



Keio University

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CALAMVS
GLADIO
FORTIOR

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

Miki Akiyama PhD, Toru Takebayashi MD, Yuriko Kikuchi Rech PhD

Keio University

Manabu Akaike MSc, Masayuki Hashimoto PhD

KDDI R&D Laboratories

Junko Miura RN

KonicaMinolta Co. Ltd

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.



1日の詳細情報

<< 前日

2011年08月09日 (火)

次の日 >>

食事画像

健康データ

今日のひと言

■ 食事画像

■ 飲み物



食事区分：内食

1日の詳細情報

<< 前日

2011年08月09日 (火)

次の日 >>

食事画像

健康データ

今日のひと言

■ 今日のひと言

投稿者：advisor (2011/08/16 14:05:30) [削除](#) [編集](#)

今日のお昼は海老フライでしたか。衣が厚いとその分油分が多くなりますので、少し衣を残す方が良いでしょう。

Fried shrimps were served for the lunch. To decrease fat intake, please remove deep fry batter.

今日のひと言投稿:

投稿

食事区分：外食

撮影時刻：12:09:56

撮影場所：E139度28分59秒 N35度54分28秒(⇒地図を表示)

画像サイズ：640 x 480

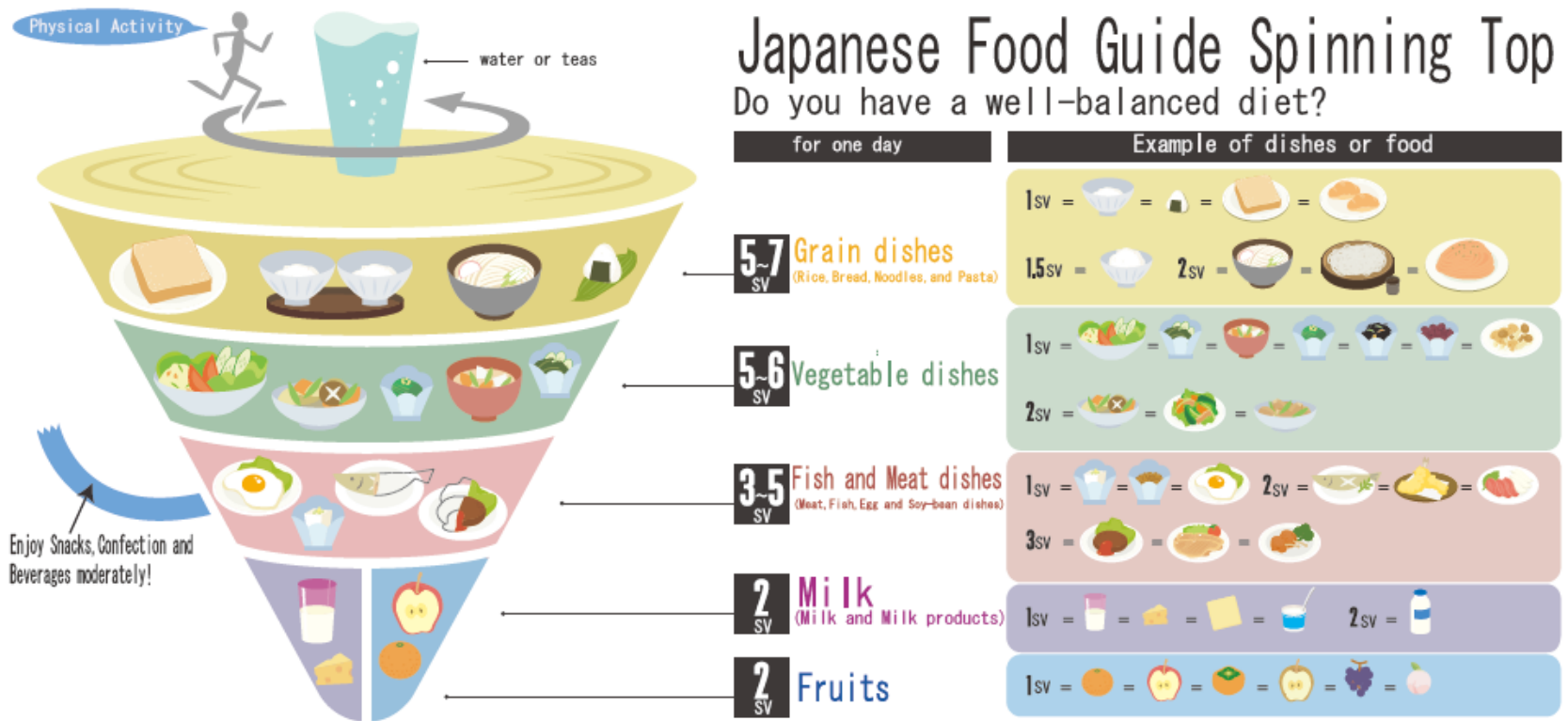
メニュー：情報なし

この画像を削除

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.



Japanese Food Guide Spinning Top

Do you have a well-balanced diet?

for one day	Example of dishes or food
5-7 SV Grain dishes (Rice, Bread, Noodles, and Pasta)	1sv = [bread] = [rice] = [noodle] = [pasta] 1.5sv = [rice] 2sv = [noodle] = [pasta]
5-6 SV Vegetable dishes	1sv = [vegetable] = [vegetable] = [vegetable] = [vegetable] = [vegetable] = [vegetable] 2sv = [vegetable] = [vegetable] = [vegetable]
3-5 SV Fish and Meat dishes (Meat, Fish, Egg and Soy-bean dishes)	1sv = [meat] = [fish] = [egg] 2sv = [meat] = [fish] = [egg] 3sv = [meat] = [fish] = [egg]
2 SV Milk (Milk and Milk products)	1sv = [milk] = [cheese] = [cheese] = [milk] 2sv = [milk]
2 SV Fruits	1sv = [orange] = [apple] = [orange] = [apple] = [grape] = [apple]

※ SV is an abbreviation of "Serving", which is a simply countable number describing the approximated amount of each dish or food served to one person

Decided by Ministry of Health, Labour and Welfare and Ministry of Agriculture, Forestry and Fisheries.

Program Steps

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

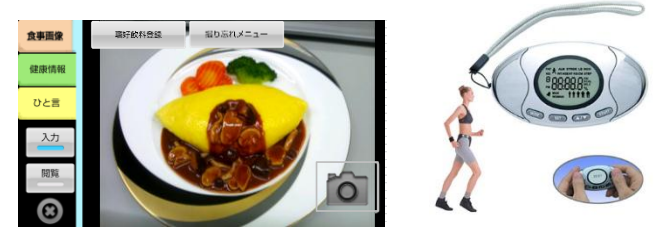
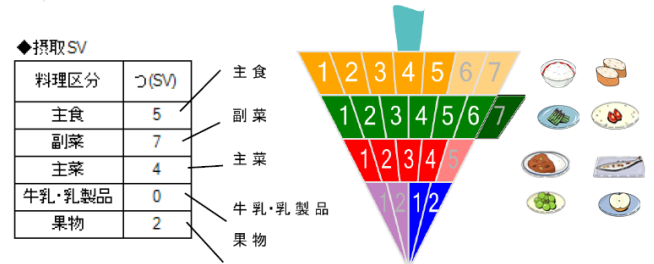
Capture and send every meal picture through smart phone

Send daily steps on pedometer through smart phone

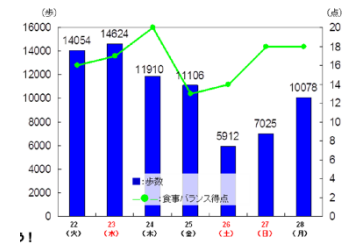
Remote dietitian scores each participant's nutritious balance + gives feedback to each participant

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

Give a feedback report to each participant



Feedback from a dietitian



Feasibility Study

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

Age \ Sex	20's	30's	40's	50's	Total
Female	3	2	2	1	8
Male	5	2	3	3	13
Total	8	4	5	4	21

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

Feedback from a dietitian

11月27日(日)(date_6)

朝



昼



夕

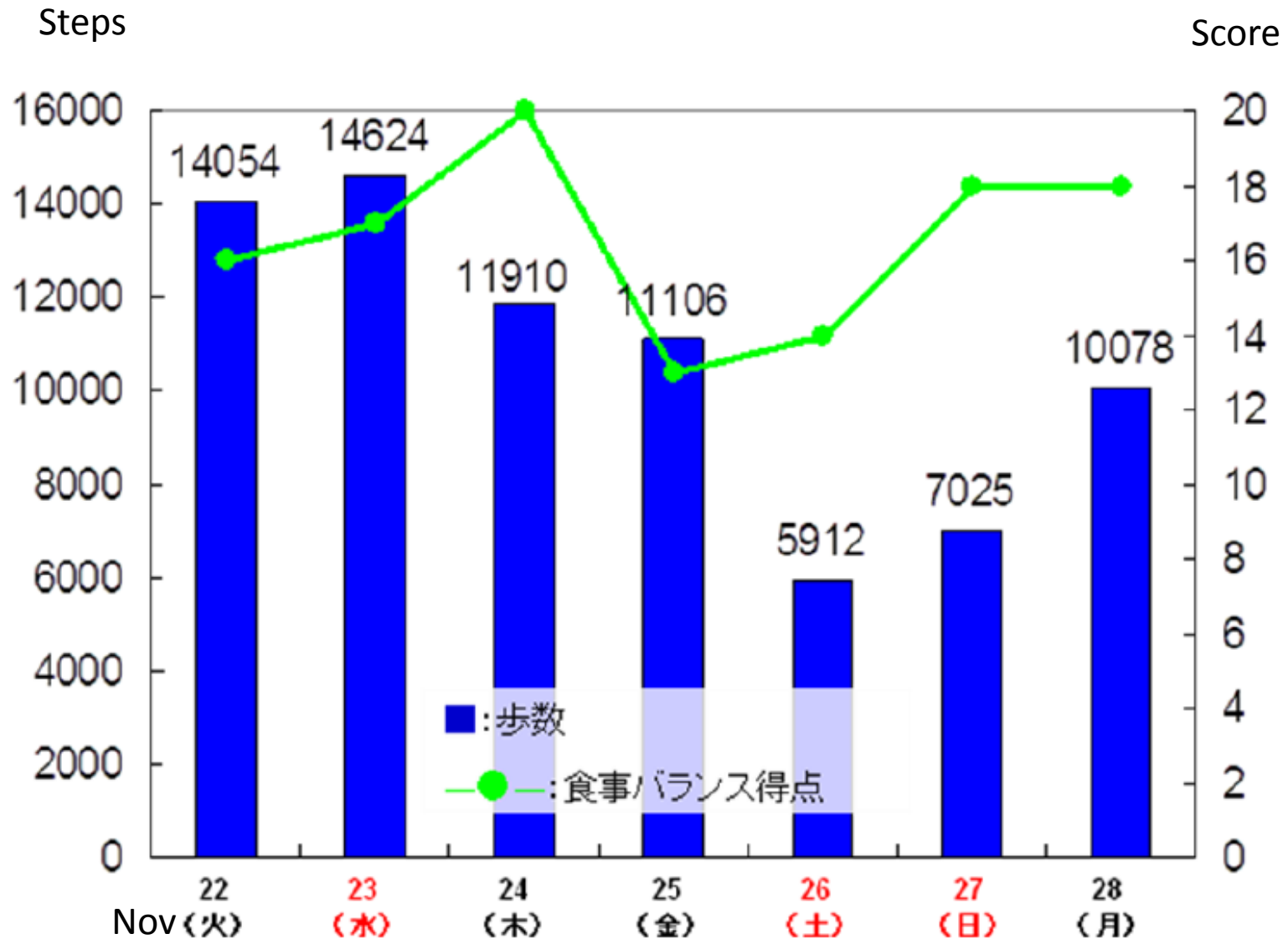


コメント

単位(つ)	あなたの 目安量	実際の 摂取量	差(実際- 目安)
主食	4	4.4	0.4
副菜	5	6.4	1.4
主菜	3	2.8	-0.2
牛乳・乳 製品	2	0	-2
果物	2	4.5	2.5

■さん、主菜二つオーバーというのは、たんぱく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ので約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が(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つずつとるのがわか

Walking Steps and Dietary Scores



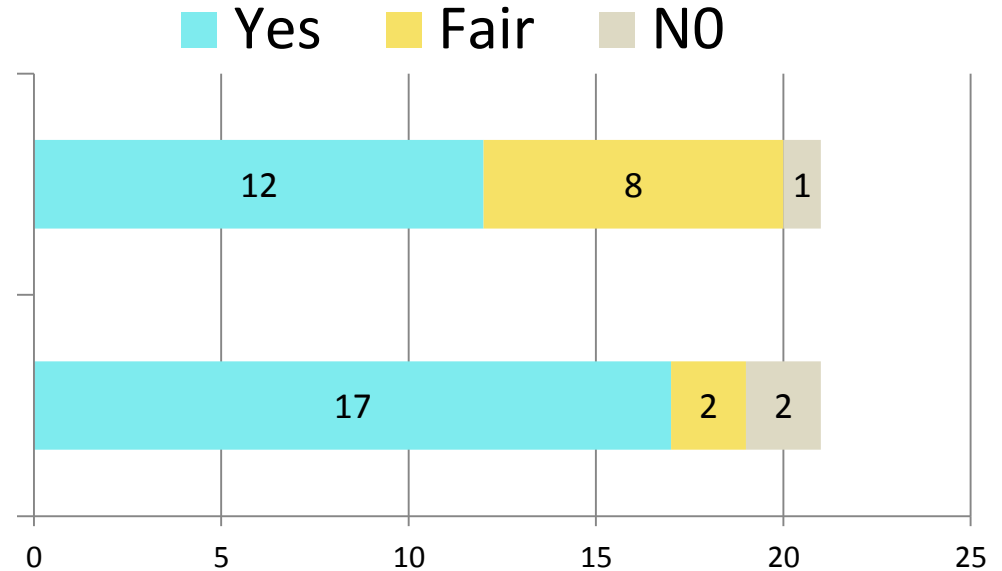
Feasibility Study Evaluation

- Questionnaire
 - Subject: All 21 participants
- Semi-structured interview
 - Subject: 10 participants and one dietitian

Program Acceptance

Did you enjoy participating the program?

Was the program useful to improve your dietary habits?

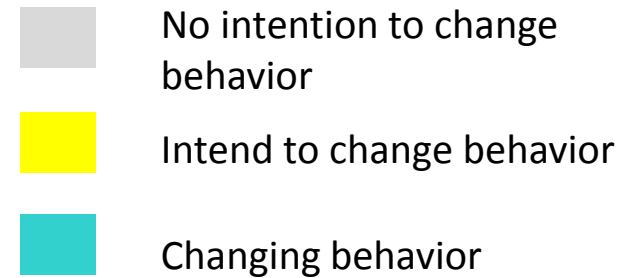
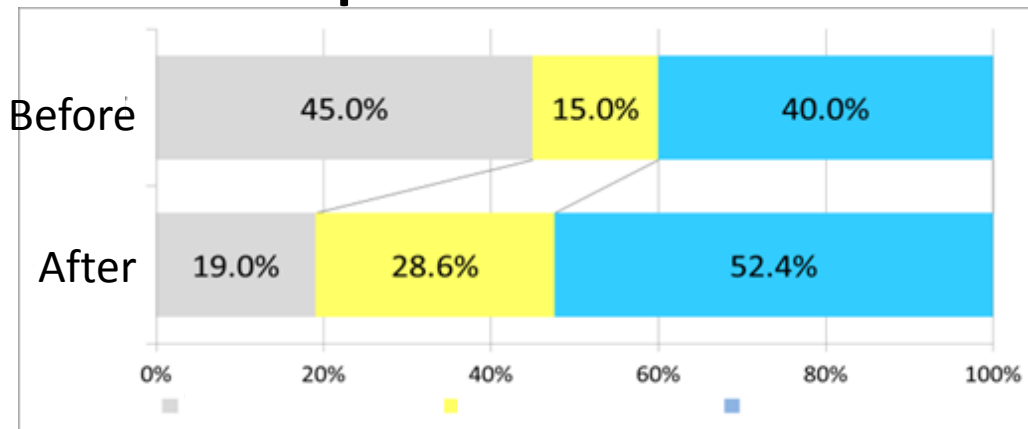


		Was the program useful to improve your dietary habits?		
		Yes (n=17)	Fair(n=2)	No(n=2)
Did you enjoy participating the program?	Yes (n=12)	100% (12)	0.0%	0.0%
	Fair (n=8)	62.5% (5)	25.0% (2)	12.5% (1)
	No (n=1)	0.0%	0.0%	100% (1)

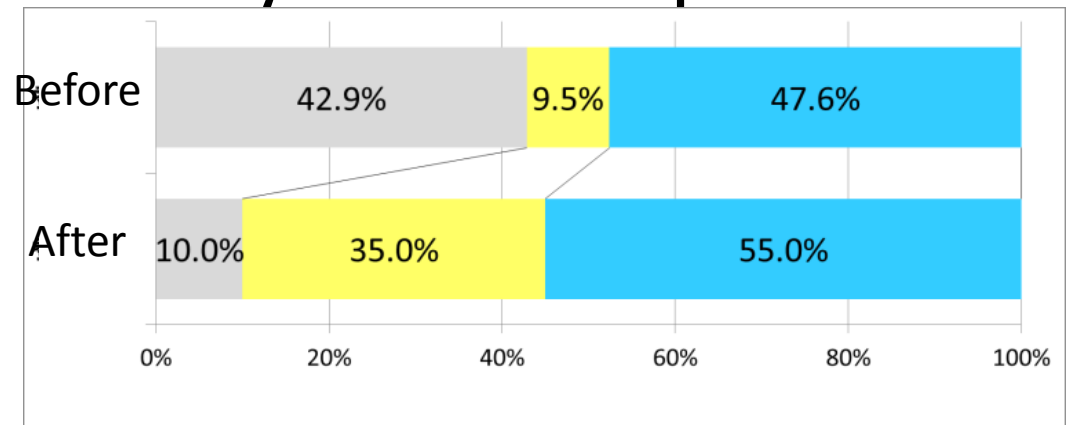
Participants, who enjoyed the program perceived it helped to change their health behavior ($p < 0.05$).

Stage of health behavior change

Diet improvement



Physical exercise improvement

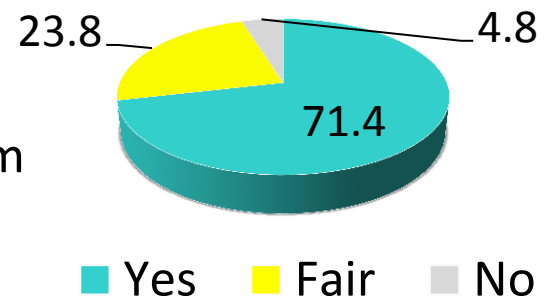


The program was effective in evoking participants' intention to improve both their diet and physical exercise.

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.