Development and implementation of a smartphone-based good diet and walking promotion program

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Purpose

Good diet and physical activity are essential to prevent lifestyle-related diseases. However, it's hard to change unhealthy behavior.

The aim of this mixed methods feasibility study was to demonstrate the acceptability and practicality of a smartphone-based health program, which combines a food logging with pedometer steps.
Smartphone based Program: “Balanced Meal and Walk Rally”

We developed “Balanced Meal and Walk Rally” which is a smartphone-based program to induce healthy behavior of adults.

The program combines newly developed food log application on Android smartphone with pedometer record.

Participants were asked to capture and upload each meal image and daily data of pedometer steps for one week.
A remote dietitian evaluated and scored each participant's nutritious balance based on “Japanese food guide” by looking at the food log every day, and gave reports by e-mail.
Diet Evaluation and Scoring

Dietitian counted the number of servings of grains, vegetables, fish and meat, milk, and fruits taken by each participant, compared with the recommended number for the participant’s age, sex, BMI and activity level, and gave a daily score.
Program Steps

Participants set own goal of daily servings, which are based on their BMI and activity level.

Capture and send every meal picture through smart phone

Send daily steps on pedometer through smart phone

Remote dietitian scores each participant's nutritious balance + gives feedback to each participant

After the trial period, calculate scores of each participant and announce winners

Give a feedback report to each participant

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After the trial period, calculate scores of each participant and announce winners

Give a feedback report to each participant
Feasibility Study

Participants: 21 employees in a large manufacturing company were agreed to participate.

<table>
<thead>
<tr>
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<th>30’s</th>
<th>40’s</th>
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Trial period: Nov. 22-28, 2011
Instruction of taking food picture

**Good**

全ての料理が良く映っている。飲み物の内容の記入があればパーフェクト

**Bad**

何が入っているのかわからない

一部分しか映ってない
うさん、主菜のオーバーというのは、たんぶつ質の多く含まれた料理いわゆるメインの料理が馬場さんの目安量よりも2つ分多かったということです。馬場さんの主菜の目安量（このバランスラリーを始めるときに決めた「つ」数です）は一日あたり3つなのでですが、26日は、約5つとったわけです。朝は、ツナで1つ、昼は、やきそばとツナとおかかで約2つ、夕飯（めかじきとしょうがやき）で約2つでした。あくまでも写真とテキストから推測するので、過剰評価になっている恐れもあります（お許しください）、馬場さんの場合1日主菜3つということなので、朝昼夕1つずつとるとのがわか
Walking Steps and Dietary Scores

Steps

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Score

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</table>
Feasibility Study Evaluation

- Questionnaire
  - Subject: All 21 participants

- Semi-structured interview
  - Subject: 10 participants and one dietitian
Did you enjoy participating the program?

Was the program useful to improve your dietary habits?

<table>
<thead>
<tr>
<th>Did you enjoy participating the program?</th>
<th>Was the program useful to improve your dietary habits?</th>
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<tbody>
<tr>
<td>Yes (n=12)</td>
<td>Yes (n=17) 100% (12) Fair(n=2) 0.0% No(n=2) 0.0%</td>
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<tr>
<td>Fair (n=8)</td>
<td>Yes (n=17) 62.5% (5) Fair(n=2) 25.0% (2) No(n=2) 12.5%</td>
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<tr>
<td>No (n=1)</td>
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</table>

Participants, who enjoyed the program perceived it helped to change their health behavior (p<0.05).
The program was effective in evoking participants' intention to improve both their diet and physical exercise.
Participants’ evaluation

• In terms of usability of the smartphone application, nine (49%) felt it was easy to use while six (29%) had some difficulties.

• Fifteen (71%) answered that the dietitian's feedbacks were useful and wanted to get personalized and tailored messages in order to achieve their goal.

Did the feedback comments from a dietitian motivate you?
Qualitative Interview Data

• Interview Subjects: 10 Participants

About Cognitive Change

“The rally made me realize what nutrients are insufficient in my everyday meal.”

“I realized that walking is also important besides intakes of balanced meal.”

“The dietitian’s comments were very helpful and motivated me for good diet”
Conclusion and Further Research Opportunities

• The program was effective in evoking participants' intention to improve their health behavior.

• Further outcome-based assessment is needed to elaborate the program to
  – determine an appropriate length of time and frequency of feedback from the dietitian.
  – Examine opportunities of other health professionals’ intervention.
  – Improve the achievement of the set goal.

• Further improvement of the user interface and usability of the smartphone program is needed.