Exploring the Use of Mobile and Agent-Mediated Social Network Interventions for Weight Loss

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Overview

- Social support and weight loss
- Social support by online social network during 2 remotely delivered 6-month weight loss interventions:
  - POD Study
  - HER Health
- Enhancing social support through agent-mediated social networks
Social Support and Weight Loss
Social Support and Weight Loss

- Chat rooms and discussion forums have been used in prior internet-based weight loss studies.

- Utilization of these features on weight loss websites, however, is often low and receives low ratings of satisfaction from participants.

# Mobile Pounds Off Digitally Study (mPOD): Groups

<table>
<thead>
<tr>
<th>Podcast only</th>
<th>Podcast + mobile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Twice weekly podcasts for 0-6 months</td>
<td>Twice weekly podcasts for 0-6 months</td>
</tr>
<tr>
<td>Monitoring of diet and physical activity using app on mobile device</td>
<td>Group and moderator support via Twitter</td>
</tr>
</tbody>
</table>

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### Baseline Demographics

<table>
<thead>
<tr>
<th></th>
<th>Podcast only</th>
<th>Podcast + Mobile Group</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>n</strong></td>
<td>49</td>
<td>47</td>
</tr>
<tr>
<td><strong>Age (years) (mean ± SD)</strong></td>
<td>43.6 (± 11.7)</td>
<td>42.6 (± 10.7)</td>
</tr>
<tr>
<td><strong>Sex [ N (%) ]</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13 (27)</td>
<td>11 (23)</td>
</tr>
<tr>
<td>Female</td>
<td>36 (73)</td>
<td>36 (77)</td>
</tr>
<tr>
<td><strong>Race, ethnicity [ N (%) ]</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Black</td>
<td>10 (20)</td>
<td>9 (19)</td>
</tr>
<tr>
<td>White</td>
<td>38 (78)</td>
<td>35 (75)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (2)</td>
<td>3 (6)</td>
</tr>
</tbody>
</table>
mPOD Results

P=.88 for time by group interaction

30 minutes of podcasts/week
10 minutes of podcasts/week

Kgs Lost

J Med Internet Res. 2011;13(4):e120.
Pod
@PodStudy Thanks!!

16 Jan

PODStudy
Saw the lion king tonight!!! Just as good as I remembered it!!! Ate dinner out but it was low in cals!!!
16 Jan

PODStudy
@Pod congrats!!!
16 Jan

eedmo
Spent last week in writing workshop. Thought I compensated for the high cal food, apparently not enough. Glad to be back in control.
16 Jan

eedmo
@Pod You are such an inspiration!!
16 Jan

Pod
Just had to buy new pants again - 34 waist now and medium shirts! One year ago I was wearing size 48 waist!
15 Jan

podstudy
Looks like some good recipes Brie! Thanks for passing along
15 Jan

Brie_PODStudy Brie McGrady
15 Jan

J_pod
Have a cold which demotivates me to exercise. Trying to be better about recording foods and tweeting.
15 Jan
What’s Twitter?

- Twitter is an online social networking and micro-blogging site
- Allows users to post updates that are 140 characters or less
- People can follow you and you can follow others
- Public or Private profile
- @ = Mentioning someone on Twitter
- # = Hashtag relates to topics people are following
- RT = Retweet relates to re-posting someone’s Twitter post
Wow, @briemcgrivvy‘s talk at #SCTRObesityRetreat is the best one I’ve ever seen. Please RT!
Who’s on Twitter?

- Are you on Twitter?
- 13% of online adults use Twitter

% of internet users in each group who use Twitter (total and on a typical day)

- White, non-Hispanic: 9% (3% typical day, 6% total)
- Black, non-Hispanic: 25% (11% typical day, 14% total)
- Hispanic: 19% (5% typical day, 14% total)

Pew Internet & American Life Project
Twitter use in the mPOD study

Total posts to Twitter by each participant

2640 posts to Twitter over the 6-month study.
Mean posts and responses per participant

<table>
<thead>
<tr>
<th></th>
<th>0-3 months</th>
<th>3-6 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>Posts</td>
<td>25</td>
<td>10</td>
</tr>
<tr>
<td>Responses</td>
<td>10</td>
<td>5</td>
</tr>
</tbody>
</table>

* Significantly different from 0-3 months; P<0.01
Twitter and Social Support

- Posts to Twitter were coded for type of support:
  - Informational
  - Tangible assistance
  - Esteem support
  - Network support
  - Emotional support
- Posts to Twitter were coded by 3 raters for type of social support.
- Each type was also coded for several different sub-types.
- An additional code for “request for support” was also included.

## Informational Support

<table>
<thead>
<tr>
<th>Support subtype code</th>
<th>Subtype name</th>
<th>Total Posts 0-6 months</th>
<th>% of Total Posts (75.4%)</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>1A</td>
<td>Suggestion/advice</td>
<td>262</td>
<td>10.0%</td>
<td>@PODStudy12 Got an insulated lunch bag? Sure helps w/ healthy eating at work. Good lunch bags avail. at kitchen store at the mall.</td>
</tr>
<tr>
<td>1B</td>
<td>Referral</td>
<td>82</td>
<td>3.1%</td>
<td>@pod_32 if you scroll to bottom of daily food diary page, click RDI field, then you can calculate your recommended daily goal</td>
</tr>
<tr>
<td>1C</td>
<td>Situation appraisal</td>
<td>5</td>
<td>0.2%</td>
<td>About healthy snacks, usually baby carrots or raw almonds no salt, the stone wheat crackers from Trader Joe’s also satisfy crunchy need</td>
</tr>
<tr>
<td>1D</td>
<td>Teaching</td>
<td>1632</td>
<td>62.1%</td>
<td>Buyer beware: I compared reduced fat &amp; full fat feta (same brand) &amp; the red fat had more cals! I got the fat free. I do love a greek salad</td>
</tr>
</tbody>
</table>
Support type

81% Request for support: 81% of teaching posts were status updates: I'm at the gym, ready to work out!

10.1% Emotional: @JanePod Don't feel bad, tomorrow is another day. Eat healthy and make sure to get some exercise!

0.3% Tangible Assistance: @podmember sounds delicious! I just bought some vegan chik tenders from BJs. Haven't tried them yet, but the picture looks good!! :)

6.9% Esteem: @momof3 Good for you!!!

1.3% Network: @Pod45 You seem to run a lot. What week/day of C25k are you on? I am modifying and repeating week 1/day 1 untl I reach success?

10.1% Emotional: @JanePod Don't feel bad, tomorrow is another day. Eat healthy and make sure to get some exercise!

7.4% Request: Guys! Help I fell off the wagon! Too much free food! Bakalava and beer... :( I feel bad.

6.9% Esteem: @momof3 Good for you!!!

1.3% Network: @Pod45 You seem to run a lot. What week/day of C25k are you on? I am modifying and repeating week 1/day 1 untl I reach success?
Twitter engagement and weight loss

- Adjusting for demographics, posts to Twitter significantly predicted % weight loss at 6 months ($B = -0.48, t(46) = -4.9, p < 0.001$).
Engagement

- What predicted use of Twitter over the 6-month study?
  - No
    - Race
    - Gender
    - Initial engagement with Twitter
    - Baseline Twitter user
  - Yes
    - Initial reported weight loss on the weekly surveys ($B = -18.9, t(31) = -2.9, p < 0.01$).

- So does engagement lead to weight loss or does weight loss lead to engagement?
HER Health: Healthy Eating for Reproductive Health

- Remotely delivered 6-month weight loss intervention comparing low-glycemic index vegan diet to a low calorie dietary approach for women with Polycystic Ovary Syndrome who are trying to conceive:
  - Tailored e-mails (on weight loss and dietary behaviors)
  - Weekly lessons
  - Optional: Facebook group

- \( n = 17; 41\% \text{ African-American}; \text{ mean BMI of } 40.5 \pm 6 \text{ kg/m}^2 \)
- Already seeing that signing up for FB is associated with greater weight loss
Next study

- Find ways to make social networks more engaging and to allow objective monitoring of activities and predictors of engagement.
  - **Intelligent Social Agents:** Software-based systems that are autonomous (humans are not required for providing direction), demonstrate social ability (agents interact with one another), and are both reactive (have the ability to perceive their environment and react to it) and proactive (demonstrate initiative and goal-directed behavior).
  - **Recommender Systems:** Software tools that provide suggestions to users that relate to decision making processes (e.g., which exercise to perform or which healthy entrée to purchase).
**Activity 1. Social Engagement & Support**  
Improve feelings of social support around weight loss

- **List one physical activity & one healthy food you ate**
  - Recommender style feedback (Amazon.com)
  - Ex: Others who reported liking to walk in the park also liked walking at this high school track
  - Frequency: Daily

- **Post reviews of new food products or exercises**
  - Recommender style feedback (Amazon.com)
  - Ex: My review of the new Lean Cuisine Chicken and Vegetables Entrée
  - Frequency: As needed

- **Rate reviews that others post**
  - Recommender style feedback (Amazon.com)
  - Ex: I give your review 5 stars
  - Frequency: As needed

- **Developing a social profile on the app for others to view**
  - Similar to Facebook
  - Ex: My favorite exercises video is: My pet's name is:
  - Frequency: In the beginning

- **Viewing others' profiles & commenting on posts**
  - Similar to Facebook
  - Ex: Great job on earning 10 points for checking into the gym!
  - Frequency: As needed

**Activity 2. Increase self-efficacy, self-regulation, and social modeling**  
Increase self-control behaviors and observational learning opportunities

- **Providing feedback on behaviors to increase confidence**
  - App will track completion of social and health-related behaviors
  - Ex: "Congrats on self-monitoring your weight 5 out of 7 days last week.
  - Frequency: As needed

- **Recording your weight, diet intake, and physical activity**
  - App will allow tracking of weight (via wireless scale), dietary intake, and exercise
  - Ex: Viewable graph of weight loss progress
  - Frequency: Daily

- **Viewing activities of other participants and receiving tips**
  - Providing opportunities to see what other activities participants have done that have been successful for them
  - Ex: "I see you managed to exercise 6 out of 7 days last week. Any tips on how to fit this into my schedule?"
  - Frequency: As needed

**Activity 3. Rewards / Incentives**  
Improving feelings of rewards for weight loss behaviors

- **Reward points**
  - Incentive points for health-related behaviors and provision of social support redeemable for prizes each month
  - Ex: You just earned 10 points for posting a review of your gym to the group
  - Frequency: Rewarded for each activity
Collaborations

- mHealth/Social Networks
  - Systems science and modeling
  - Social network analysis
  - In-the-moment prompting
  - Unobtrusive dietary self-monitoring

- Dietary interventions
  - Interest in plant-based eating styles and other studies using therapeutic diets

- Behavioral weight loss programs
  - Innovating in this area
  - Dissemination
The Obesity Society’s eHealth/mHealth Section (EMS)

- Join our section!

**Purpose**
- Rapid advancements in the capabilities of mobile technology and electronic media have greatly increased the possibilities for enhancing the treatment and prevention of obesity. The section will leverage the expertise within The Obesity Society to improve the lives of those affected by obesity by realizing the potential from these new technologies.

- [http://tos-ems.org](http://tos-ems.org)
Questions

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