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Is Interest in Art Effective in Health-Related Quality of Life?

—Results of a Cross-Sectional Survey on Lifestyle and Health Promotion—

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The objective of this survey was to examine whether lifestyle and health practices can change the health-related quality of life (HRQOL), and how much weight should be placed on each item. A cross-sectional survey by self-administered questionnaires using the SF-36 and questions of our own on lifestyle was conducted in Japan on November 5 to 7, 1999. Volunteers consisted of 147 men and 152 women over 20 years of age. Gender, age, living alone, and lifestyle items such as eating breakfast, regular sleep, and drinking alcohol were significantly associated with the SF-36 profiles. The trends corresponded to those obtained with the previous studies conducted in other countries. Interest in art and regular sleep showed the highest significance (P<0.001) in MANCOVA of eight domains. From the results of multiple regression analysis, drinking alcohol and regular sleep was closely related to physical health status. In the mental component summary and related domains, the important factors were regularity of sleep, not living alone, eating breakfast, interest in art, and drinking alcohol. We concluded that the SF-36 is an appropriate measure to determine effects of lifestyle improvement and assess health promotion programs.

Key words : Quality of life, SF-36 questionnaires, Lifestyle, Art, Cross-sectional survey

INTRODUCTION

The art of medicine centering on patients defined by Plato was quoted on the title page of the textbook by Sir William Osler [4, 16]. In recent years, health-related quality of life (HRQOL) has received well-deserved attention. HRQOL is used for medical outcome research as an index of subjective health status and daily living function. It is very important that aggressive studies and applications of HRQOL should be undertaken for preventive medicine and health promotion as well as curative medicine, rehabilitation, and terminal care. Health promotion programs and educational intervention contribute to prevention of diseases, prolonging longevity, raising HRQOL, and curtailing medical expenses, through improvements of lifestyle such as dietary habits, drinking alcohol, smoking, exercise, sleep, and social activities. It was proved by the Alameda County Study that lifestyle affects health status and mortality [2, 6].

Policies related to health promotion have been established not only by the World Health Organization (WHO), but also by the Ministry of Health and Welfare of Japan [23], which conducts campaigns to prevent and overcome disorders caused by lifestyle. Local governments and associations also play an essential part in the campaigns. Measurement of HRQOL is regarded as one of methods by which we assess effects on lifestyle improvement through health promotion programs. Although accurate measurement and statistical analysis of HRQOL are difficult because of the close relation to patients' self-satisfaction, numerous measures of HRQOL have been vigorously exploited, and utilized to estimate health status [25].

The choice of an instrument should take account of its validity, reliability, and sensitivity based on the objective of the study [9]. We chose the SF-36 (36-Item Short-Form Health Survey), which is a self-administered questionnaire and generic measure of health status. It is not age or disease specific, and consists of eight domains: physical function-

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ing; role physical; bodily pain; general health; vitality; social functioning; role emotional; and mental health. The SF-36 had been developed by Ware et al. in the United States mainly to assess medical outcomes of chronic disease from the standpoint of patients [26]. It has also been widely used in many countries such as the United Kingdom [5, 14], Switzerland [19], France [15] and Spain [20]. In Japan, this measure has been translated, and its validity and reliability have been verified [11]. Advantages of the SF-36 include convenience, simplicity of response, and saving time because of fewer items.

Various studies on lifestyle using the SF-36 were carried out with regard to daily habits such as drinking alcohol [24] and smoking [30, 32]. However, few studies were undertaken to survey the overall lifestyle, or to determine what items are closely associated with HRQOL. The objective of this study was to examine whether lifestyle and health practices change HRQOL values using the SF-36, and how much weight should be placed on each item.

METHODS

On November 5 to 7, 1999, an event to promote healthy lifestyles attracted more than 12,000 visitors to Ohito, a town about 100 km west of Tokyo, Japan. Most of the visitors were generic consumers and also included officials, scientists, and health professionals. We recruited volunteers who consented to participate in this survey after hearing our explanation at the MOA Health Science Foundation booth. This foundation was established as a non-profit organization to study and promote healthy habits and practices, authorized by the Minister of Health and Welfare of Japan.

The participants completed both the SF-36, Japanese version 1.20 and the questionnaire consisting of gender, age group, number of persons living together, and lifestyles. The questions on lifestyle were:

(1) eat breakfast;
(2) prefer rice over bread or noodles;
(3) cook dinner at home;
(4) choose organic foods;
(5) regular sleep;
(6) hours of sleep;
(7) drink alcohol at present;
(8) have drunk alcohol previously;
(9) smoke at present;
(10) have smoked previously;
(11) amount smoked daily;
(12) exercise;
(13) undertake art-related activities
(14) control diet.

These questions were selected from three aspects: the WHO definition of health; the results of the Alameda County Study [2]; and Japanese interests in lifestyle and health promotion. Scores of the physical component summary (PCS), mental component summary (MCS), and the eight domains were calculated with SAS® version 6, a software package for statistics, according to the SF-36 manual. The domain scores were scale data of 0–100, and the summaries were deviation scores of mean 50. The z-scores (standardized normal distribution) and factor loadings from the US population were used for the summaries [27].

Data analysis

For the age groups, we created eight categories: 10–19, 20–29, 30–39, 40–49, 50–59, 60–69, 70–79, and over 80. The number of respective cases were 12, 59, 57, 58, 71, 35, 16, and 3. Three categories over 60 were combined only when the age group was used as a fixed factor. Persons in the 10–19 age group were excluded from analysis because of legal prohibition against smoking and drinking alcohol at under 20 years of age in Japan.

Variations of the SF-36 profiles by gender and age were analyzed by means of multivariate analysis of variance (MANOVA) according to the SF-36 manual because it was proved that MANOVA could be appropriately used [22, 28]. Since both gender and age affected the SF-36 profiles, they were analyzed by means of multivariate analysis of covariance (MANCOVA) for adjustment. In case of gender as a fixed factor, MANCOVA was run with adjustment of age as a covariate. However, in case of age, MANCOVA was run with adjustment of gender. The other factors were analyzed with MANCOVA adjusted for both gender and age as covariates. In addition, correlation between the SF-36 profiles and age was also tested.

The item "number of persons living together" was divided into two groups: living alone and others, according to the results of a preliminary analysis. The item "hours of

sleep" was also divided into the following categories: 4 hrs or less, 5 hrs, 6 hrs, 7 hrs, and 8 hrs or more. The two items related to drinking alcohol were divided into four categories: frequent drinker, occasional drinker, ex-drinker, and non-drinker. The smoking items were also divided into four categories: smoker, occasional smoker, ex-smoker, and never smoked. The answers to the other items on lifestyle consisted of three response choices: "yes," "sometimes or a little," and "no." After analysis of the responses for three categories, the responses to these items were divided into two categories of "yes" and "others".

To estimate the relationship between HRQOL and lifestyle factors, multiple regression analyses were performed under the condition that each of the SF-36 profiles was a dependent variable, and gender, age, and selected lifestyles were independent variables (explanatory variates). We selected the lifestyle factors for which significant differences were found among the SF-36 profiles with MANCOVA. To assess the predominant factors, we adopted stepwise method in which the step-in condition of probability was 0.05 and step-out was 0.1. Since the response choice could not have linear relation, binary variables were used as dummy variables except for age and hours of sleep, which were applied with raw data before they had been combined. Statistical analyses were conducted using SPSS® for windows, version 9.0.

RESULTS

During the 3-day event, 311 volunteers consented to participate in this survey and completed the SF-36 and questionnaire. The sample we used was 299 persons comprising 147 men and 152 women, because of exclusion of persons under 20 years of age.

Table 1 indicates the difference of the SF-36 profiles between genders, and the age groups, together with F values from the results of MANCOVA. The men had significantly higher scores than the women in PCS, physical functioning, and bodily pain. In the age groups, significant differences were found in MCS and five domains. In these profiles, positive trends were observed in MCS ($r = 0.335$), vitality ($r = 0.326$), social functioning ($r = 0.212$), and mental health ($r = 0.294$), while a negative trend was in physical functioning ($r = -0.265$). These results showed Pearson's correlation coefficient and were significant ($P < 0.001$). In multivariate analysis, no significant difference was found between genders, but a high significant difference ($P < 0.001$) was obtained among the age groups.

Significant differences in several lifestyle items were found from results of MANCOVA adjusted for gender and age (Table 2). Persons living alone had significantly lower scores than those living with more than two persons in MCS, role physical, and role emotional. Persons eating breakfast every day had significantly higher scores than those sometimes eating or not eating breakfast in MCS, role emotional, and mental health. Persons sleeping regularly had significantly higher scores than those sleeping irregularly in both summaries and most of the items except for physical functioning and mental health. Concerning hours of sleep, scores of MCS, role physical, social functioning, role emotional, and mental health were significantly lower in persons sleeping under 4 hours. Alcohol drinkers obtained significantly higher scores than non-drinkers in PCS and four domains related to the summary. People who exercised had significantly higher scores in physical functioning and general health. Lovers of art had significantly higher scores than persons sometimes or not showing interest in art in general health, vitality, and mental health. From the results of multivariate analyses, significant F values were found in regularity of sleep, hours of sleep, and interest in art. Smoking and other items except for those mentioned above did not show any significant difference from the SF-36 profiles.

From the results of multiple regression analyses, the predominant factors for PCS, according to priority, were drinking alcohol at present, regularity of sleep, and age (negative). On the other hand, the predominant factors for MCS were, similarly, age, regularity of sleep, and living alone (negative). The regression models of eight domains are shown in Table 3. Values of R square (multiple correlation coefficient) in vitality, mental health, and physical functioning were higher than the others. Regularity of sleep and drinking alcohol were associated with six domains. Mental health was related to age, eating breakfast, interest in art, and

Table 1 Mean ratings of two summaries and eight domains on the SF-36, and results of MANCOVA on gender and age †

	Gender			Age					
	Male (n = 147)	Female (n = 152)	F value	20–29 (n = 59)	30–39 (n = 57)	40–49 (n = 58)	50–59 (n = 71)	60 + (n = 54)	F value
Physical component summary	50.3	48.3	3.985*	50.8	49.8	49.7	48.5	47.5	1.484
Mental component summary	48.3	48.4	0.884	42.7	45.6	48.8	52.3	52.0	11.388***
Eight domains									
Physical functioning	90.6	86.3	5.435*	92.8	90.9	89.9	85.2	83.7	4.742**
Role physical	79.4	73.2	2.086	74.2	79.0	82.8	75.4	69.9	0.955
Bodily pain	70.9	66.8	3.905*	65.4	67.4	68.2	71.7	71.1	1.231
General health	67.0	64.6	2.185	65.5	61.8	64.8	69.2	67.0	1.807
Vitality	63.3	63.4	0.844	53.9	56.9	63.5	71.5	69.5	11.223***
Social functioning	80.3	80.2	0.448	72.9	75.9	81.0	85.6	85.0	4.906**
Role emotional	76.2	73.2	0.966	65.0	75.4	75.9	84.0	71.0	2.678*
Mental health	72.8	71.5	2.571	63.8	67.0	74.0	75.4	80.4	8.622***
Multivariate analysis			1.090						3.975***

* $P<0.05$ ** $P<0.01$ *** $P<0.001$

† F values of gender analyzed in MANCOVA adjusted for age as a covariate, and those of age adjusted for gender as a covariate.

Table 2 F values from Results of MANCOVA on lifestyles only with significant differences of the SF-36 profiles, adjusted for gender and age as convariates

	Living alone	Breakfast	Regularity of sleep	Hours of sleep	Drinking alcohol	Exercise	Interest in art
Physical component summary	0.129	0.194	5.645**	0.299	5.904**	2.351	0.690
Mental component summary	5.985*	7.928**	6.106**	4.040**	0.890	0.810	2.094
Eight dimensions							
Physical functioning	0.072	0.097	1.719	0.850	4.039**	4.079*	0.001
Role physical	6.960**	2.230	6.546**	2.467*	4.149**	1.424	0.653
Bodily pain	0.539	0.001	8.158***	1.812	3.004*	0.115	2.192
General health	0.026	0.197	5.183**	1.095	4.690**	3.186*	7.070**
Vitality	2.380	2.881	8.135***	0.761	1.693	1.888	4.742*
Social functioning	0.834	1.235	8.703***	2.432*	1.598	0.840	2.063
Role emotional	8.319**	4.928*	6.609**	5.567***	2.538	1.319	0.000
Mental health	3.724	7.451**	1.881	3.216*	0.196	0.342	5.298*
Multivariate analysis	1.815	1.429	2.681***	1.788**	1.453	1.366	4.113***
Number of categories	2	2	3	5	4	3	2
Trend-higher scores	not alone	eating	regular	over 5 hours	drinker	practice	practice

*P<0.05 **P<0.01 ***P<0.001

Table 3 Results of multiple regression analysis of the relationship between each domain of the SF-36 and factors

Physical functioning				Role physical			
	B	SE	β		B	SE	β
Age	−1.997***	0.487	−0.239	Drinking alcohol	15.132***	3.789	0.223
Drinking alcohol	5.574***	1.448	0.215	Regularity of sleep	12.000**	3.774	0.177
Exercise	3.762*	1.554	0.137	Living alone	−10.446*	4.648	−0.125
Constant	92.131***	2.361		Constant	62.631***	3.837	
R		0.358				0.300	
R sq.		0.128				0.090	
Adjusted R sq.		0.119				0.081	
F value		14.478***				9.726***	
Bodily pain				General health			
	B	SE	β		B	SE	β
Regularity of sleep	10.310***	2.463	0.236	Drinking alcohol	8.046***	1.978	0.225
Drinking alcohol	5.913*	2.474	0.135	Regularity of sleep	6.818**	1.966	0.192
				Interest in art	5.912**	1.947	0.168
Constant	59.469***	2.428		Constant	54.354***	2.163	
R		0.261				0.326	
R sq.		0.068				0.106	
Adjusted R sq.		0.062				0.097	
F value		10.855***				11.689***	
Vitality				Social functioning			
	B	SE	β		B	SE	β
Age	3.574***	0.717	0.283	Regularity of sleep	9.161***	2.325	0.223
Regularity of sleep	8.614***	2.104	0.221	Age	2.255**	0.755	0.169
Drinking alcohol	4.751*	2.117	0.122				
Interest in art	4.487*	2.097	0.116				
Constant	38.870***	3.537		Constant	65.772***	3.281	
R		0.426				0.308	
R sq.		0.182				0.095	
Adjusted R sq.		0.171				0.089	
F value		16.323***				15.523***	
Role emotional				Mental health			
	B	SE	β		B	SE	β
Regularity of sleep	13.296**	3.982	0.188	Age	3.146***	0.706	0.257
Living alone	−15.270**	4.905	−0.174	Breakfast	8.351**	3.009	0.156
Drinking alcohol	7.876*	3.998	0.111	Interest in art	4.941*	2.096	0.132
				Gender	4.546*	2.071	0.122
Constant	65.543***	4.048		Constant	47.481***	3.864	
R		0.275				0.375	
R sq.		0.076				0.141	
Adjusted R sq.		0.066				0.129	
F value		8.062***				12.042***	

*P<0.05 **P<0.01 ***P<0.001

gender (male) in descending order.

DISCUSSION

This sample was not so large, but showed well-balanced distribution of gender and age. PCS of the men was 50.3 (± 0.50 SE) and MCS was 48.3 (± 0.84 SE). Comparing these data with 51.05 (± 0.29 SE) and 50.73 (± 0.29 SE) of the general population in the USA, we found that PCS corresponded to the US norms, but MCS was significantly lower ($P < 0.01$) by the z-test. Both summaries of the women were similar to 49.07 (± 0.28 SE) and 49.33 (± 0.27 SE) in the US. (Values of SE were calculated from the US norms in the manual [27].) In the UK, a similar trend was also found in the assessment of the SF-36 version 2 [14]. The trend for men to have higher scores than the women in PCS corresponded to the US norms, but in MCS, no difference was found between genders, and consequently, this result did not in correspond to the norms. The previous papers said that, in these summaries, nine European countries (Denmark, France, Germany, Italy, the Netherlands, Norway, Spain, Sweden, and the UK) corresponded closely to the US, but suggested that the SF-36 in Japan required a country-specific algorithm [12, 13]. Positive trends in MCS were observed among the age groups, which also corresponded to the American norms. MCS and related domains were more conspicuous for these trends than PCS. Since gender affected physical health and age was closely related to mental health from the above results, we were obliged to consider that gender and age influenced lifestyle items.

Drinking alcohol was the most positive factor of PCS in this survey. Of course, this did not mean that alcohol abuse brought about good health. The study on alcohol consumption and health-related quality of life with the SF-36 reported that frequent, low-quantity drinkers had the highest overall HRQOL, especially PCS [24]. The reason why drinkers were in better physical health appeared to be not only the beneficial effect of moderate drinking, but also the change when heavy drinkers with physical problems stopped drinking alcohol.

Regularity of sleep was the second positive factor in both of PCS and MCS, and the lifestyle item most associated with three domains of bodily pain, social functioning, and role emotional. Sleeping seven or eight hours a day is known as a healthy habit [2]. We found that regularity of sleep was more closely related to HRQOL than hours of sleep. Irregular sleep also included habitual sleeplessness. Our results were similar to the study in which insomnia was proved to reduce all scores of eight domains of the SF-36 [33].

Living alone had a negative association with MCS, role physical, and role emotional. Social networks included marital status affected mortality in the Alameda County Study [3]. The category of living alone may have included most of those who had not been married or lost a partner, but was not equal to marital status. Further study is expected on the association of each item with HRQOL.

Eating breakfast was related to MCS and the two domains of role emotional and mental health, but not to PCS. It was the second most important factor in mental health. In the nine-year mortality follow-up of the Alameda County Study, skipping breakfast was not associated with lower mortality and had the lowest coefficient among the seven health-related practices by multiple logistic analysis [31]. Mortality is more closely associated with physical health than mental health. It was a relevant assumption that those who had poor mental health tended to skip breakfast rather than eating breakfast elevated mental well-being.

This study revealed that interest in art was significantly associated with general health, vitality, and mental health by multiple regression analysis. It had the highest F value of MANCOVA among lifestyle items, although F values changed with their distribution and degrees of freedom. The effect of art is that appreciation of beauty or art brings mental satisfaction. Interest in art (including visits to art museums, listening to music, tea ceremony, and flower arrangement) is empirically recognized to be associated with health status. Recently, art therapies such as painting, playing music, and making ceramics have been developed in many countries, and were reviewed [1, 21]. The previous studies explained that therapies involving art improved mental health status of patients. There is also the interpretation that those with mental stability can afford to enjoy art activities. To determine interest in

art as a behavioral factor and prove the causal relationship between art and health status, a prospective study via educational intervention needs to be carried out. It was suggested that the SF-36 would be useful in estimating the effects of art therapies and intervention.

For smoking, no difference was found, and this result did not correspond to the previous studies [30, 32]. We considered that most of the smokers had not presented subjective symptoms over threshold, although smoking is known as risk factors of many diseases. In the survey of 1979, there was little relationship between smoking status and depressive symptoms [10], but, recently, smoking status, especially nicotine dependence, was significantly associated with scores of CES-D (Center for Epidemiologic Studies Depression Scale) in the US [7]. It was suggested that smokers in better mental health tended to succeed in smoking cessation, thus reducing the population of smokers. One of the reasons why HRQOL was not associated with smoking in the present study was probably that the percentage of smokers is higher than in the US and guilty conscience concerning nicotine dependence is less than that for other addictions such as alcohol and drugs.

We emphasize that interest in art as a behavioral factor was associated with HRQOL more significantly than both smoking and exercise which are typical health-related habits. This is in agreement with a report in which the arts such as dance, music, literature, museums and galleries were found to play a role in Britain's health care and public health systems to complement medical treatment [17]. We recognize that this survey had some bias because most of participants were interested in health promotion more than the public. The participants of this survey, however, provided normal scores of the SF-36 and trends corresponding to most previous studies, which means that the population of visitors to the event was similar to the general population of Japan and the US. It is necessary to investigate the reproducibility in randomized samples and international adaptation. Moreover, new types of alternative and complementary therapies as well as traditional medicine such as Chinese medicine are increasing and becoming concerns for Japanese. In the US, they are also increasing and are covered by insurance [8, 18]. These trends seem to be beneficial for health promotion and preventive medicine, provided that they are confirmed through statistical verification [29].

Limitations of this study were as follows:

(1) The relationship of cause and effect did not emerge because it was a cross-sectional study.

(2) This sample was not a randomized population, and had a bias in that the participants were more interested in health promotion.

CONCLUSIONS

The relationship between lifestyle and HRQOL was studied using the SF-36 questionnaires in Japan. Drinking alcohol and regularity of sleep were closely related to physical health status. In MCS and related domains, the important factors were regularity of sleep, not living alone, eating breakfast, interest in art, and drinking alcohol. Trends of gender, age, and lifestyle items such as eating breakfast, regularity of sleep, and drinking alcohol were similar to previous studies conducted in other countries. It was, therefore, considered that this sample was not special, but close to the general population.

This study reveals that interest in art was significantly associated with general health, vitality, and mental health in the SF-36 profiles by multiple regression analysis. Since elevation of HRQOL is one of the essential targets in health promotion, incentive for art activities, as lifestyle or as one form of therapy, may contribute to community mental health. We found that the SF-36 is an appropriate measure to determine the effects of lifestyle improvement and assess health promotion programs.

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