

HEALTH INTERVENTION PROTOCOLS FOR LIFESTYLE DISEASE PREVENTION IN JAPANESE ELEMENTARY SCHOOL CHILDREN

Katsuyuki YAMASAKI* and Seiji FUJII**

Keywords: lifestyle disease, universal prevention, non-insulin-dependent diabetes mellitus (NIDDM), coronary heart disease (CHD), elementary school children

Paralleling trends in other developed nations, Japan has seen a rise in the prevalence of certain diseases, especially cancer and non-insulin dependent diabetes mellitus (NIDDM) that are associated with certain lifestyles, and expects that the incidence of another lifestyle disease, *i.e.* coronary heart disease (CHD), will also increase rapidly in the near future. The difficulty of treating these diseases in adults highlights the importance of health interventions during childhood. Schools have several features that make them an ideal environment for prevention programs. For example, a large number of children can be targeted at the same time, and school environments such as regular lunch time and safe playgrounds are particularly useful for program implementation. Furthermore, the social setting of a school facilitates meaningful interactions among children.

Principal causes of the increasing prevalence of lifestyle diseases include unhealthy choices regarding nutrition and physical activity. Sleep habits are also crucial because poor sleep habits can have an adverse impact on nutrition and physical activity. While certain physical or physiological conditions are often observed just before the emergence of lifestyle diseases, psychological characteristics such as personality, cognition, affect (emotions), and behavior may be more fundamentally responsible for the development of these diseases (see Figure 1).

For instance, persons with a Type A personality (Friedman & Rosenman, 1959) characteristically exhibit a set of behaviors that include impatience, hard working habits, and hostility. Type B personality is essentially the opposite concept of Type A. Figure 2 shows a higher number of CHDs for subjects with a Type A personality than for subjects with a Type B personality during the first eight years of Rosenman, Brand, Jenkins, Friedman,

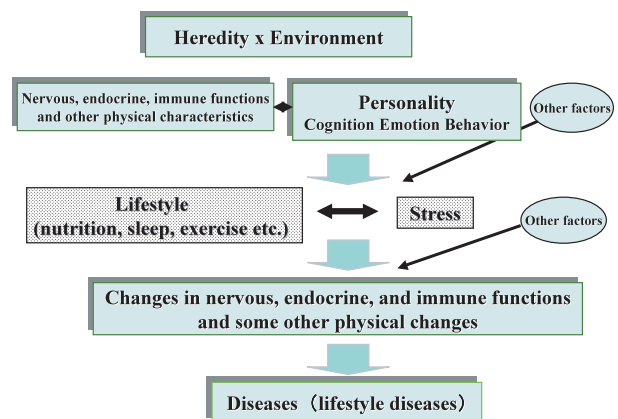


Figure 1. Schematic diagram of the interrelationship of factors affecting the development of lifestyle diseases.

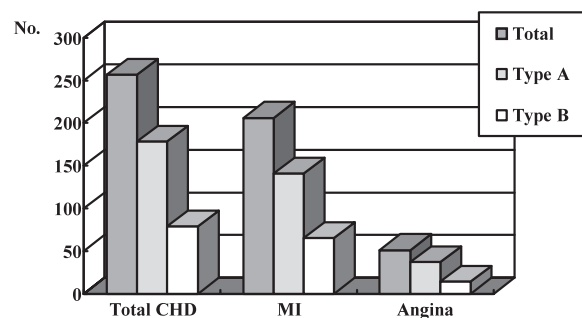


Figure 2. Number of subjects with coronary heart disease (angina and myocardial infarction), comparing Type A and Type B personalities. Adapted from Rosenman, Brand, Jenkins, Friedman, Straus, and Wurm (1975). CHD: Coronary Heart Disease. MI: Myocardial Infarction.

Straus, and Wurm's (1975) study. Cancer personality (e.g., Grossarth-Maticek, Eysenck, & Vetter, 1988) represents another example of a set of personality characteristics associated with an increased risk of disease. People

*Department of Human Development, Naruto University of Education, Tokushima, Japan

**Gakushima Elementary School, Tokushima, Japan

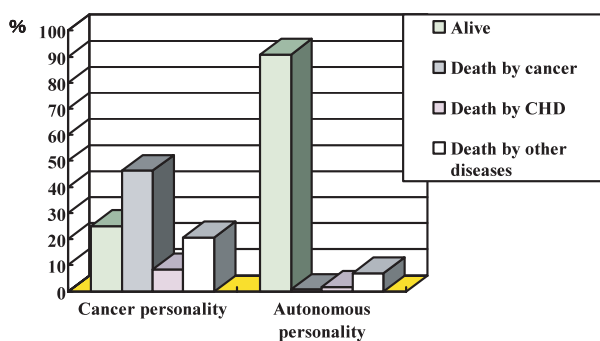


Figure 3. Mortality outcomes for cancer and autonomous personalities. Adapted from Eysenck (1987).

who have a cancer personality tend to suppress emotions and to be passive and dependent. Subjects with a cancer personality died from cancer more frequently than subjects having autonomous healthy personality during the first ten years of Eysenck's (1987) study (see Figure 3).

Prevention Programs in Japan and the United States

We therefore have been developing and implementing several universal prevention programs emphasizing psychological characteristics as fundamental causes of health or adaptation problems. We previously have developed nine programs that share common features, which collectively we have called PHEECS, Psychological Health Education in Elementary-school Classes by Schoolteachers (see Yamasaki, 2000). Common features are as follows: (1) the programs are based upon scientific empirical data and studies; (2) the programs are developed using various psychological and hygienic theories and techniques; (3) evaluation of the effectiveness of the program intervention is conducted using objective and scientific methods; (4) programs are applied to school classes educationally and preventively; (5) the characteristics targeted in the programs are minor distortions in personality and behavior (including emotions and cognition) that are not yet considered serious; (6) the prevention targets are reduction in mental and physical stress as well as decreases in maladaptation and diseases; (7) programs are not applied to adults, but to children; and (8) schoolteachers can learn the methods utilized in these programs without extensive training.

At present, eight of these PHEECS programs have been developed for elementary-school and junior-high-school students: the Aggressiveness Reduction Program, the Dependent and Passivity Personality Modification

Program, the Autonomy Enhancement Program, the Interpersonal Stress Reduction Program, the Sleep Habits Improvement Program, the Prevention of Depression Program, the Prevention of Lifestyle Diseases Program, and the Prevention of Delinquency and Crime Program. Two of the programs in this list target prevention of specific diseases: the Prevention of Depression Program and the Prevention for Lifestyle Diseases Program. The present paper describes the Prevention of Lifestyle Diseases Program.

Unlike in Japan, numerous prevention programs have been developed for children in the United States. For example, for CHD prevention, one of the more extensively studied programs is CATCH (Child and Adolescent Trial for Cardiovascular Health; e.g., Perry, Stone, Parcel, Ellison, Nader, Webber, & Luepker, 1990). For NIDDM prevention, the Bienestar Health Program (Trevino, Pugh, Hernandez, Menchaca, Ramirez, & Mendoza, 1998), Jump Into Action Program (Holcomb, Lira, Kingery, Smith, Lane, & Goodway, 1998), the Quest Program (Cook & Hurley, 1998) are well known. For cancer prevention, High 5 (Reynolds, Raczynski, Binkley, Franklin, Duvall, Devane-Hart, Harrington, Caldwell, Jester, Bragg,

Table 1. Prevention Methods in CATCH (Adapted from McGraw, Stone, Osganian, Elder, Perry, Johnson, Parcel, Webber, & Luepker, 1994)

Intervention Component	Name of the program	Grade
Classroom curriculum	The Adventures of Hearty Heart and Friends (Perry et al., 1989)	3
	GO for Health 4	4-5
	GO for Health 5 (Simons-Morton et al., 1988)	
	F.A.C.T.S. for 5 (Perry et al., 1989)	5
Physical Education	CATCH PE (Parcel et al., 1987)	3-5
School Environment	Eat Smart School Nutrition Program (Nicklas et al., 1989)	3-5
	Smart Choices (Parcel et al., 1989)	4-5
Families	Home Team Programs: Hearty Heart Home Team, Stowaway to Planet Strongheart, Health Trek, Unpuffables (Parcel et al., 1987)	3-5
	Family Fun Nights: Hearty's Party Celebration Strongheart (Nader et al., 1989).	3-4

& Fouad, 1998) is popular, coming from the 5 A DAY for Better Health Initiative (e.g., Havas, Heimendinger, Reynolds, Baranowski, Nicklas, Bishop, Buller, Sorensen, Beresford, Cowan, et al., 1994).

Table 1 shows the program structure of CATCH, identifying various programs developed in prior studies. The CATCH program has various intervention components which have been implemented for third to fifth graders in order to prevent CHD. Thus far, a few studies have been conducted to evaluate the effectiveness of the CATCH program. For instance, a study by Edmondson, Parcel, Perry, Feldman, Smyth, Johnson, Layman, Backman, Perkins, Smith, and Stone (1996) involved 24 elementary schools (14 intervention and 10 control schools) in each of the four study cities (Austin, San Diego, Minneapolis, and New Orleans). Thus, a total of 96 schools (56 intervention and 40 control schools) comprising more than 6,000 children, third to fifth graders, participated in this study. This study demonstrated the effectiveness of the CATCH program through its strict study design in which schools served as the primary unit of analysis.

General Description of the Program

Our Prevention of Lifestyle Diseases Program has several original characteristics. First, the program is implemented using various opportunities such as class hour, lunch time, recess time, and contacts with families. Second, various psychological theories and techniques are utilized in the program, for the purpose of modifying mental and behavioral characteristics influencing health. Third, this program provides the options of utilizing each of the program components separately or in flexible combinations. Lastly, the effectiveness of the program is evaluated using scientific methods.

Theories and Techniques Utilized in the Program

Table 2 outlines the various theories and techniques

Table 2. Theories and Techniques Involved in the Program

Fundamental or remedial theories	Social cognitive theory, Conditioning theory, HBM, Applied behavioral analysis, Cognitive and behavioral therapy, Client-centered therapy, etc.
Concrete techniques	Brain storming, Group discussion, Debate discussion, Role playing, Modeling, Social skills training, Relaxation, Structured encounter group, etc.

utilized in this program. In a sense, our program represents a mosaic of theories and techniques. Our experience is that lifestyle modification programs at schools such as ours should be developed flexibly using a variety of suitable theories and techniques, the choice of which is dependent on program purposes and classroom conditions. In most cases, reliance upon a single fixed theory or technique will prevent a program from achieving maximum effectiveness.

One of the principal theories behind this program is Social Cognitive Theory (e.g., Bandura, 1986), which emphasizes personal cognitive factors such as self-efficacy. Self-efficacy represents the child's assessment as to the likelihood that he or she will successfully complete an intended behavior. Thus, enhancing self-efficacy is beneficial towards successfully modifying a behavior.

Social Cognitive Theory postulates four factors that act to enhance self-efficacy. The first is "mastery experiences." When a child experiences success in doing a behavior, their self-efficacy is enhanced. Role playing models are often utilized when success is unlikely in natural settings. The second is "vicarious experiences, i.e. modeling." Since modeling of other children's behaviors is helpful to enhance self-efficacy, group activities and role playing are adopted. The third is "social persuasion," in which various reinforcement techniques using verbal reinforcers are introduced. The last factor is "reduction of stress and negative emotions," which utilizes relaxation techniques in order to reduce stress and negative emotions that can hinder self-efficacy.

Program Purpose

To accomplish the program purpose of preventing NIDDM and CHD, the program relies primarily on enhancing internal control of health and on lifestyle improvements in the areas of nutrition, exercise, and sleep. Internal control for health means the extent to which children try to enhance health on their own initiative, without any external controls such as punishments from parents or guidance by physicians. We believe that one of the most important means of health promotion is for children to acquire the ability to establish healthy conditions on their own.

Internal control of health consists of three components: an internal health locus of control, motivation for internal health control, and self-orientation skills. Internal health locus of control is the cognitive component of internal control for health. Motivation for internal health

control is its affective (emotional) component. Self-orientation skills are its behavioral component. The program endeavors to modify these cognitive, affective, and behavioral components respectively in order to enhance internal control of health.

To achieve lifestyle improvements, various concrete goals are established. First, the program targets the following behaviors for strict control: three meals a day (breakfast, lunch, and dinner) and restriction of snacks and soft drink intake (nutrition lifestyle); exercise for more than thirty minutes per day (exercise lifestyle); and bedtime of 10 pm or earlier (sleep lifestyle). Second, the program targets, without controlling, the following content through lectures, games, experiments, and audiovisual materials: how to regulate intake of fat, salt, sugar, calories, and vegetables (nutrition lifestyle); the relationships between exercise and heart function and between exercise and calorie consumption (exercise lifestyle); and the relationship between sleep and health (sleep lifestyle).

Measures to Test the Effectiveness of the Program

To evaluate the effectiveness of the program, several self-reported questionnaires are administered to the participants just before and after program implementation, and at the follow-up. By these questionnaires, the effectiveness of the program is measured by assessing improvements in the three components of internal control of health and the three areas of lifestyle (nutrition, exercise, and sleep).

The questionnaires are as follows: the Children’s Health Locus of Control Scale (Tanabe, 1997) to measure health locus of control; the Health-Enhancement Motivation Questionnaire (an original questionnaire for this program) to measure motivation for internal health control; and the Lifestyle-Control Ability Questionnaire (an original one for this program) to measure the ability to control lifestyle choices. In addition, lifestyles for nutrition, sleep, and exercise are measured using our original Lifestyle Questionnaire. Finally, the records of the changes in lifestyles during program implementation add information to the evaluation process.

Program Methods

The methods of this program have a frame-module structure, as Table 3 shows. Each of the three main frames contain several modules: (1) Game, Class, Discussion, Role Playing, and Control Modules under the Classroom

Table 3. Frame-Module Structure of the Program Methods

Frame	Module
Classroom Curriculum	Game
	Class
	Discussion
	Roll Playing
	Control
School Environment	School Lunch
	Physical Activity
	Poster
Families	Website
	Newsletter
	Calorie Calculation

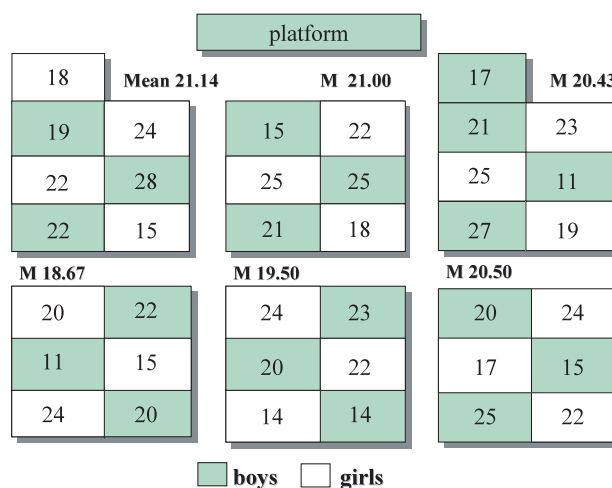


Figure 4. Distribution of students among small groups in a sample classroom. Individual and mean (M) scores on the Health Locus of Control Scale are shown for each of the groups.

Curriculum Frame; (2) School Lunch, Physical Activity, and Poster Modules under the School Environment Frame; and (3) Website, Newsletter, and Calorie Calculation Modules under the Families Frame.

Before implementing these modules, we attempt to establish the appropriate classroom environment. Because the program is mainly conducted in small groups, establishment of these groups is essential. As Figure 4 shows, each group consists of four to seven children. The members of each group are selected in accordance with their scores on the Health Locus of Control Scale measured just before program implementation. Each group includes both low-scoring and high-scoring children, thereby enabling some interaction between low and high health locus of control children.

Classroom Curriculum Frame

The Classroom Curriculum Frame consists of Game, Class, Discussion, Role Playing, and Control Modules. The Game Module is a 45-minute session during which the small groups compete with each other in four games: the Meal Game (let's cook the best school lunch), the Exercise Game (let's move fast), the Sleep Game (let's do quizzes), and the Anagram Game. The first three games, which relate to the three components of nutrition, exercise, and sleep, respectively, are designed to enhance children's motivation for joining the program and to attract their attention to the program goals. At the end of each of these games, the children receive several Japanese "hiragana" letters. In the concluding Anagram Game, the children try to make a word using those letters. The word is "Seikatsushukan" in Japanese, which means "lifestyle." The Game Module is specifically intended for the children to have an enjoyable time. Furthermore, it is noteworthy that the children find almost all of the modules in this program to be enjoyable.

The Class Module gives children information about the physical and mental changes caused by exercise, desirable nutrition, and lifestyle diseases using games, lectures, and experiments. For example, in the exercise section, every child wears a pedometer. Then, during exercise, children perform their own measurements to discover the relationship between the number steps they take and their heart rate and psychological mood. In the nutrition section, children cook school lunch and play games with "Vegetables Fighters Cards" (Adm Inc.). Each card features a food or a nutrient and provides information on how bad or how good the nutrient is. We can play various games using these cards; one such game is the "Food Battle Game," in which each card has its own power level depending on the food featured on the card. Each player plays one card at the same time, and then the player who presents the most powerful card wins all the cards presented. Through card playing, children learn about better foods. In the health section, experiments and video tapes teach children about coronary heart diseases and diabetes. For example, in an experiment on coronary heart diseases, children do an experiment in which they investigate how well water can stream through a vinyl hose when the hose is filled with some clay.

In the Discussion Module, children debate the question "Can we prevent colds completely by ourselves?" First, children are divided into Yes and No groups, and each small group prepares their position, studying this

topic by using the Internet and hearing from special persons such as physicians or school nurses. After their preparation time, the two groups conduct a debate using a semi-standard debate method. Through the debate experience, children come to learn actions they can take on their own to keep themselves healthy.

In the Role Playing Module, each small group discusses among themselves one particular health problem, followed by discussion about ways to solve this problem. After finishing the discussion, the groups create scenarios representing key points of the discussion. Furthermore, using these scenarios, the children engage in role playing. Through creating scenarios and role playing, children acquire problem-solving skills, including receiving and giving social support.

In the Control Module, we attempt to modify unhealthy lifestyles into more healthy ones. Among the targeted lifestyles, changing dietary habits is the most difficult, because it is very difficult to determine the quantity of snack or soft drink intake. We therefore establish definite standards using the sheet shown in Figure 5. This sheet shows one of the standards for snack intake. By using the sheet, children can quantify the amount of their daily snack intake on a I to V scale. This quantification is essential to self-control or reinforcement procedures. Figure 6 shows the standards for soft drinks, in which again the amount of soft drink intake is quantified on a I to V scale.

We use self-control methods to control children's snack and soft drink intake. Figure 7 shows the first self-control sheet. On the upper part of the sheet, ideal target levels are shown for meal frequency, snack intake, soft drink intake, exercise, and bedtime. Below the ideal target levels, children write their own target levels, the levels they aim at for a given week. Every day, from Monday to Friday, children monitor their own lifestyles. When the target levels for the week are attained, small cartoon stickers are attached on their sheet. Furthermore, the sheets contain a blank area for words of encouragement written by children themselves and by their parents, which provides a kind of reinforcement or verbal persuasion. Each week, the sheet changes slightly from the previous week's sheet. Figure 8 shows another self-control sheet. On this sheet, the space for the words of encouragement has been changed, substituting encouragement by friends for encouragement by parents. The last self-control of lifestyles sheet is shown in Figure 9. Control trials are not given to the children every day in this last sheet; rather, monitoring

Rule of Snacks

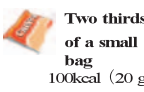


























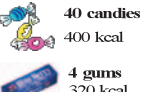






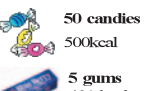
Level	Potato chips etc.	Chocolates etc.	Cakes, donuts etc.	Ice Cream etc.	Yogurt, jelly etc.	Hamburgers etc.	Candy, gum etc.
I 0 ~ 100kcal	 Two thirds of a small bag 100kcal (20 g)	 Half of a box 100 kcal (20 g)	 One stick 100 kcal (50g) 3 pieces 100 kcal (30g)	 100 kcal	 60 kcal (100g)	 Half of a hamburger 100kcal	 10 candies 100 kcal 80 kcal 40 kcal
II 101 ~ 200kcal	 One small bag 150kcal (30 g)	 One box 200 kcal (41 g)	 One donut 200 kcal (50g)	 150kcal (100g)	 3 dishes 180 kcal (300g)	 One piece 160 kcal	 20 candies 200 kcal 2 gums 160 kcal
III 201 ~ 300kcal	 Half of a standard bag 225 kcal (45 g)	 One bar 250 kcal (50g)	 One cake 210 kcal (70 g)	 300 kcal (150g)	 5 dishes 300 kcal (500g)	 255 kcal one hamburger	 30 candies 300 kcal 3 gums 240 kcal
IV 301 ~ 400kcal	 2 small bags 301 kcal (60 g)	 2 bars 400 kcal (82 g)	 One piece 350 kcal (100g)	 4 sticks 400 kcal	 7 dishes 420 kcal (700g)	 360 kcal (160g) one sandwich	 40 candies 400 kcal 4 gums 320 kcal
V 401kcal ~	 One standard bag 500 kcal (90 g)	 2 boxes 500 kcal (100g)	 2 pancakes 450 kcal (150 g)	 3 ice creams 450 kcal	 9 dishes 540kcal (900g)	 560 kcal one double hamburger	 50 candies 500kcal 5 gums 401 kcal

Figure 5. A sheet showing the standards of snack intake to control dietary habits. Calories in the figure are approximate.

Rule of Soft Drinks












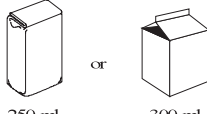




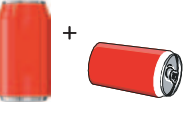

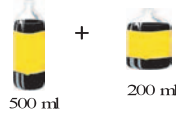

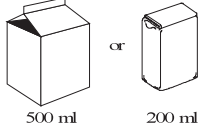
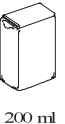
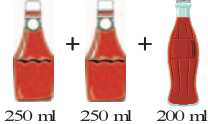






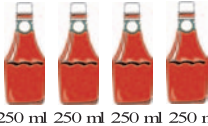









Level	Can	Plastic Bottle	Paper Pack	Bottle	Glass or Cup
I 0 ~ 200ml	 200ml	 200 ml	 or  100 ml 200 ml	 or  100 ml 200 ml	 or  175 ml
II 201 ~ 350ml	 or  250 ml 350 ml	 300 ml	 or  250 ml 300 ml	 or  250 ml 300 ml	 2 glasses (350 ml)
III 351 ~ 700ml	 +  500 ml 700 ml	 +  500 ml 700 ml	 or  500 ml 700 ml	 +  +  250 ml 250 ml 200 ml	 4 glasses (700 ml)
IV 701 ~ 1050ml	 750 ml 1050 ml	 1 liter bottle (1000ml)	 1 liter pack (1000 ml)	 250 ml 250 ml 250 ml 250 ml	 6 glasses (1050 ml)
V 1051ml ~	 1050 ml ~	 1.5 liter bottle (1500ml)	 1.5 liter pack (1500 ml)	 6 bottles 250 ml x 6	 8 glasses (1500 ml)

Figure 6. A sheet showing the standards of soft drink intake to control dietary habits.




























Steps to health

Words of encouragement to you by yourself	Words of encouragement to you by your family member
	

Name _____


The _____ Week
Dates _____ ~ _____

Targets for this week



	Meal Ideal Target Three meals a day	Snack Ideal Target Level I	Soft drink Ideal Target Level I	Exercise Ideal Target More than 30 min a day	Sleep Ideal Target 10 pm to bed
Your Targets	() meals a day	※ Put a circle on a level. I • II • III • IV • V	※ Put a circle on a level. I • II • III • IV • V	※ Duration of exercise () min * in ten-min units	() hr () min (PM) * in ten-min units
Fri.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Thur.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Wed.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Tue.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Mon.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	

※ When you attain an ideal target, you can attach a pink cartoon sticker on your sheet. When attaining your own target, you can attach a blue one.

Figure 7. The first self-control of lifestyles sheet.




























Steps to health

Words of encouragement to you by yourself	Words of encouragement to you by your friend (Name: _____)
	

Name _____

The _____ Week
Dates _____ ~ _____

Targets for this week

	Meal Ideal Target Three meals a day	Snack Ideal Target Level I	Soft drink Ideal Target Level I	Exercise Ideal Target More than 30 min a day	Sleep Ideal Target 10 pm to bed
Your Targets	() meals a day	※ Put a circle on a level. I • II • III • IV • V	※ Put a circle on a level. I • II • III • IV • V	※ Duration of exercise () min * in ten-min units	() hr () min (PM) * in ten-min units
Fri.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Thur.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Wed.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Tue.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	
Mon.	 () meals  Snack Name _____ Level _____ () () ()	 Drink Name _____ Level _____ () () ()	 Exercise Name _____ Level _____ () () ()	 hr: _____ min: _____	

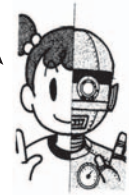
※ When you attain an ideal target, you can attach a pink cartoon sticker on your sheet. When attaining your own target, you can attach a blue one.

Figure 8. Another self-control of lifestyles sheet, in which space for the words of encouragement is changed from the sheet in Figure 7.



A robot in yourself

If you are told that you have a robot in yourself, you will be surprised at it. When you were little, some programs began to make you repeat some behaviors automatically, just like a robot. These behaviors are called "habits." We have various habits, some of which are good, but the others of which are bad. Bad habits should be changed. Do you find any of your bad habits (lifestyles) that should be changed? If so, you may want to set up your own targets and change bad habits into better ones.



Name _____

The _____ Week
Dates _____ ~ _____

Targets for this week

	Meal <u>Ideal Target</u> Three meals a day	Snack <u>Ideal Target</u> Level I	Soft drink <u>Ideal Target</u> Level I	Exercise <u>Ideal Target</u> More than 30 min a day	Sleep <u>Ideal Target</u> 10 pm to bed
Your Targets	() meals a day	※ Put a circle on a level. I · II · III · IV · V	※ Put a circle on a level. I · II · III · IV · V	※ Drink of course () min * in ten-min units	() hr () min (PM) * in ten-min units
Fri.	() meals	Snack Name Level () ()	Drink Name Level () ()	Exercise Name Level () ()	hr. min.
Thur.					
Wed.	() meals	Snack Name Level () ()	Drink Name Level () ()	Exercise Name Level () ()	hr. min.
Tue.					
Mon.	() meals	Snack Name Level () ()	Drink Name Level () ()	Exercise Name Level () ()	hr. min.

※ When you attain an ideal target, you can attach a pink cartoon sticker on your sheet. When attaining your own target, you can attach a blue one.

Figure 9. The last self-control of lifestyles sheet, in which monitoring is conducted only on Monday, Wednesday, and Friday. The sentences and figure in "A robot in yourself" are adapted from the JKYB Society (2001).

is conducted only on Monday, Wednesday, and Friday. This procedure is called a "fading procedure," which is one of the procedures designed to maintain acquired behaviors even after the program is over.

School Environment Frame

The School Environment Frame consists of School Lunch, Poster, and Physical Activity Modules. During the School Lunch Module, program practitioners attempt to teach children important knowledge about foods or nutrients, using the contents of their daily school lunch. This module is presented for two minutes just before school lunch. Quizzes, singing a song, demonstrations, picture-story shows, and other enjoyable methods are used in this module. After the presentation, children eat a lunch that includes some of the foods or nutrients discussed during the presentation. We call this module "School Lunch Theater" for children. The program names of the theater presentations include "What is the pearl in farms?," "What is the vegetable in the sea?," "Which are tomatoes, vegetables or fruits?," "Let's make mayonnaise!," "Chinese noodles and rice," "Bananas have flown out," "Be careful about salt," and so on. These names are funny or

mysterious enough to attract children's attention.

In the Poster Module, large colorful posters (16.5 x 23.4 inches) are attached on the classroom walls. The posters reinforce for the children key information about the different program goals. The poster in Figure 10 tells children about internal control of health, and the one in Figure 11 tells them about the importance of restriction of

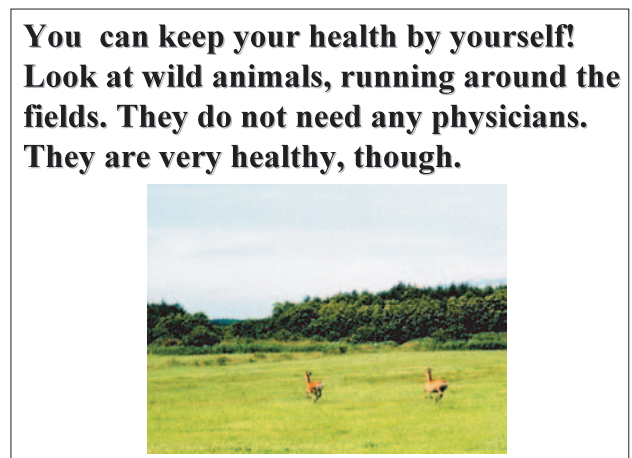


Figure 10. A poster telling children about the importance of internal control of health. The photograph is reprinted with the permission of (C) RARURU. KITANO DAICHINO OKURIMONO <http://www.asahi-net.or.jp/~jb3k-tnk/>.



Figure 11. A poster telling children about the importance of restriction of snack intake.

snack intake.

In the Physical Activity Module, children play outdoors or in the gymnasium. The play includes exercises using very novel playing tools. For example, in one play, using a large sheet, children in each group carry a ball cooperatively, and in another play, children throw a tetrapod-like ball to each other in which they get points depending on which foot of the ball they catch. The purpose of this module is to make children do exercises. As the play is very enjoyable, even the children who do not like to do exercises cheerfully participate in the play.

Families Frame

The last Frame is the Families Frame which consists of Newsletter, Website, and Calorie Calculation Modules. In the Newsletter Module, colorful newsletters are sent home to each family through their children. The contents

of the newsletters consist mainly of what children have learned in this program along with some suggestions and requests for collaboration from families to help attain the program's goals.

The most outstanding module in this frame is the Website Module. In this module, a website is made available to the children and their families. Only the family members can enter into this site using passwords. The website is updated frequently during the program implementation. The contents of the website are as follows: (1) various pictures of the children that show their parents how the children are participating in the program; (2) lectures that teach the parents about lifestyle diseases; (3) menus and recipes using healthy foods for children; and (4) questions and answers concerning lifestyle diseases, consisting of questions that parents ask using e-mails and answers by specialists such as psychologists and dieticians. Additionally, this website is also open for cell phone users. As most family members have their own cell phones in Japan, which have the capability to communicate using e-mail and websites, cell phones are one of the most promising sources by which this kind of prevention is conducted effectively.

The last module is the Calorie Calculation Module. In this module, sheets for calorie calculation are distributed among the families. If families ask for assistance in calculating the calories in their daily cooking, dieticians calculate the calories and give advice for healthy cooking. The sheets consist of three pages. On the first page, the children's name, gender, height, weight, and the amount of daily exercises are filled in by their parents. In the second sheet, the detailed contents of breakfast and dinner are written. The last one is the answer sheet, in which comments and advice about cooking are given to each family by dieticians, along with the nutrients analyzed.

The program in its entirety usually requires two or three months to complete. A rough timeline of the various modules is illustrated in Figure 12.

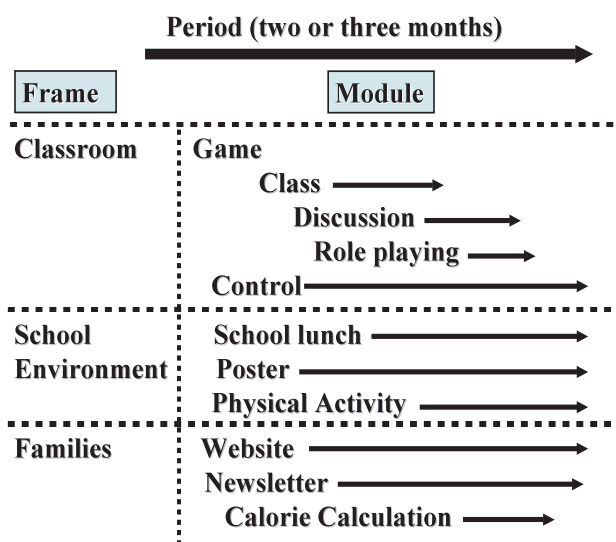


Figure 12. Timeline of program modules.

Future Directions

In 2002, Japan introduced to its schools a new educational curriculum that places greater emphasis on the psychological aspects of children's education. The previous educational curricula in Japan probably overemphasized the intellectual aspects of education, but the new curriculum recognizes the need for schools not only to address the intellectual aspects of education, but also to promote

adaptive and healthy lifestyle choices. Although the Prevention of Lifestyle Diseases Program could become a key component of this new curriculum, few teachers have sufficient knowledge and techniques to conduct this kind of program. One reason is that most universities in Japan do not include in their curriculum studies about the enhancement or modification of psychological and behavioral characteristics such as those taught in this program.

Consequently, we would suggest several steps that could be taken at this time to help overcome obstacles to initiating this program in the regular school curriculum. First, we could develop abridged versions of the program modules to alleviate the burden on teachers. Second, teachers should be offered more opportunities to learn how to conduct this program. Last, information regarding the necessity and effectiveness of the program should be widely disseminated. Because lifestyle diseases primarily afflict people beyond middle age, few teachers recognize the necessity of lifestyle modification programs for their children. Regarding this issue, long-term prospective studies are necessary to assess whether the children participating in this type of program have a lower likelihood of developing lifestyle diseases after arriving at middle age compared with non-participants.

There are various societal levels at which prevention programs for lifestyle diseases can be conducted: individual students, whole classrooms, entire schools, families, communities, and entire nations. Combinations of prevention programs at multiple societal levels will likely prove to be the most effective approach for preventing lifestyle diseases.

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Correspondence concerning this article should be addressed to Katsuyuki Yamasaki, Department of Human Development, Naruto University of Education, 748 Nakashima Takashima Naruto-cho Naruto-shi Tokushima 772-8502 JAPAN, or via e-mail at: ky341349@naruto-u.ac.jp.

HEALTH INTERVENTION PROTOCOLS FOR LIFESTYLE DISEASE PREVENTION IN JAPANESE ELEMENTARY SCHOOL CHILDREN

Katsuyuki YAMASAKI* and Seiji FUJII**

Keywords: lifestyle disease, universal prevention, non-insulin-dependent diabetes mellitus (NIDDM), coronary heart disease (CHD), elementary school children

This paper outlines a new prevention program to eliminate psychological and lifestyle risk factors associated with non-insulin-dependent diabetes mellitus and coronary heart disease. The program addresses psychological factors through efforts to enhance the internal control of health, which consists of an internal health locus of control, motivation for internal health control, and self-orientation skills. The program seeks to control the lifestyle factors of nutrition, exercise, and sleep habits. The program is based on multiple school and family components that are believed to have the greatest influence on health promotion in children. The three components, called “program frames,” consist of the Classroom Curriculum, School Environment, and Families Frames. The Classroom Curriculum Frame contains five modules (Game, Class, Discussion, Role Playing, and Control); the School Environment component contains three modules (School Lunch, Physical Activity, and Poster); and the Families Frame contains three modules (Website, Newsletter, and Calorie Calculation). The program methods, based on various psychological theories and techniques, include components that target each individual child, small groups, the whole classroom, and families. The program in its entirety usually requires two or three months to complete. Prerequisites for effective administrations and future extension of this program are discussed.

*Department of Human Development, Naruto University of Education, Tokushima, Japan

**Gakushima Elementary School, Tokushima, Japan