

Study of a Weight-loss and Body Fat Rate Reduction Program for Mentally Retarded Children in Japan

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Abstract

The purposes of this present study were (1) to modify the program of Anthony F. Rotatori's group into a program that is adjusted for Japanese children with mental retardation, and (2) to confirm the effectiveness of not only the modified weight-loss program, but also a body fat rate reduction program. Four subjects in the experimental group and two subjects in the control group selected for this study were all above 160 of Rohrer index and 20% of fat degree. The first phase of the experiment was from June 18 to October 12, 1997, and the second phase was from October 13 to December 7, 1997. Subjects were intervened in the experimental group only in the second phase.

This modified program design in Japan, based on that of Rotatori's group, is estimated to be ineffective in controlling the weight of mentally retarded children within a short period of time. This program design, however, is effective in controlling the body fat rate of mentally retarded children within a short period of time.

Key Words: obesity, mental retardation, weight, body fat rate

Introduction

Concerning investigations of obesity among mentally retarded children, previously reviewed by Azuma & Ito (2002), 17 studies in total were found to have been carried out in Japan, and among these, 7 studies describe the prevalence of obesity among mentally retarded children in Japan. The accuracy of these estimates of the prevalence of obesity, however, is unclear because the methods of measuring obesity and the number and ages of the participants varied. On the other hand, 20 studies done in the U. S. were found, and among these, 9 studies focus on the effectiveness of the behavioral weight-loss program that was conducted by Anthony F. Rotatori's group. An important issue is to verify

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whether this program could be effective if it were applied in Japan. In addition, Rotatori's group did not measure the body fat rate of subjects because they did not have the vital impedance method. An important issue is to verify whether this program could be effective for not only weight-loss but also in body fat rate reduction.

The reasons that the authors chose the program of Rotatori's group are as follows :

- (1) In Japan, very few studies have been published that describe the prevalence of obesity among mentally retarded children, and the accuracy of these estimates of the prevalence of obesity is unclear.
- (2) Outside Japan, studies of Rotatori's group were mostly in regards to obesity among mentally retarded children.
- (3) The effectiveness of the behavioral weight-loss program that was conducted by Rotatori's group was clearly shown.
- (4) The program of Rotatori's group was considered a safe one for the subjects of the study, because neither special materials nor abnormal food therapies were used.

The two-fold purpose of this present study was (1) to modify the program of Rotatori's group into a program that is adjusted for mentally retarded Japanese children, and (2) to confirm the effectiveness of the modified weight-loss program, and also a body fat rate reduction program.

Method

1. *Subjects*

We selected 7 students at a school for mentally retarded children in Japan who were scored over 160 of Rohrer index and 20% of fat degree. We asked their parents to permit their children to be subjects for this study. 4 parents of students agreed that their children could participate in the program and they were subjects in the experimental group. 3 parents of students declined to permit their children to participate in the program but they had agreed that students' height, weight and body fat rates could be measured, and they were included in the control group. Shortly after this study had begun, a student in the control group was diagnosed with a liver dysfunction and he was thus dropped from this study. 2 students remained as subjects in the control group. Fundamental data of the 4 students in the experimental group and the 2 students in the control group are shown in Table 1.

2. *Procedure*

The outline of the program of Rotatori's group (Rotatori, Fox & Mauser, 1981) is as follows :

- (1) One of the primary causes of obesity is inappropriate behavior, for example, insufficient daily activity, low cognition of overeating, and various inappropriate

Table 1 Subjects

Disorder	Sex	Age	I. Q.	S. Q.	Height(cm)	Weight(kg)	Body fat rate(%)	Rohrer index	Fat degree(%)	
Experimental group										
A	M. R.	M	10	-	55	124.9	33.6	35	167.3	33.0
B	Down S.	M	10	30	26	122.5	32.7	27	187.7	43.4
C	M. R.	M	12	18**	25	151.4	56.8	38	165.4	37.6
D	M. R.	F	14	74	-	162.5	75.5	45	179.0	45.5
Control group										
E	M. R.	F	10	-	66	133.6	38.9	26	163.1	33.2
F	M. R. with A *	F	13	15**	23	157.0	78.3	40	202.3	63.8

*: Autism **: D. Q.

eating habits.

- (2) The purpose of this program is mainly to encourage teachers to change behaviors of the students' eating habits in order to help them lose weight and maintain their lower weight.
- (3) Before the program is begun, teachers observe and write down eating habits of participants in order to plan the program, and choose the habits to be changed. After that they explain the planned program to the parents.
- (4) The program is divided into three stages. The first is the treatment stage, the second is the maintenance stage and the third is the follow-up stage.
- (5) As homework, participants write down what foods they have eaten, record their weight every day and evaluate the trained habits.
- (6) Based on the evaluation, rewards are given as reinforcement, for example, bowling trips, dances, and picnics with parents.

The experiment was conducted from June 18 to December 7, 1997, and was divided into two phases. The first phase was from June 18 to October 12. Intervention of subjects was not done either in the experimental group or the control group, and only their weight and body fat rates were measured, on June 18, July 18, August 22 and September 16. The second phase was from October 13 to December 7, 1997. Weight and body fat rates of subjects were measured both in the experimental group and the control group on October 16, November 5 and December 1. Weight and body fat rates of all subjects were measured by the weight scale and the vital impedance method, TBF-511 made by Tanita Corporation at around 10:00 a. m. each time.

The program to intervene subjects was begun only in the experimental group in the second phase, that is, after October 13. As in the first phase, intervention in the second phase was not done in the control group subjects.

Before the second phase was begun, the following survey for the experimental group

was conducted in order to plan the program and choose the habits to be changed.

This survey was conducted based on (3) of the outline of the program of Rotatori's group that is previously mentioned :

- (1) Time schedule, for example, the time when they wake up and the quantity of food in their home. The survey was conducted for two days.
- (2) Total thermal quantity throughout the day was measured by Calorie Counter Select 2 made by Suzuken Company. The survey was conducted in both school and at home for one week.
- (3) Questionnaires about eating habits that were completed by the students' mothers were checked.
- (4) Based on data of (1), (2) and (3), trial programs were planned for each individual subject and were described to the students' mothers.
- (5) The programs were revised based on their mothers' opinions, and were then finalized.

The programs are different for each subjects, because each of the subjects have different eating habits, respectively. As space here does not permit all the main programs to be shown for each of the 4 subjects in the experimental group, one program for subject A in Table 1 is shown below as an example :

First week :

- (a) Subject A eats meals only three times per day—breakfast, lunch and supper. He eats a snack only one time per day.
- (b) As a snack he eats a small portion of noodles, rather than a large portion.
(In Japan noodles are a popular snack.)

Second week :

- (a) Pattern of the first week continues.
- (b) Before eating he drinks one cup (100 cc) of water.
- (c) He does not drink water while eating, because when he drinks water with food he eats too much.

Third week :

- (a) Patterns of the first and second week continue.
- (b) Soda pop is diluted in half by water or ice.

Fourth week :

- (a) Patterns of the first, second and third week continue.
- (b) Eating noodles as a snack is forbidden.
- (c) Subject A does not drink soda pop, but rather drinks tea without sugar.

Fifth week :

- (a) Patterns of the first, second, third and fourth week continue.

Sixth week :

(a) Patterns of the first, second, third, fourth and fifth week continue.

Seventh week :

(a) Patterns of the first, second, third, fourth fifth and sixth week continue.

Eighth week :

(a) Patterns of the first, second, third, fourth, fifth, sixth and seventh week continue.

No intervention was done for two subjects in the control group, and only their weight and body fat rate were measured, on the same day and time when subjects in the experimental group were measured.

We calculated two kinds of slopes of regression lines of weight and body fat rate, "before program" and "during program" based on days included along the X axis. The "before program" indicates the first phase, from June 18 to October 12. The "during program" indicates the second phase, from October 13 to December 7. If the slope of regression line is positive, it indicates that weight and body fat rate increase, and if the slope is negative, it indicates a decrease. We then subtract slopes of regression lines of weight and body fat rate "before program" from these "during program." If the difference between "during program" and "before program" was positive, the slope of the regression line "during program" is more than that "before program". Reversely, if the difference was negative, the slope of the regression line "during program" is less than that "before program".

Results & Discussion

The weights of subjects are shown in Figure 1. As observed in Figure 1, weights of subjects in both experimental and control groups were not changed before and during the program.

The slopes of regression lines of the weights are shown in Table 2. As observed in Table 2, before the program, three slopes of regression lines of weight of subjects were positive and one slope was negative in the experimental group, and two slopes were positive in the control group. During the program two slopes were positive and two slopes were negative in the experimental group, and two slopes were positive in the control group. Three differences between "during" and "before program" were negative and one difference was positive in the experimental group, and one difference was negative and one difference was positive in the control group.

Therefore, this experimental program design is estimated to be ineffective in controlling the weight of mentally retarded children within a short period of time.

The body fat rates of subjects are shown in Figure 2. As observed in Figure 2, body fat rates of subjects in both experimental and control groups increased "before program". During the program, body fat rates of subjects in the experimental group decreased and

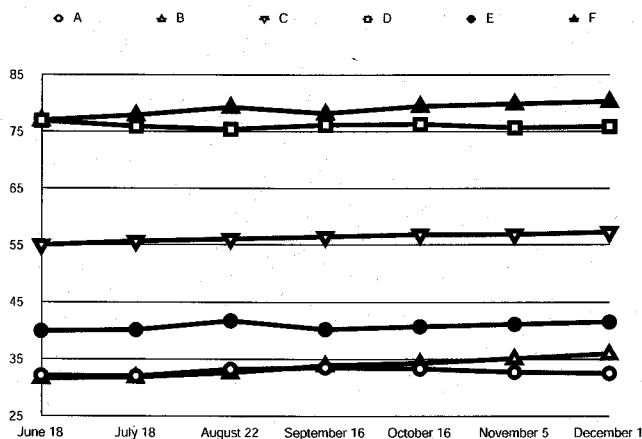


Fig. 1 W eight

Table 2 Slopes of Regression Lines of Weight

Group	Subject	Before Program	During Program	During Program – Before Program
Experimental	A	0.013	-0.017	-0.030
	B	0.025	0.035	0.010
	C	0.015	0.009	-0.006
	D	-0.003	-0.008	-0.005
Control	E	0.006	0.017	0.011
	F	0.018	0.017	-0.001

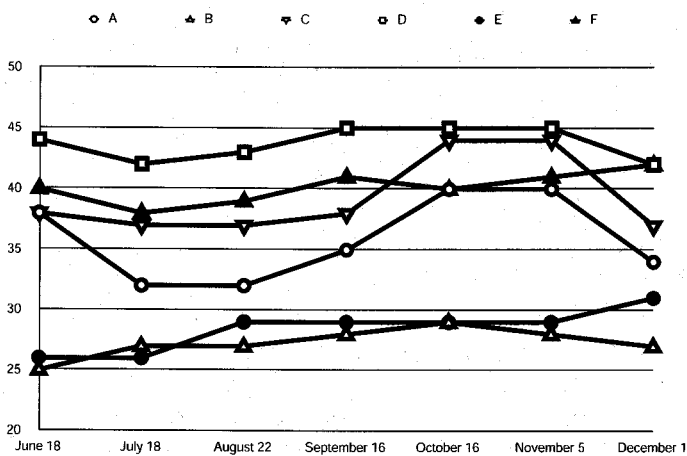


Fig. 2 Body fat rate

body fat rates in the control groups increased.

The slopes of regression lines of the body fat rates are shown below in Table 3. As observed in Table 3, before program slopes of regression lines of body fat rates of all subjects in both experimental and control groups were positive. During the program, slopes of all subjects in the experimental group were negative, and slopes of all subjects in the control group were positive. All differences between "during" and "before program" were negative in the experimental group, and all differences were positive in the control group.

These results show that this experimental program design is effective in controlling the body fat rate of mentally retarded children within a short period of time.

Table 3 Slopes of Regression Lines of Body Fat Rate

Group	Subject	Before Program	During Program	During Program – Before Program
Experimental	A	0.021	-0.135	-0.156
	B	0.030	-0.043	-0.073
	C	0.042	-0.158	-0.200
	D	0.016	-0.068	-0.084
Control	E	0.031	0.045	0.014
	F	0.010	0.043	0.033

Conclusion

This modified program design in Japan, based on that of Rotatori's group, is estimated to be ineffective in controlling the weight of mentally retarded children within a short period of time. This program design, however, is shown to be effective in controlling the body fat rate of mentally retarded children within a short period of time.

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