Quality of Life Domains in the Healthy Public: A Trial Investigation Using Attendants for an Annual Health Checkup

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Abstract

A trial investigation of subjects gathered for annual health checkups was performed to detect domains of quality of life in the healthy public, and to explore the changes of their demographic characteristics for the possibility of engaging them in health service activities in the community. The eligible 1,096 subjects aged 30-79 years were investigated. The period of this survey was from September to December, 1997. The subjects were questioned using ten quality of life domains which were preliminarily prepared and had been assumed to be most important in the subjects' lives in relation to the order of priority, importance, and satisfaction levels. The first most important domain in both the male and female subjects' lives was personal health, followed by relationships with family, though the mean importance scores for their personal health and relationships with family were almost equivalent. The mean scores for work abruptly decreased in males over 60 years of age. Also, the first large and the second relatively small principal components were extracted through principal components analysis. The proposed ten domains of quality of life are most likely valid and reliable in terms of the results analyzed and the comparison with a referred study. Relationships with family is an effective cue for health service activities in the community, and the significance of work on quality of life in the healthy public will have to be taken into account separately, especially in males.

Key words: quality of life, healthy public, family, work, health services

Introduction

Recently, quality of life¹⁻⁵⁾ has become a common concern in both clinical and health services fields. It has been pointed out as the background of flourishing quality of life measurement that there is a growing population of elderly and more developed medical skill and technology²⁻⁴⁾. Whether prolonged years of life are spent in good or poor health is a serious problem for all people. In medical interventions or treatments, nowadays, it is not uncommon to evaluate not only the clinical but also the overall health status including social well-being, so-called quality of life or health related quality of life⁴⁾, though the definition is not identical to quality of life^{1-3,6-12)}. Along with the increase of the

measurement of quality of life, various kinds of tools or scales have been developed. Those scales are normally arranged into five groups according to their intended applications³⁾: that is, clinical scales, cancer patients scales, those in primary care, general evaluative methods, and the well-being of the elderly. Some of the scales have been confirmed and proliferated in terms of validity and reliability²⁻⁴⁾, despite many kinds of measurement scales. Those qualified and popularly used generic scales are practically useful, and they have contributed to the assessment and improvement of quality of life of the patients who have physical or psychological disabilities. Meanwhile, Schipper et al.⁴⁾ presented one of the representative definitions for quality of life. They defined quality of life as that which "represents the functional effect of an illness and its consequent therapy upon a patient." In the case where the subjects to be assessed are patients, quality of life measurement could appropriately assess whether the changes due to clinical interventions or treatments are worthwhile.

Despite the effectiveness of scales for quality of life assessment with patients as above, when they are applied to health services fields, other problems are raised due to the nature

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of the subject, the healthy public. Healthy people are not usually aware of physical or psychological defects, and disease specific measures are naturally not valid. Even when general evaluations³⁾, such as the McMaster Health Profile¹³⁾, the Sickness Impact Profile¹⁴⁾, SF-36¹⁵⁾ and so on, are applied, they may not be suitable. It has been pointed out^{3,4,16)} that almost all the tools have been developed on the basis of the analysis with ill health subjects or of literature reviews and descriptions of health professionals. It would also be a valid argument¹⁶⁾ for parameters of quality of life to be weighed differently for different types of people. Once subjects are healthy, what should be measured as quality of life has to be primarily discussed as a matter of course. In public health activities, as health services policies for the healthy public¹⁷⁾ are one of major issues to be addressed, surveys about quality of life domains based and focused on healthy population are thought to be important. In other words, what domains constitute quality of life in the healthy public and how are they applied in terms of public health activities?

An interesting investigation was reported by Bowling¹⁶⁾ in 1995. The study was conducted based on a random sample of 2,000 adults in Great Britain to obtain "population norms on pertinent domains of quality of life." After reviewing quality of life measurement scales presented at that time, what was most important in people's lives, not the lives of patients, was questioned in the investigation. Such a study seemed to result in surpassing the range of health related quality of life, though it depended on the definition of quality of life. However, without detecting the domains of population norms, practical and effective health service activities for the healthy public could not be expected, and it also seemed to be meaningful that such types of studies were tried in different populations. In this investigation, based on the studies above, the authors conducted an examination on quality of life domains of the healthy public using Japanese subjects. In health service fields, activities geared towards the healthy public are also placed in a position of high importance, and, therefore, research inquiring about quality of life domains and their applications is expected to be able to give basic guidelines for public health activities. This is the first report from our study, and the following issues were our main concerns in analyzing quality of life for the healthy public: What do healthy people consider to be important in their lives? What characteristics of the subjects are described using those quality of life domains?

Subjects and Methods

1. Subjects investigated

This investigation was conducted as part of a larger study for examining quality of life in the elderly. The subjects who were investigated resided in the neighboring town of a metropolitan city in the Kyushu district, Japan. The town is one of the so-called bedroom towns. According to "The 1995 Population Census of Japan¹⁸⁾," the characteristics of the town are shown below: The number of residents was 31,504 and the population density was 2,231 per square kilometer. The percentage of the inhabitants who were 65 years of age and over was 10.5% and was not high compared to the average in Japan of 14.5%. One-person households were 18.5% and low in comparison with the average in Japan of 22.6%. Moreover, the percentages of those who were engaged in primary, secondary and tertiary industries were 1.8%, 27.0% and 70.4%, respectively. Those percentages in Japan were 6.0%, 31.6% and 61.8%, respectively, and those engaged in the tertiary industry were dominant in this subjective town. Those engaged in wholesale, retail or eating and drinking work seemed to nearly correspond to those in self-employment work. The percentage of those engaged in such works was 26.2% in this subjective town, and this number was a little high in comparison with the average in Japan of 22.8%.

The subjects for the survey were the residents who gathered to have annual health checkups held by the health and welfare section of the town during the period of August to December, 1997. The total number of subjects was 3,145 during the period, but because this survey started from September, only 1,843 subjects were examined. Seventeen hundred and two subjects (92%) agreed to respond to this investigation (see Table 1). The nature of those who gathered for the health checkup was as follows: The number of households which had been registered by the town was about 10,540 at the end of September, 1996. All of the households were asked whether there were members who needed checkups by the agency of the town, and about 80% of households replied to the inquiry. In this case, school children, those who joined health insurance systems for the employees of large companies and their dependents, inpatients and those under continuous medical care were originally ineligible for the health checkup. In all, 6,250 inhabitants, 73% of the eligible subjects, replied to have had the health checkup. Mainly because of scheduling reasons, 3,145 persons (47%) actually visited the medical center for the checkup during the term of August to December, 1997. The subjects investigated were not the healthy public in the strict sense. They, however, were basically those who gathered to have annual health check according to the conditions above, and in this sense they were healthy and appropriate for the purpose of this analysis.

Table 1 Number of subjects investigated and analyzed

Subjects			Age groups							
			-29	30	40	50	60	70	80-	Total
Investigated:	male	n	6	59	83	62	157	79	12	458
		%	1.3	12.9	18.1	13.5	34.3	17.2	2.6	100
	female	n	39	236	301	270	291	99	8	1,244
		%	3.1	19.0	24.2	21.7	23.4	8.0	0.6	100
Analyzed:	total	n	45	295	384	332	448	178	20	1,702
	male	n	—	41	55	45	97	47	—	285
		%	—	14.4	19.3	15.8	34.0	16.5	—	100
	female	n	—	156	216	203	186	50	—	811
		%	—	19.2	26.6	25.0	22.9	6.2	—	100
	total	n	—	197	271	248	283	97	—	1,096

No significant differences of percentages in relation to age groups among the subjects investigated and analyzed were found in the same sex groups.

2. Survey methods

Independently or with family members, the subjects came to the place where the health checkup was held. That is, they at least had the physical capability to be able to move and walk by themselves.

All of the subjects had a medical checkup: Physicians performed the physical examination, and some medical checkup tests, for example, blood pressure measurement, urine tests, extracting blood samples and so on, were conducted by well-trained medical specialists. Health nurses also checked subjective physical complaints about their health status, and recorded the patients' histories including illnesses the subjects were consulting doctors about at that time and diseases which the subjects had suffered in the past. After the medical examinations above, the subjects were asked to fill out a self-administrated questionnaire designed and prepared by the authors in order to inquire about their quality of life, life satisfaction and other related questions. Preliminarily, troubles answering the questionnaire were expected as it had to be completed individually. Therefore, staff who could assist the subjects stood by and replied to the questions asked by the subjects related to the questionnaire items. They also encouraged the subjects to respond to all of the question items.

3. Items investigated

The questionnaire consisted of the following six parts: activities of daily living and pain, social networks and support, quality of life and life satisfaction, subjective physical complaints, present illnesses and demographic items. However, only the related items, quality of life domains, life satisfaction, some demographic variables and presence of illnesses, were analyzed in this article for the purposes described in the introduction.

The items for quality of life domains which questioned the subjects about what was important in their lives were derived from the results of the referred study¹⁶⁾ and given some modification in consideration of the nature of the subjects, that is, healthy Japanese people. In the study mentioned, the subjects were asked to list freely up to five items they thought to be most important. The method had been based on the schedule for the evaluation of individual quality of life¹⁹⁻²²⁾ (SEIQoL), and modified for the convenience of surveying a large number of samples. The authors, moreover, made arrangements based on those results. That is, some items which indicated a high priority order in the investigation were chosen as candidate items for our

subjects to list as the quality of life domains which they thought to be important in their lives. Nine items were almost the same as those in the referred study in terms of content. Instead of the item for 'health of someone close/responsible for', morale in daily living was included in this investigation. The reason for this was that the former item was not about the subjects themselves, and seemed to be difficult to apply to health service activities. Finally, the following ten items were prepared in the questionnaire as candidates for quality of life domains: i) social and community life, ii) hobbies and learning, iii) standard of living, iv) personal health, v) relationships with family, vi) morale in daily living, vii) relationships with friends, viii) work, ix) self-supported living, x) religion or belief.

First, respondents were asked to rank each of the ten items according to the order of priority that they thought to be important in their lives. Second, respondents provided importance scores to the items on a scale of a hundred, and third, present satisfaction levels with each item were also questioned on a scale of a hundred. Separated from quality of life questions, life satisfaction level was surveyed using a horizontal visual analogue scale²³⁾, labeled 'perfectly satisfied' and 'perfectly unsatisfied' at both extremities. Life satisfaction level was assessed by the distance from the dissatisfaction end.

4. Analysis methods

Questionnaires were collected after the checkup had ended, and data was entered into a computer system. The number of the subjects investigated was 1,702, but the number of those aged 29 years or younger and 80 years or older was insufficient for analysis (see Table 1). Also, there were some missing values in the answers about quality of life domains, despite assistance of the staff, and finally 1,096 subjects aged 30 to 79 years were eligible for the following analyses. All of the analyses were performed from the viewpoint described in the introduction; that is, to explore quality of life domains in the healthy public, and to describe demographic characteristics of the subjects through the quality of life scales above. All statistical calculations were conducted using the computer software, SAS²⁴⁾ (Statistical Analysis System).

In order to comprehensively outline the subjects' norms in quality of life domains, the orders priority were examined first. The percentages of those who replied to the order of each of the ten items were calculated by sex. Next, the following analyses were conducted by sex and by ten-year age groups to explore the trend of quality of life domains among generations: The mean scores for importance and satisfaction levels were calculated for each of the ten items. Also, as Calman²⁴⁾ defined quality of life as the gap between expectations and experiences, difference scores between importance and satisfaction levels were calculated as another quality of life indicator.

In this analysis, the proposed ten items for quality of life domains were previously prepared, and whether these items were also suitable to these subjects was also a problem. Partial correlation coefficients²⁶⁾ between life satisfaction and satisfaction with quality of life domains were calculated after adjustment was made by sex and age. Moreover, principal components analysis²⁷⁾ was conducted using importance scores to confirm the characteristics of quality of life domains. In order to describe the subjects' quality of life characteristics, mean scores were calculated according to demographic variables of sex, age, the presence of others in the household, occupations and presence of

Table 2 Subjects investigated and analyzed: demographic characteristics and the prevalence of those who had diseases (%)

Variables	Male (n=285)		Female (n=811)	
	investigated	analyzed	investigated	analyzed
Living conditions:				
alone	3.5	2.9	3.8	2.9
with spouse	87.5	88.2	83.5	85.9
someone other than spouse	9.0	9.0	12.7	11.2
Occupations:				
self-employed	30.9	35.8	12.1	13.9
employee	30.4	28.7	6.8	6.4
homemaker	—	—	23.9	24.1
others	38.7	35.5	57.2	55.7
Illnesses:				
having	31.9	26.9	26.1	24.3
not having	68.1	73.1	73.9	75.7

No statistical significances were found between subjects investigated and analyzed with the three demographic variables in the same sex groups.

illnesses, and were plotted in the first and second principal component dimensions plane (see Table 2 for categories of demographic variables). Mean scores were calculated for both importance and satisfaction levels.

Results

1. Demographic characteristics of the subjects

The number of the subjects investigated and analyzed is indicated by sex and ten-year age groups in Table 1. The number of male and female subjects investigated was 458 and 1,244 respectively and totaled 1,702, but the eligible subjects for analysis aged 30-79 years numbered 1,096 (64%), 285 males and 811 females. Others were not included because of missing values in their responses. Females were 74% of all the subjects analyzed. The number of those in the 60-69 age group was relatively more compared to other age groups in males, and the number in the

70-79 age group was less in females. No significant differences of percentages in the age distribution between the subjects investigated and analyzed were found in the same sex groups.

The distributions of the demographic variables other than sex and age, that is, the presence of others in the household, occupations and presence of illnesses, are indicated in Table 2. The results show that no significant differences between the percentages of subjects investigated and those analyzed with the variables above were found.

2. Quality of life domains in priority order

The percentages of those who replied to the priority order with each quality of life domain are indicated by sex in Table 3. The first item which most subjects thought to be important in their lives was their personal health, followed by relationships with family in both males and females. The third most important item in males was work and in females morale in daily living.

Fig. 1 Trends of importance levels for quality of life domains.

SC: social and community life, HL: hobbies and learning, SL: standard of living, PH: personal health, FM: relationships with family, ML: morale in daily living, FR: relationships with friends, WK: work, SS: self-supported living, RB: religion and belief

Table 3 Priority order of quality of life domains investigated by sex

	Priority order										(%)
	1	2	3	4	5	6	7	8	9	10	
Male:											
Social and community life	7.9	6.9	4.7	7.2	9.0	16.2	13.4	17.7	14.4	2.5	
Hobbies and learning	4.7	5.8	7.6	6.5	12.6	14.1	17.3	17.7	10.5	3.2	
Standard of living	4.7	8.3	15.9	16.6	14.4	12.6	10.5	10.1	5.4	1.4	
Personal health	53.4	19.9	9.4	7.2	2.9	1.4	2.5	2.2	1.1	0.0	
Relationships with family	29.2	40.4	15.2	3.2	4.0	3.6	1.8	1.8	0.0	0.7	
Morale in daily living	7.2	7.9	13.4	17.0	16.6	10.5	9.7	11.6	4.7	1.4	
Relationships with friends	5.1	6.5	10.8	14.8	19.9	17.7	14.4	6.1	4.0	0.7	
Work	12.6	13.0	14.8	12.6	7.6	7.6	6.1	7.9	10.5	7.2	
Self-supported living	6.5	4.3	3.6	8.3	9.0	5.1	11.9	14.4	28.2	8.7	
Religion or belief	2.2	2.2	3.2	2.2	1.4	2.5	2.2	5.1	13.7	65.3	
Female:											
Social and community life	1.6	2.2	4.6	3.6	8.2	11.3	16.2	22.7	24.0	5.5	
Hobbies and learning	2.4	2.2	5.5	7.5	13.4	16.7	20.7	16.8	11.3	3.5	
Standard of living	1.6	3.4	16.1	15.4	13.6	14.4	14.2	8.8	8.2	4.2	
Personal health	56.7	24.0	8.7	4.1	2.9	1.1	1.0	1.0	0.5	0.0	
Relationships with family	35.9	45.5	9.3	4.5	2.1	0.4	0.5	0.6	0.6	0.6	
Morale in daily living	2.6	10.2	23.0	22.9	13.3	11.1	7.8	5.6	2.7	0.6	
Relationships with friends	2.9	5.1	16.4	20.7	20.0	14.8	10.8	6.2	2.5	0.5	
Work	2.5	4.6	9.6	9.1	14.3	11.6	12.6	12.6	15.6	7.6	
Self-supported living	3.2	3.5	6.2	6.8	9.8	13.3	11.1	17.9	21.7	6.4	
Religion or belief	3.1	2.5	2.5	2.2	2.7	2.0	3.2	6.5	8.3	66.9	

Those who replied to either of the first two items, personal health and relationships with family, occupied over 95% in both males and females, though the results are not included in the table. Inversely, religion or belief was ordered last by almost all the subjects.

3. Trends of quality of life domains

1) Importance scores

Mean scores for importance levels given to each of the ten items were calculated by sex and ten-year age groups, and the trends are drawn in Fig. 1. As a whole, changes of the mean scores were relatively small for age in both males and females except for work. Work was characteristic especially for males, and the scores decreased abruptly in the age groups of over 60 years. Even in females, the lowest mean score among the ten items was work in the 70-79 age group.

The two highest scores were personal health and relationships with family in both males and females. Though personal health was the first rank in priority order, the mean scores of personal health and relationships with family were not too different throughout all the age groups in both sexes. In females, relationships with family showed the highest importance scores except for the 60-69 age group. In contrast to the above, mean scores for religion or belief were characteristically low in males and younger females.

2) Satisfaction scores

Mean scores for satisfaction levels showed the same trends

as those in importance levels (see Fig. 2). In males, the scores of relationships with family were the highest throughout the age groups among the items. Mean scores for work also steeply lowered in the 60-69 and 70-79 age groups. In females, relationships with family showed explicitly high satisfaction scores. Religion or belief showed lower satisfaction throughout the age groups in both males and females, as well as social and community life and hobbies and learning.

3) Dissatisfaction scores

According to Calman's definition of quality of life²⁵⁾ (see Methods), the differences of scores between importance and satisfaction levels were calculated (Fig. 3). In cases in which the values of the item are positive, dissatisfaction levels are recognized to be high. The following views were found: The gaps became smaller along with age in both males and females. Personal health distinctively showed high dissatisfaction levels throughout age groups in females. Meanwhile, scores for religion or belief were low, and high satisfaction was found in younger subjects. Work did not show high dissatisfaction levels in male subjects of over 60 years of age.

4. Properties of quality of life domains

1) Life satisfaction and quality of life domains

Mean scores of life satisfaction were 49 with 15.7 standard deviation, and showed no obvious differences among sex and age, and the distribution of the life satisfaction scores was normal ($p < 0.0001$), though no figures or tables are indicated.

Fig. 2 Trends of satisfaction levels for quality of life domains
See legends in Fig. 1 for abbreviations.

Fig. 3 Trends of dissatisfaction levels for quality of life domains
See legends in Fig. 1 for abbreviations.

Partial correlation coefficients between life satisfaction and scores for each of the ten importance item adjusted for sex and age are indicated in Table 4. Standard of living, personal health, relationships with family and morale in daily living showed coefficients of over 0.2, and literally life satisfaction was mainly related to domestic daily living. Partial correlation coefficients among life satisfaction and indicator of overall quality of life, which were composed of the first component of the principal component analysis and described below, were 0.28 and also significant ($p < 0.0001$).

2) Structure of quality of life domains

Table 5 shows the results from the principal component analysis using importance scores for quality of life domains. Only the first and the second eigenvalues exceeded one, and 4.50 and 1.14, respectively. All of the eigenvectors for the first component were positive and showed almost similar values. The first component was thought to suggest the importance of overall quality of life. The first eigenvalue was large enough compared to the second, and, accordingly, the ten quality of life domains could be summarized into one factor. The results above may suggest that the ten items are consistent and valid as a scale. Cronbach's alpha coefficient²³⁾, one of the indicators for reliability of an assumed scale, was 0.85, and was large enough for ensuring internal consistency with the ten items.

5. Characterization of the subjects through principal components analysis

1) Quality of life domains

Mean scores of the first and the second principal components using importance scores for quality of life domains were calculated for each demographic category, that is, sex, age, the presence of others in the household, occupations, and presence of illnesses. Those were plotted in the two-dimension plane in Fig. 4. The horizontal axis (P1) indicates the first principal component and the vertical axis (P2) the second. Male subjects who were in the 60-69 and 70-79 age groups were situated in the lower scores for the first principal component. Also, male subjects who engaged in part-time work, other work or had no occupation and who had illnesses also indicated relatively lower scores for the first principal component.

2) Satisfaction scores

Mean scores of the first and the second principal component using satisfaction scores are plotted in the two-dimension plane, according to the demographic variables and illness conditions of the subjects as described above (Fig. 5). The

horizontal (P1) and vertical axis (P2) are the same as those in Fig. 4. The three points deviating to the left are male subjects who were living alone, the lowest score for the first component, followed by those having illnesses and those living with someone except a spouse. This means that the subjects who were in those positions were dissatisfied with overall quality of life domains on average.

Discussion

As described in the Methods, some demographic indicators suggested that the subjects investigated resided in a common neighboring town in Japan. The characteristics of the subjects were concretely described in comparison with the figures in Table 2. Though one-person households of the town where the subjects investigated resided were 18.5% (see Methods), those subjects

Fig. 4 Plot of groups characterized by demographic variables: the mean first and second principal components scores for importance levels

a: males aged 70-79, b: males having illnesses, c: males having no occupations, d: males aged 60-69, and no explanations are given to the other marks except the a-d. P1: the axis for the first principal components scores, P2: the axis for the second principal components scores. See Methods in text for calculation of the principal components scores.

Table 4 Partial correlation coefficients among life satisfaction and quality of life domains, adjusted for sex and age

Social and community life	0.12	$p < 0.0001$
Hobbies and learning	0.17	$p < 0.0001$
Standard of living	0.28	$p < 0.0001$
Personal health	0.22	$p < 0.0001$
Relationships with family	0.30	$p < 0.0001$
Morale in daily living	0.23	$p < 0.0001$
Relationships with friends	0.18	$p < 0.0001$
Work	0.15	$p < 0.0001$
Self-supported living	0.14	$p < 0.0001$
Religion or belief	0.13	$p < 0.0001$
The first principal component \$	0.28	$p < 0.0001$

\$ Indicator for overall quality of life domains and derived from principal component analysis. See Methods in text.

Table 5 Results from principal components analysis and Cronbach's alpha coefficient

Items	Eigenvectors		Eigenvalues \$	
	1st	2nd		
Social and community life	0.33	-0.38	First component	4.50
Hobbies and learning	0.33	-0.23	Second component	1.14
Standard of living	0.32	0.12	Third component	0.71
Personal health	0.25	0.59		
Relationships with family	0.29	0.48		
Morale in daily living	0.35	0.19		
Relationships with friends	0.35	0.05		
Work	0.31	-0.15		
Self-supported living	0.33	-0.17		
Religion or belief	0.29	-0.36		
				Cronbach's alpha coefficient
				0.85

\$ Eigenvalues after the third principal component were not indicated because they were smaller than one.

Fig. 5 Plot of groups characterized by demographic variables: the mean first and second principal components scores for satisfaction levels

a: males living alone, b: males having illnesses, c: males living with someone except spouse.
See the legends in Fig. 4.

who lived alone were 3.5% in male and 3.8% in female (Table 2) and those were rather low. However, since the age distribution of the subjects tended to be elderly (see Table 1), those figures would not be unique. The percentages of those engaged in wholesale, retail or eating and drinking work in the town and in Japan were 22.8% and 26.2% respectively as mentioned in the Methods. The percentages of those engaged in self-employment work were also not too specific in the subjects investigated, though both occupation category were not strictly comparable. On the other hand, those who replied to have diseases were 31.9% in male and 26.1% in female (Table 2). The prevalence rates in Japan²⁸⁾ were 25.7% in male and 31.2% in female, and when the age distribution of the subjects was taken into account, the figures in the subjects were also not peculiar. Though educational or economic aspects were unclear because of no inquiry, the subjects investigated were not specific with the variables which characterized their social nature.

In this study, domains of quality of life in the healthy public were explored using items prepared in advance, and those originated in Bowling's study¹⁶⁾ where samples were taken randomly from populations in Great Britain. Twelve of the most important items in the subjects' lives including others were listed in the report, when respondents had freely mentioned as many items as they wanted in open-ended questions, but up to five had been registered. Responses deviated to the following five items which indicated response rates of over 20%; relationships with family, one's own health, health of someone close, standard of living, social life or work related items. Those items also appeared high in rank in our investigation, though responses deviated more to personal health and relationships with family. As the subjects in this investigation were those who gathered to have health checkups, consciousness of their own health might have been exaggerated. It has been pointed out in Japan that those who have health checkups in the community are highly conscious of their

own health²⁹⁾. When taking the results above and relatively lower ranks for other items into consideration, the health of someone close may be included as a candidate. Baker³⁰⁾ reported that after adjusting for cultural equivalence with some popularly used quality of life instruments, those measures were valid in their usage among culturally diverse populations. This suggests inversely that quality of life items are on average common in various populations when the reappearance of the content is ensured. In cases in which a scale is applied in other cultural populations, the content of the scale has to reappear virtually in the scale used in the populations³¹⁾. Though some further examinations to ensure cultural equivalence are needed, the items which resulted in the referred study reappeared also in our investigation. The items proposed here would be suitable at least with the content and cover major quality of life domains except with health of someone close.

Using Japanese domestic subjects, several reports³²⁻³⁴⁾ were found which examined quality of life and related factors. Matsubayashi et al.³²⁾ examined the factors which affected subjective happiness in the elderly. They used subjective happiness as the synonym of quality of life, and found that economic conditions, family relationships and group behavior significantly correlated with happiness. They³³⁾ also conducted a comparative study of quality of life in the elderly in two distant districts, and found that family relationships commonly showed significant associations with quality of life through the subjective groups. Nakamura et al.³⁴⁾ also investigated elderly subjects and reported that social activity or participation in a group positively correlated with quality of life. The investigations above were not conducted in order to explore quality of life domains. Items to assess quality of life were set in advance, and physical or environmental factors assumed to be related to quality of life in the subjects were pursued. The findings above, therefore, were not comparable with our results, but seemed to be supportive. As shown in Table 4, relationships with family were significantly correlated with life satisfaction after adjustment was made for sex and age, as well as the other domain items. The consistent associations between family relationships and quality of life in distant districts would suggest that relationships with family were one of the essential factors for assessing quality of life domains.

Though in the analysis of priority order, the extent of the importance levels among domains or trends among generations was not explored, scores for importance levels offered another kind of information in regard to quality of life domains. Importance scores for personal health and relationships with family were almost equivalent, and in younger subjects scores for the latter were higher than those for the former. Relationships with family were, also, the most important items in Bowling's study. That is, relationships with family seemed to constitute basic domains of quality of life in healthy people, as well as personal health. Those are not fully taken into consideration in popular quality of life measures^{3,4)}, but are also an important part of social support³⁵⁻³⁸⁾. In health services fields, activities which encompassed family members or took the family into account would contribute to quality of life in the healthy public.

Besides the findings above, the trends of importance scores except for work in males were relatively stable among age groups in both sexes, as seen in Fig. 1. This suggests that those domains had consistent significance in the subjects' lives throughout generations, though work and religion or belief would have to be examined separately. Also, correlation analysis among life

satisfaction and satisfaction scores for quality of life domains (Table 4) would support the fact that those items are suitable to assess quality of life domains in the healthy public. Though life satisfaction itself does not necessarily mean quality of life, it is significant in quality of life research^{2,4,8)}. Definitions of quality of life have been expanding along with a developing social environment and an increase in more spiritual factors such as life satisfaction, for there are no rigid distinctions among them³⁾. If quality of life domains are assumed to be causes and satisfactions with them as results or objectives, it might be significant to inquire about relative importance among domains. In this case, scores for satisfaction levels provide useful information.

Principal components analysis indicated that the ten quality of life domains were abridged into one overall factor. All of the eigenvectors also had similar values. Those above realized the nature of quality of life. While quality of life has the properties of multifactoriality^{8,9)}, it is integrated into the concept of quality of life itself. The ten items investigated here were basically exclusive to each other in content, but they consisted of one large factor (Table 5) and this factor significantly correlated with life satisfaction (Table 4). The quality of life domains in this study indicated that they had agreeable contents and consistent significance and structure. These findings suggest the items were valid and reliable as quality of life domains for the healthy public, though more surveys are required.

The subjects analyzed in this investigation were not sampled randomly from the inhabitants. The procedure to select the subjects investigated was described in Methods. Eligible inhabitants for health checkups included the general population of the city except for students and the employees of large companies and their dependents. Those who actually had checkups consisted of about 47% of the eligible inhabitants, and the major reason for absence had to do with scheduling difficulties. Because such a reason is thought not to cause systematic biases, and also all of the analyses here were performed considering sex and age, a possible cause of selection bias could be occupation. Occupation was proved to significantly affect quality of life domains and their satisfaction levels, especially in males (see Fig. 1 and Fig. 2). Though occupation would not have effects on domains themselves, when considering the results shown through the analyses here, studies which take them into account might place additional weight on occupations. On the other hand, the subjects analyzed were part of those investigated. However, they would probably not cause biases with demographic variables as they were consistent among both subjects investigated and analyzed as seen in Table 1 and Table 2. The main difficulty for the subjects in responding to the questionnaire was actually the assignment of priority order, despite the assistance of the staff. Though the bias derived from that procedure could not be denied, there are not useful cues for estimating possible effects from such a bias. Other methods for conducting this survey have to be considered.

Satisfaction and dissatisfaction scores showed three significant findings: First, differences of dissatisfaction levels among domains were larger in younger generations. Next, in females, health scored high in dissatisfaction and relationships with family scored high in satisfaction. Third, work in the elder male subjects decreased both in importance and in satisfaction levels. Individual quality of life domains were different in importance and satisfaction levels along with sex and age, and the ten items as a whole retain the possibility of assessing what

domains of quality of life are problems between the different sexes and among the different generations. Though priority order in these quality of life items is useful in detecting domains themselves, characteristics of quality of life domains among demographic variables can be described using satisfaction or dissatisfaction scores. Trends also reveal relative weights among domains and make it possible to seize changes throughout generations.

The demographic characteristics of the subjects on quality of life domains used in this study also emerged on the two-dimension plane consisting of the first and the second principal components. The first component scores mean overall quality of life domains, and the male subjects who were over 60 years of age, who had illnesses or whose occupation categories were part-time, the others or no work diverted to lower scores (Fig. 4). Mean importance scores for work decreased in cases in which age was over 60 years of age (Fig. 1), and work also affected the importance for overall quality of life domains. The effects of work on the elderly subjects were not investigated because of present concerns, but importance levels were not so low even in females (Fig. 1). Work seems not to be an issue in public health activities, but the meaning of work on overall quality of life would be valuable to examine. Social interaction through work would have significant effects on social health especially^{3,4,8,39)}, and psychological health aspects after retirement⁴⁰⁾ also could be problems in public health activities in the community.

Overall satisfaction levels in male subjects who lived alone or with someone except a spouse and who were ill were distinctively deviated to lower scores. Comparing the results from trends with each quality of life domain and investigation from overall quality of life based on principal components analysis, the following could be summarized: Females complained of dissatisfaction with their personal health throughout the generations, but this showed no demographic traits with overall quality of life. On the other hand, males indicated no remarkable findings concerning health, and only work was distinctive, but those living alone or with someone other than a spouse or those in an ill condition indicated low satisfaction with overall quality of life. In other investigations^{35,36)}, though there were no obvious differences of mortality for social networks or support between males and females, those may be explored in terms of quality of life. Principal components analysis can seize demographic or other characteristics which regulate overall quality of life domains.

Quality of life domains examined here might surpass the range of health related quality of life under some definitions. However, when investigating data from healthy people, some useful findings were obtained, and some issues on quality of life for the healthy public have been made clear: Relationships with family have significant meanings as one of the quality of life domains. Work and the presence of someone else in the household, also, would be a matter of quality of life especially in males. Domains and satisfaction of quality of life were related to social factors more strongly in males than in females. It is important to assess the effects of medical interventions on those suffering from disabilities due to illnesses in terms of quality of life. However, quality of life undoubtedly exists, also, in the healthy public^{12,41,42)}, and interventions through public health activities have to contribute to improving their quality of life. In that case, relationships with family, work or residential situations might be helpful for activities.

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Appendix

Part of the questionnaire: Items to inquire about quality of life domains

The ten candidate items which seem to be important in your daily living are indicated below.

- Rank them according to priority order.
- Mark each on a scale of a hundred from the viewpoint of importance in your daily living.
- Finally, mark your satisfaction levels at present also on a scale of a hundred.

	a)rank order	b)importance score	c)satisfaction score
1. Social and community life:	[]——()———()		
2. Hobbies and learning:	[]——()———()		
3. Standard of living:	[]——()———()		
4. Personal health:	[]——()———()		
5. Relationships with family:	[]——()———()		
6. Morale in daily living:	[]——()———()		
7. Relationships with friends:	[]——()———()		
8. Work:	[]——()———()		
9. Self-supported living:	[]——()———()		
10. Religion or belief:	[]——()———()		

(The full questionnaire is available by request from the authors.)