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A study group on disease management practices in Japan, organized by Sompo Japan Research Institute Inc., met for the sixth conference in December 2006. Yoshiko Adachi, PhD, Director of the Institute of Behavioral Health in Dazaifu City, presented a lecture on her study of weight reduction support using non-face-to-face, behavioral change programs (referred to as the "Kumamoto Region Study" below), conducted simultaneously in twelve municipalities in Kumamoto Prefecture in 2005 and 2006. After the lecture, Dr. Adachi took questions from the floor.

Dr. Adachi has been studying the application of behavioral therapy in health programs for a long time while working for the local government health administration in Fukuoka. She set up the Institute of Behavioral Health in 1999 and is currently researching health improvements and disease prevention by lifestyle changes[1]. Two non-face-to-face behavioral change programs she developed were used for the Kumamoto Region Study. The background of the Kumamoto Region Study, its development and results based from the lecture, and a summary of discussion among participants at the meeting, are reported here.

Simultaneous support in many areas using non-face-to-face behavioral change programs: the Kumamoto Region Study

Background of the Kumamoto Region Study

The Kumamoto Region Study was simultaneously conducted in many areas with a large number of subjects to assess the effectiveness of two kinds of non-face-to-face behavioral weight control program with the aim of preventing lifestyle diseases[2].

1. Purpose and main research questions

Dr. Adachi established the following three questions for validation by the Kumamoto Region Study.

a) Is simultaneous support in many areas possible by standardizing the support methods?

b) The effectiveness of non-face-to-face, behavioral change programs has been assessed through various research studies, but is it possible to verify that the programs produce similar effectiveness for simultaneous support in across many geographical areas?

Dr. Adachi and other researchers have already performed research to assess the local effectiveness of the non-face-to-face behavioral change programs used in the Kumamoto Region Study. Based on the results of this research, Dr. Adachi pointed out that such non-face-to-face behavioral change programs are particularly effective for subjects who are prepared to change their behavior. The Kumamoto Region Study assessed the effectiveness of implementation of simultaneous support across many different locations using non-face-to-face behavioral change programs, rather than the effectiveness of the non-face-to-face behavioral change programs per se.

c) Is there a difference in effectiveness by applying different types of non-face-to-face behavioral change programs or by adding interviews?

To examine the above, the Kumamoto Region Study was conducted by separating the subjects into four groups by program type, and with or without interviews.

2. Outline of non-face-to-face behavioral change programs

According to Dr. Adachi, the features of non-face-to-face behavioral change programs compared with face-to-face behavioral change programs are as follows.

a) Convenient for practitioners and subjects because of less restriction on time and place.

[1] Institute of Behavioral Health's website (http://www.geocities.jp/adachi_ibh/) (visited Nov. 30, 2007)

[2] Non-face-to-face behavioral change programs are programs to promote change in behavior using communication media — mail, telephone, fax, interactive TV, computer, the internet, email, cell phone, etc., without meetings between health practioners and subjects. Koji Yamatsu, Yoshiko Adachi, Shuzo Kumagai, "*A development, evaluation, and usefulness of non-face-to-face behavioral weight control program*", Journal of Health Science, 2005, vol. 27(in Japanese).

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Table 1 Features and advantages of face-to-face behavioral change programs versus non-face-to-face behavioral change programs

	Face-to-face program	Non-face-to-face program
Definition	Support programs use face to face verbal communication between practitioners and subjects.	Support programs use various communication media, but no face-to-face verbal communication between practitioners and subjects.
Provision of support	Directly from practitioners during interviews.	Via communication media (i.e. mail, telephone, fax, video, computer, the internet, email, cell phone)
Means of information provision	Verbal, non-verbal	Verbal or visual/image-based
Venue to improve lifestyle	Mainly at institutions (medical institutions, health centers, etc.)	Mainly at home
Advantages	• Acquisition of non-verbal information. • Possible to acquire immediate response and feedback. • Significant weight reduction.	• Less restriction on advising time and venues. • Possible to support more subjects per counselor. • Relatively low support costs.

Source: Koji Yamatsu, Yoshiko Adachi, Shuzo Kumagai, *"A development, evaluation, and usefulness of non-face-to-face behavioral weight control program"*, Journal of Health Science, 2005, vol. 27 (in Japanese).

b) Possible to apply to a larger number of subjects.

c) Support costs are relatively low because of reduced costs for staff, venues, and transportation. [Table 1][3].

The Kumamoto Region Study used two non-face-to-face behavioral change programs: "Mastering Your Health (Kenko-Tatsujin): A Weight Reduction Guide" and "Simple Lifestyle Improvement Program", both with development input by Dr. Adachi. The following are the outlines of the two non-face-to-face behavioral change programs.

(1) Mastering Your Health (Kenko-Tatsujin): A Weight Reduction Guide

Mastering Your Health: A Weight Reduction Guide (referred to as the "KTP" below) is a program jointly developed by the Institute of Behavioral Health and Omron Healthcare Co., Ltd., and commercialized in 2000[4].

The KTP is a program where computer software analyzes users' answers to questions and prepares advice for weight reduction according to a users' characteristics, habits, etc. The computer analysis algorithm is partly based on Dr. Adachi's experience and skills in weight reduction counseling in face-to-face behavioral therapy. In the KTP, advice is given twice a month by mail. First, a booklet of information concerning weight reduction and the first questionnaire are sent to participants. The booklet contains the minimum information required, so participants require only a short time to grasp the gist of the program. The questionnaire includes questions on age, gender, work, health conditions, past weight changes, dieting experience, dietary habits, physical exercise and stress. The participants gain an understanding of their current lifestyle by answering the questions and then set their own action targets. The questionnaire procedures are as follows.

a) Answer 29 items concerning dietary habits and physical exercise by choosing one of three choices of: "doing now", "possible with some effort" and "impossible" (for instance "stop eating before becoming full" and "walk a minimum of 40 minutes a day for commuting and shopping").

b) Among the items you have chosen as "possible with some effort", select between three and five as your action targets.

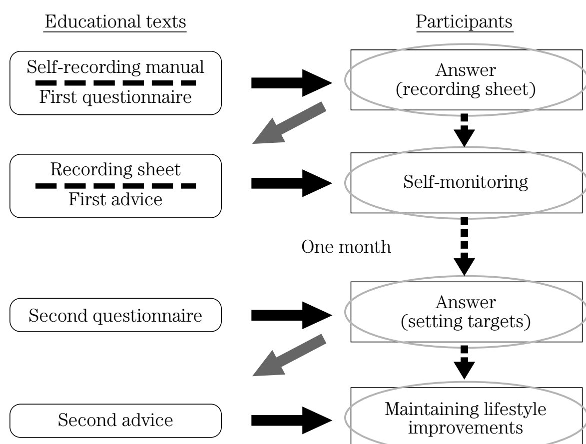
Participants are allowed to set the targets as they wish according to their own circumstances (e.g., the participants can change "walk a minimum of 40 minutes a day" to "walk a minimum of 30 minutes a day"). The participants send completed questionnaires to the information center where a computer analyzes the answers on the questionnaires and prepares written advice for individuals appropriate for their lifestyles and action targets. The participants receive written advice and a self-monitoring sheet (referred to as the "SM sheet" below), in which they fill in their weight and the result of fulfilling selected action targets every day. The participants conduct self-monitoring for one month, in line with the written advice. They receive the second questionnaire one month later. The participants record any changes in lifestyle and weight by answering the questionnaire, and send the completed questionnaire to the information center. The computer analyzes the answers on the second questionnaire and prepares the second written advice to be sent to the participants. This is the end of the program. [Fig. 1 and 2]

Fig.1 Booklet, etc., to be sent with the first questionnaire in the "Mastering your health (Kenko-Tatsujin): a weight reduction guide" program.

[3] *Ibid.*

[4] The following explanation of the programs is based on Dr. Adachi's lecture and Yoshiko Adachi, *"Behavioral therapy for nutritional counseling -- a new computer-based method"*, Clinical Nutrition, 2002, vol. 101, 7 (extra edition)(in Japanese).

Fig.2 "Mastering your health: a weight reduction guide" program flow.



Source: Dr. Adachi's lecture material.

Fig.3 Booklet of "Simple Lifestyle Improvement Program"

(2) Simple Lifestyle Improvement Program

The Simple Lifestyle Improvement Program (referred to as the "SP" below) is a self-help weight reduction program lasting for one month that contains a weight reduction manual and an SM sheet (for weight and action targets). This program is designed for participants wishing to lose weight and to understand their problems related to dietary habits and physical exercise by answering the questions in the manual, to set their own action targets, and conduct self-monitoring. The manual contains practical advice on how to succeed in weight reduction [Fig. 3].

As part of the SP, the manual and a recording sheet are distributed at the beginning of the program; there is no personal support during the program. So the SP is also a non-face-to-face program, like the KTP.

Development of the Kumamoto Region Study

The Kumamoto Region Study not only assessed the effectiveness of non-face-to-face, non-face-to-face behavioral change programs at the time of simultaneous support in many areas, but also examined a system to support the health practitioners (referred to as the "practitioners" below) in carrying out support simultaneously in many regions.

1. Research design and protocol

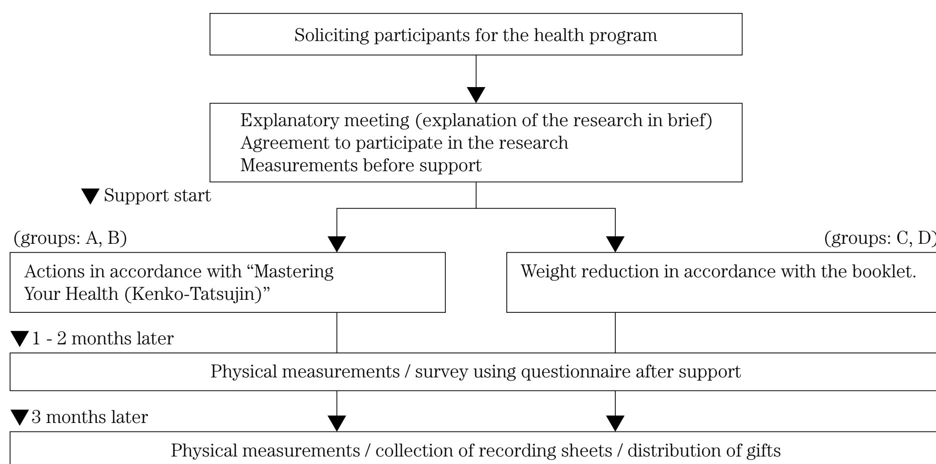
The research was conducted by separating the participants from twelve municipalities into four groups: Group A, KTP + interview; Group B, KTP only; Group C, SP + interview; and Group D, SP only. The inclusion criteria for participants were an age of between 30 and 65, and a BMI (Body Mass Index) of at least 24 (or 22 for people required to lose weight for health reasons). Anybody seriously ill or pregnant was excluded.

The length of the study was three months. At the end of one month and three months from the start of the research, the participants of each group were gathered for physical measurements (height, weight, waist circumference) and to complete a questionnaire (lifestyle)[5]. Items assessed were weight, BMI, waist size, rate of weight reduction from the initial weight, continuity rate and rate of submission of SM sheets [Fig. 4].

2. Support system for the practitioners in other geographical areas

Means were developed to effectively explain programs, research plans and the actions required for the research process to the practitioners working in different regions and to answer any questions from the practitioners. Manuals for the practitioners were prepared for each research process and sample documents required for support were prepared. Dr. Adachi also supported the practitioners remotely by email and by mail, except for the initial explanatory meeting.

Fig.4 Research protocol



Source: Institute of Behavioral Health's website (http://www.geocities.jp/adachi_ibh/kumamoto2.html) (visited Nov. 30, 2007)
Note: "Booklet" means the "Simple Lifestyle Improvement Program" (SP).

[5] Participants were surveyed for one year.

3. Preparations: requesting participation of municipal governments' practitioners and planning

Research preparations began with requesting municipal governments in Kumamoto Prefecture to participate in the research. Before the Kumamoto Region Study, Dr. Adachi provided training to the practitioners of fifty-six municipalities in Kumamoto Prefecture in 2004. To solicit participation in the research, letters explaining the purpose of the research were sent to the practitioners who experienced the KTP during their previous training, with the assistance of the Kumamoto Federation of National Health Insurance Organization. In response to the invitations, the practitioners of fifteen municipalities attended the explanatory meeting, and twelve municipalities decided to participate in the research. One week was given from the day of the explanatory meeting to make a decision to allow the relevant administrative sections of the municipalities, rather than the practitioners alone, to decide whether or not to participate in the research. The practitioners of the municipalities were all public health nurses, except for two national registered dietitians. Dr. Adachi considers that the twelve municipalities decided to participate in the research for the following reasons:

a) The practitioners had already experienced the KTP during their training in 2004 and understood the program.
b) The practitioners were motivated because the letter of invitation stated that the purpose of the research was for the practitioners to participate in the practical training.
c) The practitioners were allowed to decide minor matters concerning the conduct of the research to suit the need of their areas, although they expected to comply with essential research design and protocol described above.

The practitioners of the twelve municipalities who decided to participate made preparations which included devising plans for their municipality, writing public relations materials to promote participation in the research, booking venues for explanatory meetings for the volunteer participants, preparing reference materials and securing the required staff. Detailed manuals were prepared for each step of the preparations. Dr. Adachi and coworkers emailed the practitioners with all information required for each step of the preparations. Specimens of required documents were sent to the practitioners, who changed them to suit their needs; Dr. Adachi went over the revisions. The practitioners were supported by the internet, and were emailed for all of the steps in the research process until the end of the research.

4. Support research: from beginning to end

In response to invitations received from the municipalities, 215 people agreed to participate in the research. The participants were broken down by municipality into four groups [Table 2].

The practitioners met with the participants of each of their municipalities to explain the program. At the explanatory meetings, physical measurements of the participants were taken, they completed a common questionnaire, the practitioners explained the program to them and they were issued with a program kit. The participants were requested to sign a research participation agreement.

Participants in Groups A and C were interviewed individually. Dr. Adachi devised the interview questions. The practitioners asked the questions as they were told to do so. The interviews lasted between five and ten minutes.

After the explanatory meetings, the participants started trying to reach their action targets and to monitor themselves in accordance with their programs (the KTP or the SP). The self-monitoring period for both the KTP and the SP was one month. At the end of this period, extra SM sheets were provided only to the participants who wished to continue with the self-monitoring.

The participants were gathered in venues for their physical measurements to be taken, one month and three months after commencement, as they had gathered for the explanatory meeting. When the participants who completed the program were gathered for physical measurements to be taken at three months following commencement, they were presented with a gift (a choice of toothbrush set, bubble bath or multi-vitamin tablets) to thank them for participating in the research.

Results of the Kumamoto Region Study

All twelve municipalities participating in the research made smooth progress and completed the research program. By the end of the research (at three months), weight reductions and lifestyle improvements were seen in all groups from Group A to Group D.

Dr. Adachi believes that she can answer the following two questions which were set initially, based on the research results, although this was not a precise Randomized Controlled Trial (RCT).

a) Simultaneous support in many areas is possible by standardizing the support method.
b) Similar effectiveness of behavioral change programs can be achieved even when the programs are used simultaneously in many regions.

Concerning the remaining point

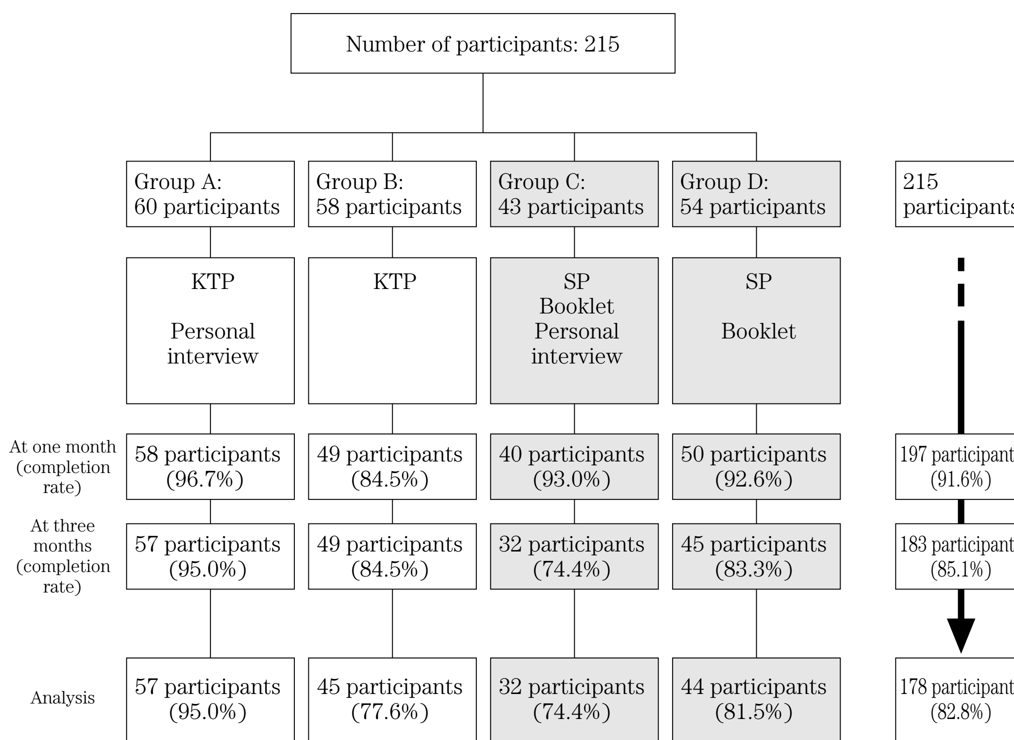
c) Is there a difference in effectiveness by type of behavioral change programs by adding interviews, Dr. Adachi considers that the difference between the groups is not clear enough to reach any conclusion and that more analysis and research are required.

Table 2 Grouping of the participants

Program name	Interview provided/ not provided	Group name	No. of municipalities	No. of participants (See note)	Participants male/female	Average age
KTP	Provided	Group A	3	60 (60)	28/32	48.9
	Not provided	Group B	2	58 (60)	21/37	51.6
SP	Provided	Group C	4	43 (50)	12/31	48.1
	Not provided	Group D	3	54 (50)	12/42	53.1

Source: Prepared by Sompo Japan Research Institute based on reference material attached to Dr. Adachi's report
Note: The numbers in parentheses in the "No. of Participants" column are the numbers of peaple the municipalities sought.

Fig.5 Flowchart of participants



Source: Dr. Adachi's lecture material.
Note: The numbers of the participants stated in the bottom line for "Analysis" are the numbers of participants used as subjects in the analysis of the research results. Participants from who the required assessment information was obtained at the explanatory meeting and at the time of physical measurements at one month and three months became analysis subjects.

1. Results

(1) Completion rate

The percentage of the participants who completed the research program (three months) was 85.1%. The rate for Group A (KTP + personal interview) was the highest among the groups, at 95.0%, which is significantly greater than that for Group B of 84.5%, which received only KTP [Fig. 5]. Based on these results, Dr. Adachi considers that interviews may be effective in raising the completion rate of the participants. Taking into consideration that the interviews provided for the research lasted for about between five and ten minutes and that the program was explained mainly at the interviews, Dr. Adachi thinks that brief interviews to ensure that participants understand the program are sufficient.

(2) Effectiveness in weight reduction and changes in lifestyle

Effectiveness in weight reduction

Effectiveness in weight reduction was seen for all groups at one month (Group A: -0.7kg, Group B: -1.0kg, Group C: -0.7kg, Group D: -0.9kg), but there was no statistically significant difference between them. Effectiveness in weight reduction during the period between one month and three months was seen in all groups (Group A: -0.8kg, Group B: -1.0kg, Group C: -0.8kg, Group D: -0.2kg), but there was no significant difference between them. Concerning Group B (KTP) and Group D (SP), neither of which received interviews, the effectiveness in weight reduction of Group B was greater than that of Group D, which means that there was a difference in effectiveness between the programs. There was no significant difference between the effectiveness in weight reduction of Groups A and B, both of which used the KTP, meaning that the interviews conferred no significant benefit. On the other hand, comparing Group C with Group D, both of which used the SP, the weight reduction of Group C, which received interviews, was significantly greater than that of Group D [Fig. 6]. In addition to changes in weight, BMI and waist size also improved for all groups.

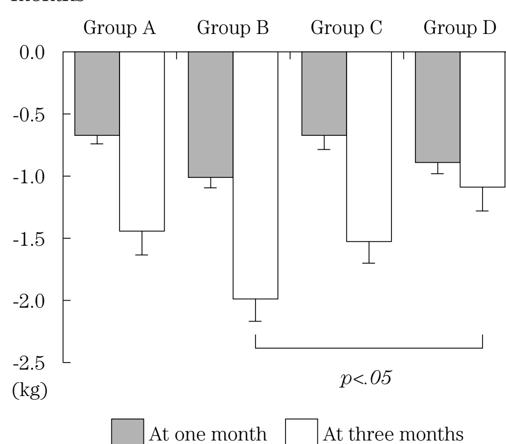
Changes in lifestyle (dietary habits and physical exercise)

At three months, overall, 16 of the 18 assessment items concerning dietary habits and 7 of the 10 assessment items concerning physical exercise improved.

(3) Developing a system for simultaneous support in many regions

As stated earlier, setting up a support system for the practitioners to enable simultaneous support in many areas was one of the criteria researched. Dr. Adachi gave the following reasons as to why all of the twelve municipalities were able to complete the research program with

Fig.6 Changes in weight for each group at one month and three months



Source: Dr. Adachi's lecture material.

explanations and communications using the internet and email, and without meetings.

a) The preparation and actions to be performed by the practitioners were clearly explained in e-mails which were sent without fail.

b) Work procedures were designed to be sent sequentially, and only the work procedures required immediately were provided at each communication .

c) Minor matters concerning the conduct of the research were left to the discretion of the practitioners.

2. Issues pointed out by Dr. Adachi, taking into consideration the Kumamoto Region Study

Dr. Adachi pointed out the following as still outstanding issues. First of all, behavioral change programs need to be made both effective and practical. To promote adoption by insurers, the programs must be economical and practical. Users must have the willingness, knowledge and skills to gain most benefit from the programs, so they should be motivated somehow. If the a practitioner are assigned to motivate the users, they must receive training and drills.

Secondly, the following four points are required, assuming it is possible to improve health by using information appropriately.

a) Content quality (trustworthiness, usefulness, convenience and satisfaction).

b) Information technology quality (setting up a system for the content and the means of communication).

c) Economical features (costs of development and maintenance, and reasonable pricing).

d) Ethical considerations (safety, medical services, protection of personal information).

Summary of discussion at the meeting

At the meeting, based on Dr. Adachi's lecture, discussion was held concerning the significance and effectiveness of non-face-to-face behavioral change programs and other issues raised by the Kumamoto Region Study where simultaneous support in many areas was examined. The following is a summary of select opinions expressed during the discussion.

1. Efficient use of health practitioners

- In the programs reported, the work to be done by health practitioners is mainly preparation, explanation of the programs, and personal interviews, which is highly leveraged compared with the amount of work required for ordinary health guidance where health practitioners provide advice to individuals. This is considered to be desirable because health practitioners are currently overloaded with work.
- There is trade-off between a reduction of health practitioners' work by outsourcing support to improve lifestyles, and the cost of such support. If health practitioners' work is reduced by non-face-to-face behavioral change programs, which require less support cost, efficiency will be improved.

2. Motivation of recipients of health guidance (participants)

- It is generally difficult to motivate people who are not very enthusiastic. For these people, the SP which allows more flexible choices may be more effective because they will feel less restricted.
- There must be people who will benefit from even modest support. Motivation of people is important for improvements in their lifestyle. When grouping people to provide support, not only their health risks, such as medical examination data, but also their behavioral transition stages and their mental state should be considered.

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