime
Conclusion

• Bone Power program’s positive effects on the early phase of behavioral change trajectory (i.e., setting specific goals).

• Further analyses regarding the impact of the changes on health outcomes will be conducted.

• If the approach used in this study is proven to be effective, it can serve as a model for many other eHealth studies.
Thank you!!

Q & A
**RE-AIM Framework:**
*Dissemination Study*

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Original RE-AIM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach</td>
<td>Number and proportion of individuals willing to participate in a given program</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>Effectiveness/efficacy of an intervention</td>
</tr>
<tr>
<td>Adoption</td>
<td>Number and proportion of settings willing to initiate a program</td>
</tr>
<tr>
<td>Implementation</td>
<td>Extent to which the intervention is implemented as intended across settings</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Long-term effects of an intervention (individual level)/sustainability of a program (organization level)</td>
</tr>
</tbody>
</table>

The RE-AIM framework was modified in our eHealth project.
## RE-AIM Framework: Dissemination Study

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Modified RE-AIM for Online Study</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reach</td>
<td>The number of individuals reached will be more meaningful than the proportions.</td>
</tr>
<tr>
<td>Effectiveness</td>
<td>Effectiveness/efficacy of an intervention</td>
</tr>
<tr>
<td>Adoption</td>
<td>Not applicable in this study because the recruitment sites were selected based on convenience.</td>
</tr>
<tr>
<td>Implementation</td>
<td>Modified at the individual level using the individual’s usage and perceived usability, because in this study, our team will provide uniform interventions to both settings.</td>
</tr>
<tr>
<td>Maintenance</td>
<td>Long-term effects of an intervention on individuals only (the length of the program is limited to the length of our study)</td>
</tr>
<tr>
<td>General</td>
<td>Instructions for using the learning modules; Glossaries</td>
</tr>
<tr>
<td>---------</td>
<td>----------------------------------------------------------</td>
</tr>
</tbody>
</table>
| WK1     | **M1: Importance of bone health**: Confidence/adherence to health plans  
|         | • Self assessment: a. Calcium/vitamin D consumption; b. Activity/Exercise; c. Osteoporosis Risk;  
|         | • Goal setting: a. Calcium/vitamin D consumption; b. Activity/Exercise |
| WK2     | **M2: Osteoporosis: General overview**: Bone structures; Definition of osteoporosis; Risk factors; Symptoms; Prevention; Diagnosis; Tx options; |
| WK3     | **M3, Part I: Calcium and Vitamin D**: Importance of a balanced diet; Amount of calcium & vitamin D in food; Methods to increase calcium & vitamin D consumption  
|         | **M4, Part I: Activity/Exercise**: Who should exercise; What kinds of activities improve health and mobility, etc. |
| WK4     | **M3, Part II: Calcium and Vitamin D: Part II** - Calcium & Vitamin D Supplement; Cooking tips and recipes  
|         | **M4, Part II: Activity/Exercise Part II** - Different types of exercise, e.g., The NIA exercise videotape [demo] |
| WK5     | **M5: Osteoporosis Medications** - Osteoporosis medications |
| WK6     | **M6: Falls and Fracture** - Falls: The problem; risk factors; prevention; what to do in case of a fall; home safety; Hip Fracture: Outcomes of hip fractures; risk factors; prevention; recovery from hip fracture |
| WK7     | **M7: Home Safety** - Home safety; What to do in case of a fall |
| WK8     | [Reviews] |