

Original Article

Preferable Forms of Relaxation for Health Promotion, and the Association between Recreational Activities and Self-perceived Health

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Little research has been done on the association between relaxation and health. In the present study, by conducting a nationwide cross-sectional survey, we aimed to obtain scientific data on the preferable forms of relaxation for health promotion, and to clarify the associations between specific recreational activities and self-perceived mental and physical health. We selected 4,000 households by stratified random sampling from across Japan in November 2009 and used the interview method to collect data (number of subjects: 2,206). The questionnaire contained items on sleep, recreation status, recreational activities, and self-perceived mental and physical health status. We obtained responses from 1,224 adults (response rate: 55.5%). Insufficient rest from sleep, short sleep duration (< 6h/day), ineffective use of free time, and less free time used for activities other than rest showed independent positive associations with poor mental and physical health. The results of the logistic regression analyses showed significantly low adjusted odds ratios with regard to the status of poor mental and physical health for outings/walking among men (0.33 [95% confidence interval; 0.16–0.68] and 0.49 [0.26–0.90], respectively), and for community activities among women (0.19 [0.04–0.79] and 0.27 [0.09–0.77], respectively). Relaxation for the promotion of health should include both passive relaxation (rest) and active relaxation (recreation). In addition, ensuring sufficient sleep duration is important for passive relaxation, and engaging in outings/walking for men and community activities for women are important for active relaxation.

Key words: passive relaxation, active relaxation, recreational activity, self-perceived health

Received July 13, 2011; accepted October 6, 2011.

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In 1988, the then Ministry of Health and Welfare of Japan proposed the 2nd National Health Promotion Program, the “Active 80 Health Plan,” in which nutrition and diet, exercise, and relaxation were considered the 3 essential elements in

health promotion campaigns. The Ministry later proposed Relaxation Guidelines for Health Promotion to ensure adequate relaxation for maintaining good health and to promote a healthy, high-quality, and active way of life [1]. The concept of relaxation (*kyuu-you*, in Japanese) for health promotion includes two aspects: rest (*kyuu*) and recreation (*you*). Rest denotes passive relaxation, which allows recuperation from physical and mental fatigue, and recreation denotes active relaxation, which helps develop a sense of purpose in life through activities that nurture mental and spiritual well-being [2, 3].

In the "National Health Promotion Movement in the 21st Century (Health Japan 21)," which was initiated in 2000, the Ministry of Health, Labour and Welfare listed relaxation/mental health as one of the 9 important issues to be addressed, and set targets for reducing the percentages of people reporting a lack of rest due to sleep deprivation and those who had experienced stress over the previous month [1]. However, the Relaxation Guidelines for Health Promotion were developed in 1994, and now appear to be outdated in view of the diversification of lifestyles and working styles that has occurred in Japan since then, along with changes in socioeconomic trends. Therefore, an evidence-based amendment of the Guidelines that takes into account the current diversification of lifestyles is necessary to ensure the effective development of public health promotion campaigns.

It has been stated that leisure may make a valuable contribution to all aspects of health, both because of its short-term benefits and, perhaps more importantly, the potential cumulative effects of life-long participation in leisure activities [4]. It is also noteworthy that vacations have recently become a topic of interest in health research, and that both their beneficial and adverse effects on health have been documented [5]. Previous Japanese studies of relaxation include those performed by Tarumi *et al.* on leisure vacations, in which the study populations comprised workers [6, 7], and a study performed by Ohta *et al.* on the effect of physical activities during leisure time [8]. However, these studies focused mainly on the psychological aspects of relaxation, and no study has yet examined the effects of relaxation on health, including physical health. de Bloom *et al.* recently performed a meta-analysis of previous studies on the effects of vacation on health and well-being, and remarked on the paucity

of such studies [9].

Therefore, our aims in the present study were (1) to obtain scientific data on the preferable forms of relaxation for the promotion of health, and (2) to clarify the association between specific recreational activities and self-perceived mental and physical health.

Materials and Methods

Interview survey by stratified random sampling. In our study, all the municipalities in Japan were divided into 12 blocks, in units of prefecture or city, and the municipalities in each block were then classified and stratified into 19 large cities (ordinance-designated cities), other cities, and towns/villages. The number of samples (4,000 in total) for each stratum was prorated based on the number of people aged 20 or older. The survey areas and subject households in each stratum were randomly selected, using the basic units of the census enumeration districts, which had been designated for Census 2005, and OA-TOWN II (by Zenrin Co., Ltd. Kitakyushu, Japan), the electronic residential map database. The survey was conducted for a period of one month in November 2009. One person (aged 20 years or older) with the earliest birthday as of November 1 2009 was selected beforehand as a subject from each subject household, and that person was interviewed if he/she was at home when the researcher visited. The subjects comprised 2,206 adults among 4,000 households, selected as mentioned above. Trained researchers visited the selected households, conducted the interviews, and collected the data.

Composition of the questionnaire.

1. Survey items

The questionnaire contained four items. The items and question topics were as follows: (1) Basic attributes (gender, age, years of schooling completed, size of the city of residence, and working hours per day [hours dedicated to study for a student, and to housework for a full-time homemaker or unemployed person, were considered as working hours]); (2) sleep and recreation status during the past month (sleep duration, sufficiency of sleep, length of free time used for activities other than rest per week, and the level of effective use of free time for activities other than rest); (3) recreational activities; and (4) self-perceived mental and physical health status.

2. Recreational activities

We included the following options to evaluate the activities undertaken to promote mental/physical health during free time (*i.e.*, recreation) over the previous month; multiple answers were permitted: (i) Leisure: engaging in computer games, *karaoke*, Japanese pinball (*pachinko*), betting on horse racing, taking a sauna, getting a massage, *etc.*; (ii) sports: exercising, jogging, training, swimming, athletics, *etc.*; (iii) learning activities: enrichment lessons, appreciation of art works, reading, obtaining higher qualifications, *etc.*; (iv) community activities: participating in community events and meetings, volunteer activities, parent-teacher-association activities, *etc.*; (v) media usage: television, radio, newspaper, magazines, comic books, Internet, *etc.*; (vi) outings/walking: driving, traveling, visiting an aquarium, attending events, walking, eating out, shopping, *etc.*; and (vii) conversation/communication: conversing with family, relatives, friends, or acquaintances either directly or via telephone, e-mail, *etc.* For these options, we referred to the behavioral classifications used in the NHK National Time Use Survey [10].

3. Self-perceived mental and physical health status

To evaluate the self-perceived mental health of the participants, we determined how a subject appraised his/her mental health status during the previous month. With regard to self-perceived physical health, each subject was similarly asked to appraise his/her physical health status. For both questions, the following 5 options were provided: very good, good, bad, very bad, and I don't know. Subjects who selected "bad" or "very bad" were defined as being in poor mental or physical health. For self-perceived health, we used as a reference a question regarding health status found in the questionnaire on health for the National Livelihood Survey conducted by the Ministry of Health, Labour and Welfare [11].

Statistical analyses. Statistical analyses were performed as follows. First, the prevalences of poor mental and physical health were calculated according to the basic attributes. Second, the prevalences of poor mental and physical health were calculated according to sleep and recreation status. For both calculations, we used the χ^2 test to determine the significance of differences.

Third, logistic regression analyses were performed,

using the status of poor mental/physical health as the dependent variable and sleep/recreation as the explanatory variable. For these analyses, 2 types of models were set. One type used the "quantity" of sleep/recreation (sleep duration and length of free time used for activities other than rest) as an explanatory variable; the other type used the "quality" of sleep/recreation (sufficiency of sleep and level of effective use of free time for activities other than rest) as an explanatory variable. The analyses were adjusted for gender, age, years of schooling completed, size of the city of residence, and working hours.

Fourth, with regard to the activities performed during free time for the promotion of health, the gender- and age-based percentages of people who selected each activity were calculated, then the χ^2 test was performed to determine whether there was a significant difference. Finally, logistic regression analyses were performed, by gender, using the status of poor mental/physical health as the dependent variable and activities performed during free time for the promotion of health as explanatory variables, and the models were adjusted for age, years of schooling completed, size of the city of residence, and working hours.

The response "I don't know" and missing data were excluded from these analyses. The significance level was set at 5%. SPSS 16.0J for Windows was used for the statistical analyses.

Ethical considerations. The following ethical considerations were taken into account: (1) Participation was voluntary, but informed consent of the subject was required; (2) data collection and statistical analysis were performed by different researchers so that the person performing the analysis did not have access to the subjects' personal data; (3) collected data were coded to protect personal information and maintain confidentiality; and (4) approval was obtained from the Ethics Committee for Epidemiological Study of Nihon University School of Medicine before the study was begun.

Results

Among 2,206 adult subjects, 1,224 (539 men and 685 women) provided responses (response rate: 55.5%). The average ages (\pm standard deviation) for males and females were 50.7 (\pm 17.6) and 51.2 (\pm 16.8) yr,

respectively. No significant age difference by gender was observed (Mann-Whitney U test; $p=0.526$). With regard to years of schooling completed by the participants (men and women in total), junior high school, high school, and junior college/university accounted for 12.9%, 54.0%, and 33.0% of the subjects, respectively. With regard to the size of the city of residence, 25.6% of respondents were residents in the 19 large cities, 63.9% in other cities, and 10.5% in towns/villages. The numbers of participants who answered "I don't know" to the questions on self-perceived mental and physical health were 17 and 7, respectively, and the data of those participants were excluded from the statistical analyses, except for the statistical analysis indicated in Table 4.

Associations between the basic attributes and the prevalences of poor mental and physical health are shown in Table 1. The prevalence of poor mental health was 11.4% and that of poor physical health was 13.7%. In terms of working hours per day, the prevalences of poor mental and physical health were lower among those whose number of working hours were ≥ 5 h but < 9 h, compared to those whose working hours were < 5 h or ≥ 9 h. Significant differences were observed between these groups with regard to the prevalences of poor mental/physical health among men and poor mental health among women.

The associations between sleep and recreation status during the past month and the prevalences of poor mental and physical health are shown in Table 2. The prevalences of poor mental and physical health increased as sleep duration shortened, sleep became less sufficient, free time used for activities other than rest became shorter, and the use of free time became less effective. Significant associations were observed between the prevalences of poor mental/physical health and each item relating to sleep/recreation, except for that between the prevalence of poor physical health and the length of free time used for activities other than rest among men.

The percentage of people who never had sufficient sleep or did not have fairly sufficient sleep was 18.5% (226 of 1,219 men and women; *i.e.*, the total number of participants after excluding those who responded that they did not know the answer to this question).

The associations between poor mental/physical health, sleep duration, and length of free time used for activities other than rest were evaluated using

logistic regression analysis, and the results are shown in Table 3 (Models 1 and 2). Sleep duration and the length of free time used for activities other than rest (covariates) showed significant independent associations with poor mental and physical health (response variables). Next, associations among poor mental/physical health, the sufficiency of sleep, and the level of the effective use of free time for activities other than rest were evaluated using logistic regression analysis, and the results are shown in Table 3 (Models 3 and 4). Significant independent associations were found between both the sufficiency of sleep and the level of effective use of free time (covariates) and poor mental and physical health (response variables).

Activities performed during free time for the promotion of health are shown in Table 4. Among men, media usage was the most popular (46.8%), followed by outings/walking (42.9%), while among women conversation/communication was the most popular (60.9%), followed by outings/walking (48.0%). Activities that showed significant differences in percentages between men and women were leisure and sports (men $>$ women) and conversation/communication (men $<$ women). Significant differences by age were observed with regard to leisure and community activities among men, and leisure, sports, learning activities, and conversation/communication among women.

Logistic regression analyses were performed to evaluate the associations between the status of poor mental/physical health and the activities performed during free time for the promotion of health; the results are shown in Table 5. The analysis indicates that the adjusted odds ratios with regard to poor mental health were significantly low among men who engaged in leisure activities or outings/walking (Model 1). The adjusted odds ratio with regard to poor physical health was also significantly low among men who engaged in outings/walking (Model 2). Among women, the adjusted odds ratios with regard to poor mental and physical health were significantly low among those engaging in community activities (Models 3 and 4).

Discussion

In this study, we conducted a nationwide interview survey to clarify the sleep, recreation status, and

Table 1 Associations between the basic attributes and the prevalences of poor mental and physical health

	N ^a	Prevalence of poor mental health (%)	<i>p</i> value ^b	N ^a	Prevalence of poor physical health (%)	<i>p</i> value ^b
Gender			0.486			0.352
Men	532	10.7		536	12.7	
Women	675	12.0		681	14.5	
Age			0.485			0.601
Men						
20–39	182	11.0		185	11.9	
40–59	166	12.7		167	11.4	
60– yr	184	8.7		184	14.7	
Women			0.526			0.381
20–39	209	12.9		210	11.9	
40–59	228	13.2		230	16.5	
60– yr	238	10.1		241	14.9	
Years of schooling completed			0.192			0.138
Men						
Junior high school	58	15.5		58	20.7	
High school	270	11.5		275	11.6	
Junior college/university	203	7.9		202	11.4	
Women			0.805			0.750
Junior high school	99	11.1		100	17.0	
High school	377	12.7		381	14.2	
Junior college/university	199	11.1		200	14.0	
Size of the city of residence			0.555			0.224
Men						
19 large cities	131	8.4		132	9.1	
Other cities	340	11.2		344	14.5	
Towns/villages	61	13.1		60	10.0	
Women			0.891			0.911
19 large cities	177	13.0		177	14.7	
Other cities	431	11.6		436	14.2	
Towns/villages	67	11.9		68	16.2	
Working hours/day ^c			0.018			0.047
Men						
<5h	136	11.0		136	14.0	
≥5h, <9h	253	7.5		258	9.3	
≥9h	129	17.1		128	18.0	
Women			0.009			0.052
<5h	259	12.7		263	15.2	
≥5h, <9h	320	9.1		322	12.1	
≥9h	79	21.5		79	22.8	
Total	1,207	11.4		1,217	13.7	

^aIn each section, the response “I don’t know” and missing data were excluded from the statistical analyses.

^b χ^2 test.

^cHours dedicated to study for a student, and to housework for a full-time homemaker or unemployed person, were considered as working hours.

recreational activities of the Japanese population, to elucidate the associations between these parameters and self-perceived mental and physical health, and to obtain scientific data that would indicate the prefera-

ble forms of relaxation for the promotion of health. As few epidemiological studies have investigated the relaxation status of the Japanese population [6–8], these results provide important basic data for the

Table 2 Associations between sleep and recreation status during the past month and the prevalences of poor mental and physical health

	Men						Women					
	N ^a	Prevalence of poor mental health (%)	p value ^b	N ^a	Prevalence of poor physical health (%)	p value ^b	N ^a	Prevalence of poor mental health (%)	p value ^b	N ^a	Prevalence of poor physical health (%)	p value ^b
Sleep duration/day			0.004			0.011		<0.001				0.003
<6h	161	16.1		162	17.9		279	17.9		281	19.2	
≥6h	368	7.9		371	10.0		391	7.7		395	11.1	
Sufficiency of sleep			<0.001			<0.001		<0.001				<0.001
Fully sufficient	149	6.0		149	8.1		145	6.9		146	9.6	
Fairly sufficient	305	7.9		307	6.5		383	8.6		385	9.9	
Not fairly sufficient	70	27.1		72	43.1		129	23.3		132	31.1	
Never	7	71.4		7	71.4		14	50.0		14	35.7	
Length of free time used for activities other than rest/week ^c			0.004			0.694		0.001				<0.001
None	103	18.4		106	15.1		164	20.1		166	24.7	
Available (<10h)	264	10.2		265	12.5		349	9.7		352	11.4	
Available (≥10h)	147	5.4		147	11.6		143	7.7		143	9.8	
Level of effective use of free time for activities other than rest			<0.001			0.007		<0.001				<0.001
Fully effective	53	5.7		53	7.5		59	5.1		59	6.8	
Fairly effective	285	6.3		285	10.5		361	7.2		363	9.9	
Not fairly effective	125	14.4		127	13.4		174	19.0		176	20.5	
Never	42	35.7		42	28.6		51	25.5		51	31.4	

^aIn each section, the response "I don't know" and missing data were excluded from the statistical analyses.

^b χ^2 test.

^cDuring the past month, how much free time did you make available per week for leisure, sports, learning or community activities, etc., other than rest?

Table 3 Logistic regression analyses using poor mental and poor physical health status as the dependent variable and sleep/recreation as the explanatory variable

	Poor mental health status			Poor physical health status		
	N ^b	AOR	95% CI	N ^b	AOR	95% CI
	<u>Model 1^a</u>			<u>Model 2^a</u>		
Sleep duration/day						
≥6h	712	1.00	reference	719	1.00	reference
<6h	428	2.04	1.37–3.02	430	1.71	1.19–2.45
Length of free time used for activities other than rest/week ^c						
Available (≥10h)	287	1.00	reference	287	1.00	reference
Available (<10h)	597	1.24	0.71–2.15	601	0.97	0.61–1.55
None	256	2.62	1.47–4.65	261	1.86	1.13–3.04
	<u>Model 3^a</u>			<u>Model 4^a</u>		
Sufficiency of sleep						
Fully sufficient	278	1.00	reference	279	1.00	reference
Fairly sufficient	638	1.01	0.56–1.82	639	0.81	0.48–1.36
Not fairly sufficient	190	3.10	1.64–5.83	194	4.60	2.63–8.02
Never	17	10.12	3.13–32.66	17	5.28	1.71–16.27
Level of effective use of free time for activities other than rest						
Fully effective	107	1.00	reference	107	1.00	reference
Fairly effective	630	1.26	0.50–3.17	632	1.57	0.70–3.51
Not fairly effective	295	3.07	1.21–7.82	299	2.48	1.07–5.74
Never	91	4.42	1.61–2.11	91	3.74	1.48–9.43

^aThe two items were inputted as covariates in each model that was adjusted for gender, age, years of schooling completed, size of the city of residence, and working hours.

^bIn each section, the response "I don't know" and missing data were excluded from the statistical analyses.

^cDuring the past month, how much free time did you make available per week for leisure, sports, learning or community activities, etc., other than rest?

AOR, adjusted odds ratio; CI, confidence interval.

Table 4 Activities performed during free time for the promotion of health^a

Activities performed during free time	Men				Women				Men	Women	p value ^b
	20-39 (N=185)	40-59 (N=169)	60- yr (N=185)	p value ^b	20-39 (N=212)	40-59 (N=231)	60- yr (N=242)	p value ^b	Total (N=539)	(N=685)	
Leisure ^c	41.6	24.3	20.5	<0.001	18.9	13.0	9.5	0.014	28.9	13.6	<0.001
Sports ^d	29.7	28.4	32.4	0.699	15.6	26.0	22.7	0.025	30.2	21.6	0.001
Learning activities ^e	18.9	13.6	16.8	0.403	13.2	22.5	15.7	0.026	16.5	17.2	0.741
Community activities ^f	5.4	13.6	21.6	<0.001	8.0	15.2	12.0	0.067	13.5	11.8	0.368
Media usage ^g	53.5	44.4	42.2	0.069	44.3	45.9	40.5	0.476	46.8	43.5	0.257
Outing/walking ^h	44.3	40.8	43.2	0.795	51.9	50.2	42.6	0.100	42.9	48.0	0.071
Conversation/communication ⁱ	41.1	33.7	38.9	0.346	67.5	61.0	55.0	0.025	38.0	60.9	<0.001

^aThe values in this table represent percentages (%) of the subjects who selected the corresponding activities. Multiple answers were permitted.

^b χ^2 test.

^cEngaging in computer games, *karaoke*, Japanese pinball (*pachinko*), betting on horse racing, taking a sauna, getting a massage, etc.

^dExercising, jogging, training, swimming, athletics, etc.

^eEnrichment lessons, appreciation of art works, reading, obtaining higher qualifications, etc.

^fParticipating in community events and meetings, volunteer activities, parent-teacher-association activities, etc.

^gTelevision, radio, newspaper, magazines, comic books, Internet, etc.

^hDriving, traveling, visiting an aquarium, attending events, walking, eating out, shopping, etc.

ⁱConversing with family, relatives, friends, or acquaintances either directly or via telephone, e-mail, etc.

development of future health promotion campaigns. We believe that the results of our study are representative of the general population for 2 reasons. First, our interview survey was conducted by stratified random sampling across Japan. Second, the results of the National Health and Nutrition Survey 2006 indicated that the percentage of people who never had sufficient sleep or did not have fairly sufficient sleep was 18.8% (1,540 of 8,208 male and female individuals aged 15 years or older) [12], which is very similar to the result (18.5%) obtained in our study.

The Japanese term *kyuu-you* (relaxation) for the promotion of health encompasses 2 types of behavior: rest (*kyuu*) and recreation (*you*). A similar division has been proposed by a group studying work psychology in the Netherlands and Germany. They distinguished 2 mechanisms, passive and active, which make vacations powerful recovery opportunities [9]. The passive mechanism is equivalent to the “rest” category in our study, and the active mechanism corresponds to the “recreation” category. In the present study, we framed the questions on the basis of these 2 categories and evaluated the associations between rest/recreation and self-perceived health. Sleep duration and sufficiency of sleep were included in the rest category (*i.e.*, passive relaxation), while free time used for activities other than rest and the level of effective use of free time for activities other than rest were included in the

recreation category (*i.e.*, active relaxation).

Our statistical analyses revealed significant associations between most of the items included in the passive and active relaxation categories and self-perceived mental/physical health. In addition, the relationships observed among the variables were such that the sense of self-perceived health deteriorated with increasingly insufficient rest/recreation. Logistic regression analyses using length of time (quantity) and sufficiency and level of effective use (quality) as explanatory variables, in which passive and active relaxation were included as covariates in the same model, revealed that these 2 variables were independently associated with self-perceived mental and physical health. These results indicate the possibility that both rest and recreation are indispensable for relaxation in the promotion of health, and that one cannot be substituted for the other. This indicates that when the Relaxation Guidelines are revised, after the roles of rest and recreation are clarified, specific guidelines for each of these 2 elements should be included. With regard to the “Health Japan 21” program [1], besides setting a target value for rest through sleep, it is necessary to consider setting specific target values for recreation.

Although little research has been done on the effects of relaxation on health, perhaps due to the lack of an established definition of and evaluation of rest/

Table 5 Logistic regression analyses using poor mental and poor physical health status as the dependent variable and activities performed during free time for the promotion of health as the explanatory variables

Activities performed during free time	Men						Women						
	Model 1 ^a		Model 2 ^b		Model 3 ^c		Model 4 ^a		Model 3 ^c		Model 4 ^a		
	N ^b	AOR	95% CI	N ^b	AOR	95% CI	N ^b	AOR	95% CI	N ^b	AOR	95% CI	
Leisure ^c	No	363	1.00	reference	366	1.00	reference	568	reference	573	1.00	reference	
	Yes	154	0.45	0.21–0.95	155	1.18	0.65–2.16	90	0.65	0.30–1.45	91	0.98	0.51–1.89
Sports ^d	No	357	1.00	reference	361	1.00	reference	515	1.00	reference	520	1.00	reference
	Yes	160	0.76	0.38–1.53	160	0.71	0.38–1.35	143	0.52	0.26–1.07	144	1.06	0.61–1.82
Learning activities ^e	No	431	1.00	reference	435	1.00	reference	543	1.00	reference	546	1.00	reference
	Yes	86	0.77	0.28–2.12	86	1.42	0.67–3.02	115	0.79	0.39–1.60	118	1.06	0.58–1.93
Community activities ^f	No	447	1.00	reference	450	1.00	reference	579	1.00	reference	585	1.00	reference
	Yes	70	0.55	0.18–1.64	71	0.41	0.14–1.20	79	0.19	0.04–0.79	79	0.27	0.09–0.77
Media usage ^g	No	278	1.00	reference	276	1.00	reference	370	1.00	reference	373	1.00	reference
	Yes	239	0.87	0.47–1.60	245	1.06	0.61–1.86	288	1.20	0.73–1.97	291	1.36	0.87–2.14
Outing/walking ^h	No	294	1.00	reference	295	1.00	reference	340	1.00	reference	342	1.00	reference
	Yes	223	0.33	0.16–0.68	226	0.49	0.26–0.90	318	0.66	0.40–1.11	322	0.67	0.42–1.07
Conversation/communication ⁱ	No	319	1.00	reference	321	1.00	reference	257	1.00	reference	260	1.00	reference
	Yes	198	1.07	0.56–2.01	200	0.89	0.49–1.62	401	1.37	0.81–2.32	404	0.99	0.62–1.57

^aIn each model, all of the activities (multiple answers were permitted) listed in this table were simultaneously inputted as covariates. Each model was adjusted for age, years of schooling completed, size of the city of residence, and working hours.

^bIn each section, the response "I don't know" and missing data were excluded from the statistical analyses.

^cEngaging in computer games, *karaoke*, Japanese pinball (*pachinko*), betting on horse racing, taking a sauna, getting a massage, etc.

^dExercising, jogging, training, swimming, athletics, etc.

^eEnrichment lessons, appreciation of art works, reading, obtaining higher qualifications, etc.

^fParticipating in community events and meetings, volunteer activities, parent-teacher-association activities, etc.

^gTelevision, radio, newspaper, magazines, comic books, Internet, etc.

^hDriving, traveling, visiting an aquarium, attending events, walking, eating out, shopping, etc.

ⁱConversing with family, relatives, friends, or acquaintances either directly or via telephone, e-mail, etc

AOR, adjusted odds ratio; CI, confidence interval.

recreation [4, 5], epidemiological data on vacation time have been gradually accumulating, because such data can be collected easily. A study in the United States reported that taking vacations decreased the risk of mortality associated with coronary heart disease [13]. Tarumi *et al.*, in their study of 357 Japanese male white-collar workers aged 20–59 years, reported that fewer vacations over an extended period of time was significantly associated with depression [7]. A study in Austria indicated that the subjects' physical complaints, quality of sleep, and mood at three days after a vacation showed improvement compared to those before the vacation [14]. In addition, de Bloom *et al.* performed a meta-analysis of 7 studies of vacation time and reported that vacations had positive effects on health and well-being [9]. The results of our present study suggest that sufficient rest and recreation are associated with good self-perceived mental and physical health, a finding that concurs with the results of previous studies.

Specific recreational activities were covered in this study. While the percentage of subjects engaging in media usage was the highest, followed by that for outings/walking among men, more than 60% of women selected conversation/communication, which was substantially higher than the second-highest option among women, outings/walking. The percentages for leisure and sports were significantly higher among men than among women. Some recreational activities showed significant differences in the percentage of subjects by age among both men and women. From these results we concluded that gender and age need to be considered when examining the promotion of health through recreational activities.

The results of the logistic regression analyses with regard to poor mental and physical health status showed significantly low adjusted odds ratios for outings/walking among men (0.33 [95% confidence interval; 0.16–0.68] and 0.49 [0.26–0.90], respectively) and for community activities among women (0.19 [0.04–0.79] and 0.27 [0.09–0.77], respectively). In a study of non-work-time behavior, Winwood *et al.* found that respondents reporting higher levels of active leisure activities, exercise, hobbies, and social activity reported significantly better sleep, recovery between work periods, and lower chronic maladaptive fatigue [15]. Social activity in their study corresponded to community activities in our study, and

women accounted for 72% of their subject population (225 females among 314 total workers). These factors suggested a degree of concordance between our results and those of Winwood *et al.* Another study of white-collar employees (109 females, 82 males) found that recuperation was facilitated by social behavior in the form of making new acquaintances [5]. Community activities included activities that offered some service to others, such as volunteer activity. On the basis of a study conducted on 104 women and 62 men in Germany, it was concluded that volunteer work during leisure time was positively related to important recovery experiences, suggesting that volunteer work contributes to successful recovery by creating new resources [16]. Such activities appeared to contribute to the well-being of others and were beneficial to the providers' health.

In our study, the outings/walking category included items such as driving and traveling. For Japanese men, taking time out from the daily routine and work appeared to have an important effect on health. It was previously noted that vacation, in terms of time taken off from work, offered the individual a chance to recover from work demands and to build new resources [17]. This finding and the results of our study indicate the importance of distancing oneself from daily life, particularly for men. With regard to leisure, for men the adjusted odds ratio with regard to poor mental health status was significantly lower than 1, but that with regard to poor physical health status was greater than 1 (1.18), although this value was not significant. From these results, it can be definitively concluded that there is no association between leisure and a sense of well-being.

In a study of 670 Japanese men and women, Ohta *et al.* reported that leisure-time exercise may be associated with better mental health in men [8]. A study in Canada indicated that physically active leisure could contribute to better health and provide a valuable resource for coping with stress [18]. In addition, a study in England reported that vigorous exercise during leisure time had a protective effect against coronary heart disease [19]. In our study, however, no significant association was observed between sports and physical or mental health for either men or women. In contrast, the results of a study conducted in France indicated that the long-term association between leisure-time physical activity and health-

related changes in the quality of life was limited and had little clinical significance [20]. The differences between the results of the previous studies and ours may be attributed to the different definitions and methods used to evaluate relaxation, the type of target population, and the study design. Epidemiological studies of the effects of relaxation on health have begun to be conducted only recently in Japan. More studies along similar lines are warranted in order to accumulate further data.

Our study had some limitations. First, because this was a cross-sectional survey, there was limited scope to establish a causal relationship between relaxation and self-perceived health status. Therefore, we could not determine from our findings whether outings/walking and community activities improved participants' self-perceived health or whether the participants could engage in outings/walking and community activities because they were in good health. Second, we had no information about other factors that might influence self-perceived health, such as the presence/absence of current and previous diseases, smoking, drinking alcohol, marital status, or intensity of labor. Third, all the data were subjective, and no objective data were used. It should be noted that self-perceived health and the actual health status of a participant may not always coincide. Fourth, the response rate of 55.5% was not particularly high. If more of the physically healthy and mentally relaxed individuals in the sample had provided data for our survey, then the prevalences of poor mental and physical health may have been underestimated. Finally, some of the types of recreational activities included in the questionnaire could be interpreted as "resting" activities. We plan to improve the study design for a future survey in order to correct the above-mentioned shortcomings.

When the Ministry of Health, Labour and Welfare of Japan began to study relaxation for the promotion of health towards the end of the 1980s, Nozaki *et al.* classified *kyuu-you* into 5 categories: break (*kyuu-soku*, in Japanese), measured in units of one second; recess (*kyuu-kei*), in units of 1 minute; private time (*shiteki-jikan*), in units of 1 hour; weekend (*shuu-kyuu*), in units of 1 day; and vacation (*kyuu-ka*), in units of 1 week or 1 month [2, 3]. Among these categories, epidemiological data have been accumulated for the "vacation" category, as mentioned earlier. However, the other categories of relaxation have not been examined suffi-

ciently [16, 21–23]. The classification and definition of relaxation (*kyuu-you*) must be clarified, and further epidemiological studies should be carried out to clarify the effects of relaxation on health. On the basis of the data obtained from these studies, it will be possible to plan and implement evidence-based health policies, such as health promotion campaigns.

In conclusion, in this study, we conducted a nationwide interview survey to examine the sleep and recreation status of the Japanese population and the associations between specific recreational activities and self-perceived mental and physical health. The findings suggest that the preferable forms of relaxation for the promotion of health should include both passive relaxation (rest) and active relaxation (recreation). In addition, it was found that having sufficient sleep is important for passive relaxation, and that outings/walking for men and community activities for women are important forms of active relaxation.

Acknowledgments. The present study was supported by a Health Science Research Grant from the Ministry of Health, Labour and Welfare of the Japanese Government (*H20-Junkankitow-Ippan-002*).

We would like to thank all the participants who answered the survey questionnaire. We are also grateful to Ms. Hiromi Sekine and Ms. Hiromi Hoshino for their help with this study.

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