Field Study

Diffusion of Health Education Programs with Reference to Health Behavior Theories in Japanese Workplaces: Present Status and Future Plans

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Abstract: Diffusion of Health Education Programs with Reference to Health Behavior Theories in Japanese Workplaces: Present Status and Future Plans: Hiroko FUJII, et al. Department of Public Health, Dokkyo Medical University School of Medicine—Objectives: This study investigated the characteristics of health education programs and the health behavior theories used to establish more effective programs for Japanese companies. **Methods:** The study surveyed 1,372 companies with 500 or more employees. In a cross-sectional study, the characteristics of the health education programs were surveyed using a questionnaire, which included items regarding target lifestyle-related diseases and lifestyle areas, and the health behavior theories used to develop the present status and future plans. **Results:** One hundred ninety companies responded giving a response rate of 13.8%. At the time of the survey, the most common diseases targeted for primary prevention were obesity (27.1%), hypertension (22.7%), hyperlipidemia (22.1%), and diabetes (22.1%). Approximately 60% of the respondents were implementing health education programs that targeted certain lifestyles, and the most frequently reported target lifestyles were diet (41.0%) and exercise (38.2%). At the time of the survey, 40% of respondents had implemented programs that included health behavior theory, and 55.6% were going to implement such program plans in the future, a significantly higher percentage than at the time of the survey. **Conclusions:** In Japanese workplaces, it has been suggested that programs that include health behavior theories have not been implemented frequently enough, but such programs are expected to become

more common in the future. The findings of this survey may be useful for planning health education programs using health behavior theories to establish more effective programs for Japanese companies. (*J Occup Health* 2009; 51: 84–90)

Key words: Health education, Workplace, Health behavior theory, Lifestyle-related disease, Lifestyle

In Japan, according to data from annual health checkups mandated by the Industrial Safety and Health Law, the proportion of workers demonstrating abnormal test results had increased to 49.9% in 2007. A breakdown of these results shows that the proportion of those who were at-risk of hyperlipidemia was 30.8%, three times the prevalence in 1990¹⁾. Consequently, it has become necessary to approach health management from both physical and mental perspectives, not only with regard to occupational diseases but also with regard to lifestyle-related diseases. In Japan, the workplace has been recognized as an important venue for health promotion, and the development of effective health education programs is required. A variety of health behavior theories, such as the stage of change theory posited by the transtheoretical model²⁾, the self-efficacy theory representative of social cognitive theory³⁾, and other theories based on behavior science including self-monitoring, goal-setting and social support⁴⁾, have been applied to many health promotion programs. Previous studies in the workplace have shown the effectiveness of programs which target physical activity⁵⁾, smoking⁶⁾, stress⁷⁾, and comprehensive lifestyle including diet^{8–11)}. However, not all health education programs that include health behavior theories are effective. Plotnikoff *et al.* reported that for promoting physical activity, the efficacy of stage-matched materials compared with standard materials was confirmed for women, but not for men, and suggested that particular attention should be paid to possible gender differences¹²⁾. Griffin-Blake *et al.*

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Table 1. Question related to health behavior theory used in health education programs at the workplace

Question	Which theory or technique related to health behavior is used in your company's health education programs?
Choice	<ol style="list-style-type: none"> 1. Stage of change 2. Behavior science (self-monitoring, goal-setting, etc.) 3. Precede-proceed model 4. Self-efficacy 5. Social support 6. Health belief model 7. Health Locus of Control 8. Other theory or technique related to health behavior 9. No theory or technique related to health behavior

reported that in a randomized control study of physical activity intervention at workplaces, minimal contact, one-shot physical activity interventions delivered at work helped people increase their participation in regular physical activity, and stage matching may not necessarily add value to interventions that otherwise make good use of behavior change theory¹³⁾. However, the development of health promotion activities based on the concept of health promotion that make a point of acting independently need appropriate support from specialists with training in health behavior theory and methods¹⁴⁾.

In addition to physical state, behaviors and consciousness as measures for evaluating health education programs are important for confirming the effectiveness of not only the short-term but also the long-term. The physical state is the most objective measure, but it may not evaluate programs with sufficient sensitivity, because it is influenced by genetic factors and it changes over the long term. Thus, behaviors and consciousness may be more direct measures of health education programs, and better evaluation may be achievable using these parameters together with physical state. In addition, we presume that some supports based on these measures would achieve better outcome. However, the diffusion of health education programs for primary prevention that are based on health behavior theories has not been clarified in Japanese workplaces. This study evaluated health education programs using health behavior theories, target disease and lifestyle and other conditions to clarify the need for developing more effective health education programs for Japanese workplaces.

Methods

Respondent workplaces and study design

This study surveyed 1,372 companies with 500 or more employees which were listed on the First or Second Sections of the Tokyo Stock Exchange in December 2003. A cross-sectional study design was employed, and responses to the survey were returned anonymously.

We mailed questionnaires to the target companies requesting responses from the person in charge of health management in February 2004. We enclosed return envelopes and cover letters, in which we explained the objective of the survey and asked that the questionnaire be completed and returned by March 2004. Health education programs in the present study were defined as programs that mainly targeted prevention of lifestyle-related diseases focusing on physical, not mental issues, and excluded individual health consultations for employees who had been diagnosed with an abnormality during medical examinations mandated by the Industrial Safety and Health Law.

The ethics committee at Dokkyo University School of Medicine approved the study protocol.

Evaluation measures and statistics

Respondents completed a questionnaire regarding the conditions of health education programs targeting lifestyle-related disease at their workplace including the target disease and lifestyle areas, use of health behavior theory, practical form, and staff in charge of the programs. In the question about the target disease, we asked respondents to indicate one of two categories, "primary prevention stage" and "secondary or tertiary prevention stage". As a rule, primary prevention stage programs were defined as health education programs that were implemented and planned to prevent lifestyle-related diseases among employees with no identified abnormality in the health check, and secondary or tertiary prevention stage programs were defined as programs for employees with some identified abnormality. In the other question items, we did not ask about the prevention stage. The questions related to the health behavior theory used in health education programs at the workplace in the present study are shown Table 1. We selected "Stage of change", "Behavior science", "Self-efficacy", "Social support", "Health belief model", "Precede-proceed model", "Health locus of control" and other theories by referring to health

Table 2. Characteristics of the responding workplaces

	N ^a	Item	(%)
Industry type	186	Manufacturing	53.8
		Finance (clerical)	11.8
		Sales	8.1
		Service	8.1
		Construction	5.4
		Transport and communication	3.2
		Labor	1.6
		Other	8.1
Worksite size	185	500–999 employees	18.4
		1,000–4,999 employees	61.6
		5,000–9,999 employees	9.2
		10,000–29,999 employees	7.0
		30,000 employees or more	3.8
Profession/Occupation of respondent staff	179	Public health nurse or nurse	35.2
		Hygiene management staff	25.7
		Physician	6.7
		Exercise instructor	0.6
		Clinical psychotherapist	0.6
		Other	31.3

a. Number of respondents to each questionnaire item.

Table 3. Target of lifestyle-related disease in health education programs at workplaces (N^a=181)

	Primary prevention			Secondary or tertiary prevention		
	Present ^b (%)	Future (%)	<i>p</i> value ^c	Present ^b (%)	Future (%)	<i>p</i> value ^c
Obesity	27.1	28.7	0.711	16.0	16.0	1.000
Hypertension	22.7	21.5	0.868	13.3	14.9	0.678
Hyperlipidemia	22.1	25.4	0.377	14.9	17.1	0.541
Diabetes	22.1	21.5	1.000	15.5	15.5	1.000
Liver dysfunction	17.1	16.0	0.839	9.9	9.4	1.000
Hyperuricemia	14.9	12.2	0.359	9.4	9.4	1.000
Cancer	12.7	8.3	0.057	4.4	3.9	1.000

a. Number of respondents to each questionnaire item. b. “Present” defined as the status during the last year. c. *p* value was determined by McNemar’s test for “present” vs. “future” on primary prevention and secondary or tertiary prevention.

behavior theories widely accepted by various medical and health care staff in Japan¹⁵⁾. Companies were asked to answer all questionnaire items with regard to present status and future plans. Present status was defined as the status during the last year.

Differences between present status and future plans conditions were determined by McNemar’s test for categorical variables. For all tests, values of *p*<0.05 in the two-tailed test were considered significant. All analyses were performed using SPSS 15.0J for Windows (SPSS Inc., Tokyo, Japan).

Results

One hundred and ninety worksites responded yielding a response rate was 13.8%. Of the respondents, 53.8% were manufacturing companies, with more than 80% having 1,000 employees or more (Table 2).

At the time of the survey, the diseases most commonly targeted for primary prevention were obesity, hypertension, hyperlipidemia, and diabetes (Table 3). There were no significant differences between the present and future programs with respect to the relative

Table 4. Target lifestyle area, profession of staff in charge of the programs and diffusion rate of health behavior theory in health education programs at workplaces

	N ^a	Item	Present ^b (%)	Future (%)	<i>p</i> value ^c
Overall health education practices	178	Overall health education	60.1	58.4	0.711
Target lifestyle area	178	Diet	41.0	38.2	0.473
		Exercise	38.2	34.8	0.362
		Smoking	36.5	34.8	0.728
		Drinking	32.0	27.0	0.108
Profession of staff in charge of the program	92	Public health nurse or nurse	65.2	73.9	0.008
		Physician	57.6	62.0	0.388
		Registered dietician or dietician	16.3	26.1	0.012
		Exercise instructor	21.7	21.7	1.000
		Clinical psychotherapist	26.1	22.8	0.549
Health behavior theory	90	Use at least one theory	40.0	55.6	0.001
		Behavior science	28.9	40.0	0.013
		Stage of change	21.1	31.1	0.049
		Self-efficacy	13.3	24.4	0.013
		Social support	10.0	16.7	0.180
		Health belief model	4.4	5.6	1.000
		Precede-proceed model	1.1	5.6	0.125

a. Number of respondents in each questionnaire item. b. “Present” defined as the status during the last year. c. *p* value was determined by McNemer’s test.

proportions of the target diseases.

Approximately 60% of all respondent workplaces were implementing health education programs for some lifestyle areas in some practical form at the time of the survey, and planned further programs in the future (Table 4). At the time of the survey, the most frequently reported target lifestyle areas in these programs were diet, followed by exercise. There were no significant differences between the present status and future plans with regards to target lifestyle areas in health education programs. Regarding staff in charge of programs, a public health nurse or a nurse was most frequently indicated, followed by a physician. A public health nurse or a nurse and a registered dietician or a dietician were scheduled to lead programs significantly more frequently in the future compared to the situation at the time of the survey. At the time of the survey, 40% of respondent workplaces had implemented programs that included some health behavior theories, and the most frequently used theory was behavior science including goal setting and self monitoring, followed by stage of change and self-efficacy. The proportion of respondent workplaces that planned programs that included some health behavior theories in the future was significantly higher than that at the time of the survey.

Regarding target lifestyle-related diseases, at the time of the survey, most programs using at least one behavior theory comprised less than half of all respondent

companies, except for programs targeting diabetes (Table 5). For four lifestyle-related diseases, programs were more frequently planned for future implementation than presently practiced, and the difference was significant for hyperlipidemia and obesity, especially with regard to self-efficacy for these lifestyle-related diseases, and for programs using stage of change theory for obesity. Regarding target lifestyle areas, all programs using at least one behavior theory comprised less than half of the programs at all respondent companies at the time of the survey, with significantly more programs targeting all four lifestyles being planned for the future. More than 60% of respondents were planning such programs, and there was a tendency to include self-efficacy theory in them. At the time of the survey, the proportion of health education programs based on self-efficacy was lower than that based on behavior science but in the future, self-efficacy was expected to increase significantly in all four lifestyle areas. Regarding the professions of practical staff, registered dietitians or dieticians included health behavior theories more frequently than public health nurses, nurses, or physicians. However, public health nurses or nurses and physicians planned to significantly increase the use of health behavior theories in the future.

Discussion

In the present study, we surveyed the characteristics of health education programs that focused on primary

Table 5. Diffusion rate of health education programs at workplaces having health behavior theories by target lifestyle-related disease, target lifestyle area and profession of staff in charge of the programs

		Present ^c (%)	Future (%)	<i>p</i> value ^d
Target lifestyle-related disease				
Diabetes (N ^a =31)	Use at least one health behavior theory ^b	51.6	61.3	0.250
	Behavior science	45.2	48.4	1.000
	Stage of change	22.6	29.0	0.625
	Self-efficacy	16.1	25.8	0.375
Hypertension (N ^a =29)	Use at least one health behavior theory ^b	48.3	55.2	0.500
	Behavior science	44.8	44.8	1.000
	Stage of change	24.1	31.0	0.625
	Self-efficacy	10.3	20.7	0.250
Hyperlipidemia (N ^a =41)	Use at least one health behavior theory ^b	46.3	63.4	0.039
	Behavior science	39.0	51.2	0.125
	Stage of change	22.0	36.6	0.070
	Self-efficacy	9.8	26.8	0.016
Obesity (N ^a =44)	Use at least one health behavior theory ^b	43.2	65.9	0.002
	Behavior science	40.9	52.3	0.125
	Stage of change	18.2	40.9	0.006
	Self-efficacy	11.4	27.3	0.016
Target lifestyle area				
Diet (N ^a =54)	Use at least one health behavior theory ^b	48.1	61.1	0.039
	Behavior science	42.6	50.0	0.289
	Stage of change	22.2	35.2	0.065
	Self-efficacy	13.0	29.6	0.004
Exercise (N ^a =49)	Use at least one health behavior theory ^b	46.9	65.3	0.012
	Behavior science	40.8	51.0	0.125
	Stage of change	22.4	38.8	0.021
	Self-efficacy	14.3	30.6	0.008
Drinking (N ^a =39)	Use at least one health behavior theory ^b	46.2	64.1	0.039
	Behavior science	43.6	51.3	0.375
	Stage of change	23.1	38.5	0.070
	Self-efficacy	12.8	30.8	0.016
Smoking (N ^a =46)	Use at least one health behavior theory ^b	41.3	63.0	0.002
	Behavior science	37.0	47.8	0.180
	Stage of change	23.9	37.0	0.109
	Self-efficacy	10.9	28.3	0.008
Profession of staff in charge of the programs				
Registered dietician or dietician (N ^a =14)	Use at least one health behavior theory ^b	64.3	71.4	1.000
	Behavior science	57.1	64.3	1.000
	Stage of change	14.3	28.6	0.500
	Self-efficacy	21.4	28.6	1.000
Exercise instructor (N ^a =16)	Use at least one health behavior theory ^b	62.5	81.3	0.250
	Behavior science	56.3	62.5	1.000
	Stage of change	31.3	56.3	0.125
	Self-efficacy	25.0	37.5	0.500
Public health nurse or nurse (N ^a =58)	Use at least one health behavior theory ^b	50.0	70.7	0.002
	Behavior science	39.7	53.4	0.039
	Stage of change	27.6	39.7	0.092
	Self-efficacy	13.8	29.3	0.022
Physician (N ^a =48)	Use at least one health behavior theory ^b	37.5	52.1	0.039
	Behavior science	31.3	41.7	0.063
	Stage of change	18.8	37.5	0.004
	Self-efficacy	12.5	18.8	0.250

a. Number of respondents to each questionnaire item. b. Health behavior theories in this study included in "Stage of change", "Behavior science", "Self-efficacy", "Social support", "Health belief model", "Precede-proceed model", "Health locus of control" and other theories. c. "Present" defined as the status during the last year. d. *p* value was determined by McNemer's test.

prevention, excluding individual health consultations for employees who had been diagnosed with an abnormality in medical examinations mandated by the Industrial Safety and Health Law. The survey results show that 60% of all respondent workplaces were implementing health education programs targeting some lifestyle areas in some practical form at the time of the survey, and 40% of them were implementing programs that included some health behavior theories; that is approximately one-fourth of all respondent workplaces had programs that included some health behavior theories.

These results suggest that there is an insufficient diffusion rate of programs that include health behavior theories. However, the proportion of respondent workplaces that intended to implement programs including some health behavior theories in the future was significantly higher than that at the time of the survey. We found a tendency to focus on lifestyle areas in health education programs. Those were diet, exercise, drinking and smoking, and especially self-efficacy. Though the proportion of health education programs with self-efficacy was lower than that with behavior science, an increase in the use of self-efficacy in the future would result in more effective programs.

Previous studies in the workplace have shown the effectiveness of programs that include health behavior theories. In Japan, Arao *et al.* reported a non-randomized trial that showed the effectiveness of lifestyle modification programs for physical activity and diet that consisted of counseling plus self-monitoring, and social and environmental support, in which counseling was provided during sessions on goal setting and during monthly follow-ups, using a protocol based on the stage of change⁹⁾. Prochaska *et al.* reported that in a randomized clinical trial among employees, treatments using a brief health risk intervention plus motivational interviewing or an online transtheoretical model with tailored communications produced significant multiple behavior changes⁸⁾.

Several characteristics of this study have to be taken into account in order to interpret the findings accurately and generalize them to Japanese workplaces. First, the response rate to the questionnaire was low at 13.8%. Since the responding workplaces were thought to be more interested in health education than those that did not respond, our results did not adequately reflect the condition of all target companies. Second, although we surveyed the subject companies' health education programs that focused on the prevention level, it is disputable whether each respondent understood the prevention level. In the future, all health education programs should be planned, implemented and evaluated with a clear target level of prevention in order to be more effective. Third, we cannot deny that the profession/occupation of the respondent staff created bias in their

answers to questions about health behavior theory. The proportion of the respondents who did not answer the questions properly was 50.0% among hygiene management staff compared with 22.0% among public health nurses or nurses (Data not shown). Fourth, though working lifestyle influences workers' health, we did not include working lifestyle in target lifestyle areas. Fifth, the timing of the survey should be discussed, because the Ministry of Health, Labour and Welfare of Japan has developed a new lifestyle-related disease prevention system, in which health insurers conduct an annual health check of all 40–74 yr olds to detect metabolic syndrome and offer a lifestyle intervention program based on risk assessed by waist circumference and blood pressure, HDL cholesterol level, glucose level, etc. The Ministry recommended that the lifestyle intervention program be conducted using health behavior theory focusing on the subject's concept and stage of change¹⁶⁾. Thus, an increase in the use of health behavior theory in programs was expected. These five factors are regarded as indications of internal validity. Lastly, subject companies in our study were limited to those with 500 or more employees, and that may have influenced the external validity of our results. According to the establishment and enterprise census of 2006, Japan had 5.7 million establishments, and 0.2% of them had 300 employees or more. Previous studies have reported that the health status in small- and medium-sized companies differs from that in large companies in Japan¹⁷⁾, and the frequency of abnormal health findings was higher in workers at small companies¹⁸⁾. Further research on the diffusion of health education at small- and medium-sized companies is needed in order to generalize the findings of this study. Our findings need to be distributed among large companies providing health education both at present and in the future.

In Japanese workplaces, health education programs that include health behavior theories have not yet been sufficiently implemented at present, but such programs are expected to become more prevalent in the future. The survey data may help the development of more effective health education in the workplace.

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