



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

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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



"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

<u>Settings</u>

- 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

Recruitment Period: 11/30/2010 - 7/6/2011

- A total of 866 participants were recruited online.
- Mean age: 62.8 <u>+</u> 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)

Variables	N (%)
Gender	
Male	549 (63.4%)
Age (mean: 62.8 ± 8.5)	
50 – 65	578 (66.8%)
65-74	194 (22.4%)
≥75	93 (10.8%)
Ethnicity	
White	776 (89.6%)
Education	
HS or Below	111 (12.9%)
Some College	309 (35.7%)
College or higher Degree	140 (51.5%)
WEB Experience	
<5 years	37 (4.3%%)
5-10 Years	107(12.4%)
>10 Years	721 (83.4%)

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



Welcome to the Bone Power Web Site!



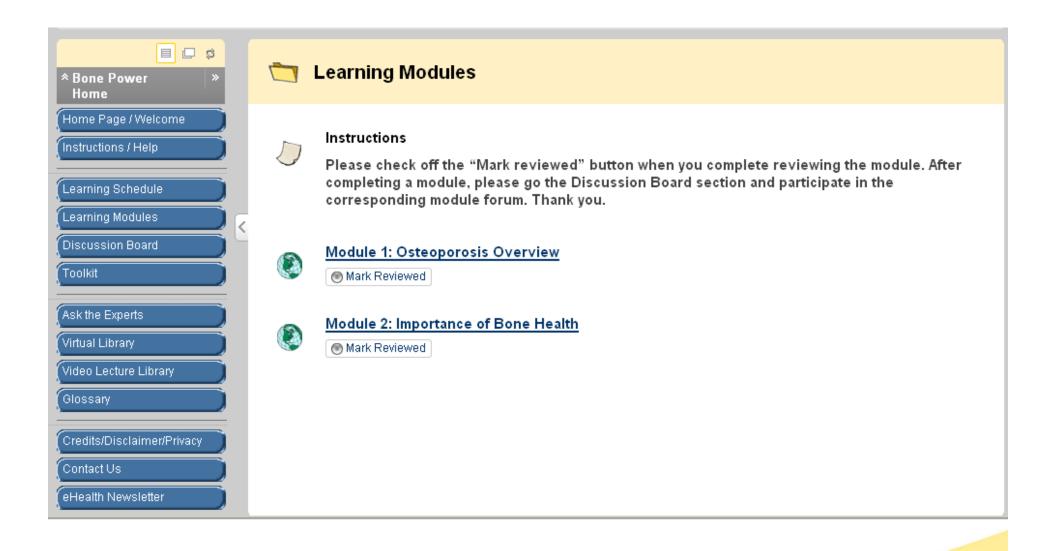
The purpose of this program is to provide adults age 50 and over with important bone health information, practical tools, and other resources.

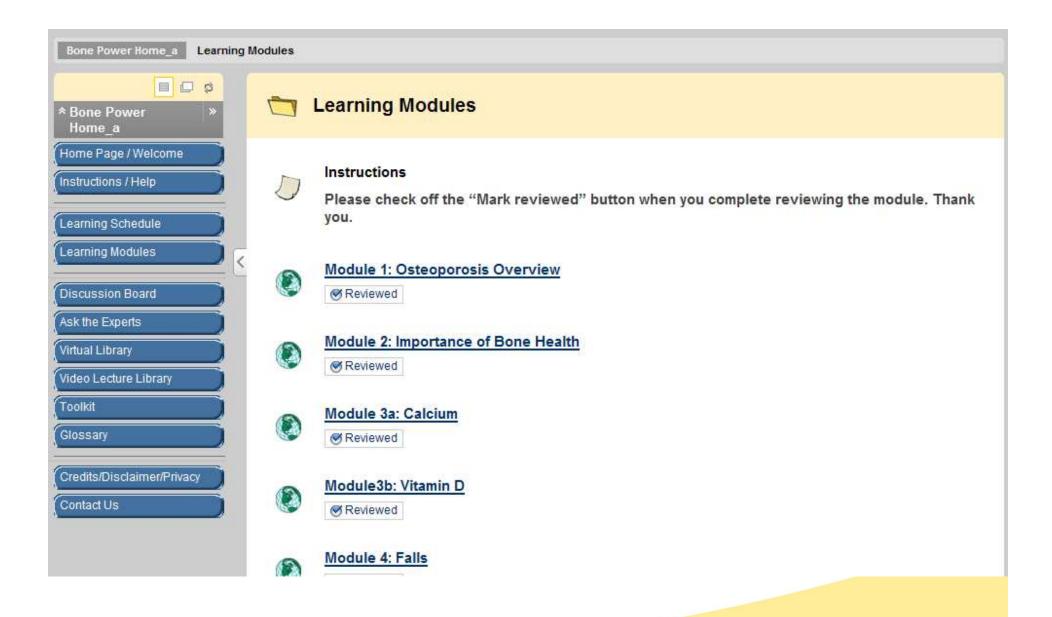
Eun-Shim Nahm, PhD, RN, the primary researcher for this project and Ms. Jeanine Brown, RN, the project manager, are here to assist you in using this program.

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.

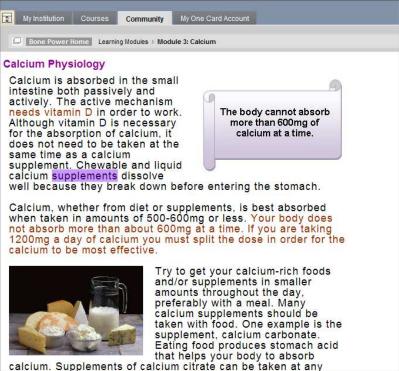
Before you start the program, please click on the button below and view a short set of instructions (it plays like a movie and contains audio). Once it is done, close that window to return.

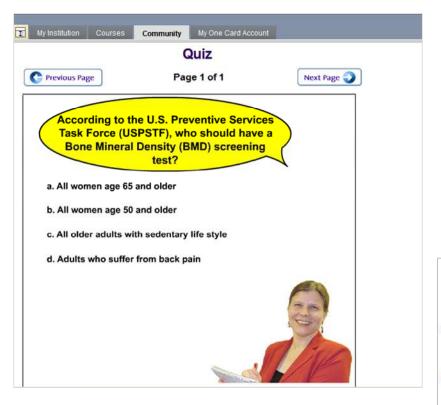














A

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

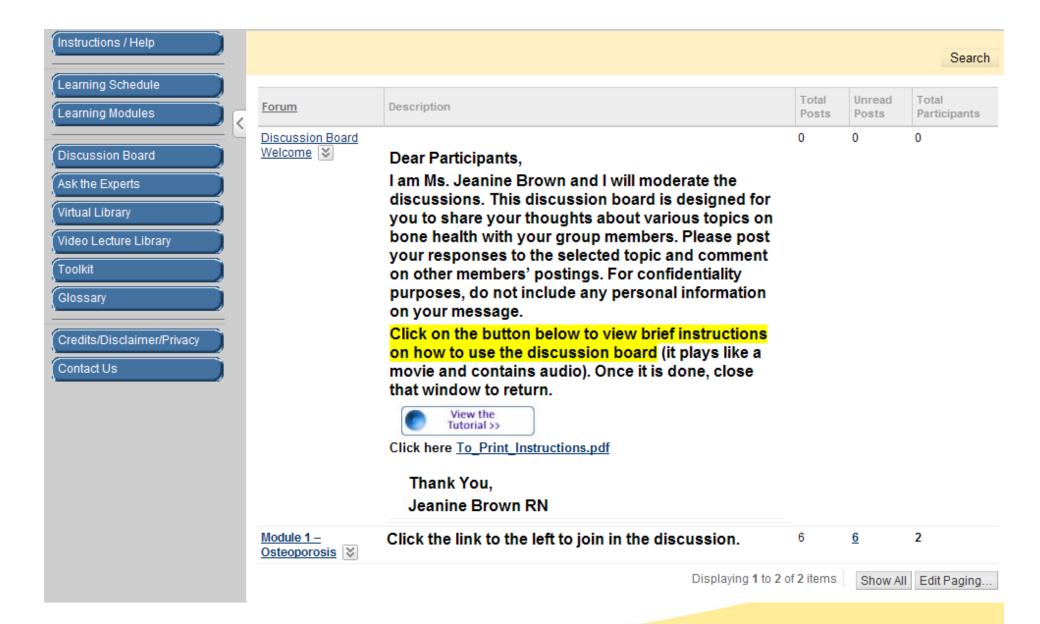
Activity that increases the body's demand for oxygen, resulting in an increase in respiration and heart rate.

anorexia

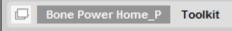
Loss of appetite and inability to eat, especially as a result of a disease.

anticoagulants

Substances that slow down or prevent the clotting of blood.



Learning Schedule					
Learning Modules	Forum	Description	Total Posts	Unread Posts	Total Participants
Discussion Board	Module 1 – Osteoporosis ♥	Click the link to the left to join in the discussion.	32	32	11
Toolkit	Module 2 – Importance of Bone Health	Click the link to the left to join in the discussion.	21	<u>21</u>	7
Ask the Experts	Module 3a – Calcium	Click the link to the left to join in the discussion.	20	<u>20</u>	7
Virtual Library Video Lecture Library	Module 3b – Vitamin D	Click the link to the left to join in the discussion.	13	<u>13</u>	6
Glossary	Module 4 − Falls 💸	Click the link to the left to join in the discussion.	10	<u>10</u>	5
Credits/Disclaimer/Privacy	Module 5 – Physical Activity and Exercise	Click the link to the left to join in the discussion.	14	<u>14</u>	6
Contact Us eHealth Newsletter	Module 6 – Osteoporosis Treatment [❤	Click the link to the left to join in the discussion.	8	<u>8</u>	4
	Module 7 – Medicine Safety ▼	Click the link to the left to join in the discussion.	17	<u>17</u>	5
	Module 8 – Osteoporosis and Fractures ♥	Click the link to the left to join in the discussion.	6	<u>6</u>	2
	Module 9 – Balanced Diet ♥	Click the link to the left to join in the discussion.	5	<u>5</u>	2
	Module 10a – Effects of Smoking ♥	Click the link to the left to join in the discussion.	2	<u>2</u>	1
	Module 10b – Quit Smoking	Click the link to the left to join in the discussion.	2	2	1



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



Video Lecture Library

The content below is outside of the Blackboard Learn environment.

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



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If you have problems viewing this e-mail, please click here »



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 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 6point 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.

Category	Calcium intake	Vitamin D intake	Activity/Exerci se	Other
My goals for the next 4 weeks are:				

Bone Health Goal Attainment

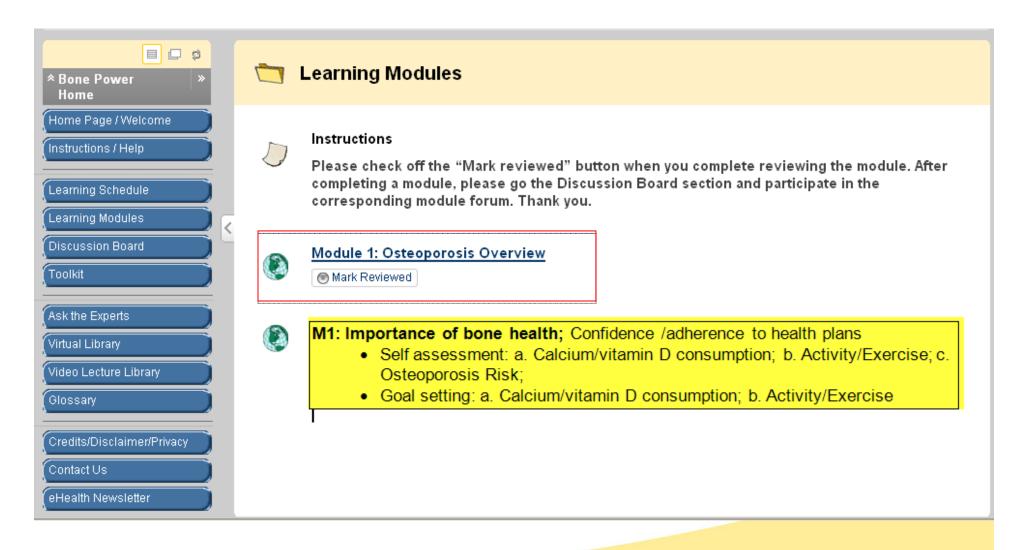
[In Follow Up Survey]

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.

Since the last time I set my goals, I						
	Did not meet the goals	Seldom met the goals	Met the goals slightly less than half of the time	Met the goals half of the time	Met the goals most of the time	Completely met planned goals
Calcium intake						
Vitamin D intake						
Activity/Exercise						
Other (your						
personal goal)						
	If	you coul	d not meet you	r goals, brie	efly descr	ibe
The reasons:						
Plans to meet your goals:						

Intervention Groups: BoneHealth & BoneHealth Plus



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.

Category	Calcium intake	Vitamin D intake	Activity/Exerci se	Other
My goals for the				
next 4 weeks are:				

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.



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

	Calcium intake	Vitamin D intake	Activity/Exercise	Other
My goals for the next 4 weeks are:		*	Y	
Back	Submit			

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)

_	Calcium intake	Vitamin D intake	Activity/Exercise	Other	
BL	milk	ok	will try	Maybe	
Post- Overview	per day	supplement until I get to go out doors into the sun. It has been a looooong winter in MN	attend Yoga class and walk out doors		
BL **	sources of calcium rich foods to incorporate into our meals	vitamin D scores are now,	-walk 30 min/day -do yoga 20 min 3x/wk, focusing on balance stances	remove items fr stairs!	om
Post- Overview	~6oz non-fat yogurt 2x/wk ~calcium supplement 600mg/day ~add 1 serving various greens/day	add 1000mg/day Vitamin D supplement	~Yoga 1hr 4x/wk ~walk 2 mi/day 5x/wk hilly terrain	review bone density with my doctor	,
BL			balancing exercises each	Discuss bone density screenii with physician	ng
Post- Overview	Fat free milk (at least 8 oz 3x/day), green leafy veggies and 500mg calcium	Take 1000 mg vitamin D per day, at least one serving of fatty fish per week	Continue 3 (50 min) exercise classes per week, daily muscle strengthing, gardening and walking	Have scheduled dexascan for Ma 20.	

Bone Health Goals (Intervention Groups)

	000000000000000000000000000000000000000	Calcium intake	Vitamin D intake	Activity/Exercise	Other
BL		milk	ok	will try	Maybe
Post-		1000mg calcium	800 mg vitamin D	attend Yoga class	
Overviev	ſ	supplement per	supplement until I get	and walk out doors	
		day	to go out doors into		
22	HOUSECHES		the sun. It has been a		and the local part of the excellent and control to a transcribe and the local to a trade of the local
			looooong winter in MN		

Bone Health Goals (Intervention Groups)

	Calcium intake	Vitamin D intake	Activity/Exercise	Other
BL	1 cup 2% mile daily	60 min. p/wk outside	walk 3 times p/wk	
Post-	2 cups of milk p/day	1/2 hr. of sunshine	walk 30 min p/day	
Overview		outside		
BL	Calcium supplement	Daily supplement	Yoga	
Post- Overview	1200 mg/ day	1000 IU/ day	disabled)	Use the resources presented here to improve my diet (e.g. Spark People URL).
BL	up calcium intake to 2 pills 1000mg - 1 cup of fat free milk per day	up to 400 iu	20 mins walk daily 20 mins yoga 4 x week	
Post- Overview	get 600 mg from real food- milk, cheese, yogurt other 600 from supplement	add salmon, tuna to diet at least two fish per week	walking 45 mins 5 days week balance exercise 15 mins 3x week	chart food i eat every day
BL	continue one a day vitamins and more calcium foods	continue suppiments and more d richer foods	continue current four days aweek	
Post- Overview	2-3 cups soy milk per day yogurt for breakfast one a day vitamin	vitamin d supplement milk one a day vitamin	swim 1/2 mile twice a week circuit weight train twice aweek physicle therapy once a week	two doctor visits next two weeks
BL	drink 2 8 oz glasses of fat free milk. I already eat cheese, but can cut down on this.	Remember to take my caldum-D supplement daily. Increase to 2 daily	Add at least 2 times weekly to walk at least 2 miles.	
Post- Overview	1200	800	at least 30 minutes of walking or other excersize per day	try to clear obsticles from walking areas in my home

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

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

The RE-AIM framework was modified in our eHealth project.

RE-AIM Framework:

Dissemination Study

Dimension	Modified RE-AIM for Online Study
Reach	The number of individuals reached will be more meaningful than the proportions.
Effectiveness	Effectiveness/efficacy of an intervention
Adoption	Not applicable in this study because the recruitment sites were selected based on convenience.
Implementation	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.
Maintenance	Long-term effects of an intervention on individuals only (the length of the program is limited to the length of our study)

	Course Modules and Contents
	(All modules: (1) External links; (2) Self Assessment Quizzes)
General	Instructions for using the learning modules; Glossaries
WK1	M1: Importance of bone health; Confidence /adherence to health plans
WKI	 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] 55