

研究と報告

Studies on Life Habits and Biomedical Variables with Special Reference to Prevention of Atherosclerotic Cardio-and Cerebrovascular Diseases; Final Report

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Objectives of the study:

There have been no studies so far in Japan demonstrating the relevance of life habits to biomedical problems leading to morbidity and mortality related to health affairs characterized by biochemical and physiological data. Objectives of the present study are of two folds; (1) comparison of 23 life habit scales derived from the Life Planning Center-Life Habit Inventory (LPC-LHI) performed on people living in the Tokyo metropolitan area and a rural area in Chiba prefecture (Shirahama-cho), and (2) identification of specific life habit parameters for biomedical problems especially related to atherosclerotic cardio- and cerebrovascular diseases.

Subjects:

The first group of the study includes apparently healthy 545 male subjects (average age of 47 ± 10

Age Category (years)	Tokyo Metro. Area	Shirahama Area
below 39	122	7
40 - 49	226	59
50 - 59	137	89
60 - 69	43	140
above 70	17	46
total	545	342

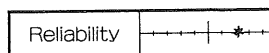
Table 1. Age distributions of the subjects participated to the program in two different areas.

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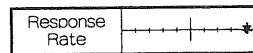
LPC LIFE HABITS TEST RESULTS

* As the asterisk moves to the right, the tendency becomes stronger.

Life Habits Scales		Your Tendency			Your Community's Tendency		
		Weak	Neutral	Strong	Weak	Neutral	Strong
Meals	Salt		*			*	
	Sugar	*					*
	Meat and Fats	*				*	
	Western Style Diet			*		*	
	Regular intake of meals	*			*		
	Motivation and interest in cooking		*			*	
Alcohol		*					*
Smoking		*					*
Attitude	Intellectual and cultural activities	*					*
	Entertainment			*			*
	Spirit of social service			*		*	
	Sense of love and duty	*				*	
	Thrift		*			*	
	Traditional			*		*	
	Personal hygiene	*				*	
	Wife-leadership type		*			*	
Health Status	Emotionally stable	*				*	
	Many physical complaints	*				*	
	Unhealthy			*			*
Personality	Extrovert			*			*
	Voluntary		*			*	
	Sympathetic		*			*	
Exercise				*			*



→ high



→ high

years) living in Tokyo metropolitan area who visited to the LPC for annual physical check-up from 1 April '87 to 30 September '87. The second group of the study consists of 342 male subjects (mean age of 60 ± 10 years) without major health problems living in Shirahama-cho, Chiba prefecture. Those people voluntarily joined to this study program during taking seasonal medical check-up performed to the residents as a regular basis in May 1987. Age distributions of the subjects participated to these programs were summarized in Table 1.

Methods:

1. Outlines of the LPC-LHI

The LPC-LHI that was revised in 1985 after its initial publication in 1982 was adopted for the present study.^{1), 2)} The inventory consists of 195 questionnaires from which 23 life habit scales are derived for the quantitative assessment of the life habit. Life habits were summarized into following 4 major categories; (1) dietary, smoking, drinking behaviors, (2) present physical and psychological health conditions, (3) behavioral attitudes toward health maintenance and promotion, and (4) general social behaviors in daily life activities with mutual communications. In the present study, we have used a new form for the result note to the subjects taking the test, in which each life habit scale value was shown within the range of ± 1 variance divided into 10 division scales: a group mean equals 0 and the range is expressed with dispersion of ± 5 scales. A sample form was shown in Figure 1.

2. Biomedical parameters

Biomedical parameters are as follows; (1) general demographic variables and (2) physical parameters including two major categories such as physiological and biochemical ones. The former consists of anthropometric measures, blood pressure, ECG and pulmonary functions, and the latter consists of hematology, glucose tolerance and blood chemistries. To the subjects in Shirahama area, biochemical studies were only limited to the following items; total cholesterol, HDL-cholesterol, GOT and GPT. All these biological data were obtained in the morning fasting state and the samples thus obtained were analyzed at the LPC with highly qualified automated analyzer system under strict quality control.

Data analysis:

All completed questionnaires were sent to the Department of Statistics at St. Luke's Nursing College where these were subjected to detailed analysis by such computer system as HITAC M-680/S810 with special program designed to this study.

Statistical analysis:

Student-t test was applied for the comparison of two mean values and $p < 0.05$ was considered to be the limitation of significance of difference.

<u>Biomedical Measures</u>	
Age (years)	47 \pm 10
Height (cm)	168 \pm 5
Weight (kg)	64 \pm 8
Obesity Index (%)	6 \pm 12
Systolic Pressure (mmHg)	117 \pm 15
Diastolic Pressure (mmHg)	77 \pm 10
Blood Sugar, fasting (mg/dl)	101 \pm 15
Blood Sugar, 2 hours after 50gGl. (mg/dl)	122 \pm 47
total Cholesterol (mg/dl)	214 \pm 38
HDL-Cholesterol (mg/dl)	54 \pm 13
Triglyceride (mg/dl)	144 \pm 100
GOT (U/L)	25 \pm 12
GPT (U/L)	30 \pm 21
<u>LPC-LHI Measures (scores)</u>	
Intellectual and cultural activities	7.4 \pm 2.5
Entertainment	6.6 \pm 2.3
Spirit of social service	6.4 \pm 2.8
Sense of love and duty	9.4 \pm 2.3
Thrift	8.9 \pm 2.3
Traditional	10.9 \pm 2.5
Personal hygiene	11.8 \pm 2.8
Wife-leadership type	8.0 \pm 3.0
Emotionally unstable	6.5 \pm 3.8
Many typical complaints	4.2 \pm 3.0
Unhealthy	4.3 \pm 2.7
Extrovert	8.9 \pm 3.9
Voluntary	10.0 \pm 2.9
Sympathetic	10.9 \pm 2.6
Exercise	7.0 \pm 3.3
Salt	6.7 \pm 3.5
Sugar	6.2 \pm 2.9
Meat and fat	6.9 \pm 2.5
Western style diet	8.8 \pm 2.8
Regular intake of meals	11.0 \pm 3.6
Motivation and interest in cooking	4.8 \pm 2.9
Alcohol and smoking	5.4 \pm 3.3

Table 2. Summaries of biomedical and LPC-LHI measures in the Tokyo metropolitan area group. (n=545, mean \pm 1S.D.)

Results:

1. Comparisons of biomedical and life habit parameters between Tokyo metropolitan and Shirahama areas.

Mean values for biomedical and life habit parameters obtained from two different groups were shown in Tables 2 & 3. All biomedical data were within normal limits comparing to the standards for

<u>Biomedical Measures</u>	
Age (years)	59 \pm 9
Obesity Index (%)	10 \pm 14
Systolic Pressure (mmHg)	132 \pm 19
Diastolic Pressure (mmHg)	80 \pm 10
t-Cholesterol (mg/dl)	198 \pm 33
HDL-Cholesterol	53 \pm 15
GOT (U/L)	24 \pm 13
GPT (U/L)	21 \pm 18
<u>LPC-LHI Measures (scores)</u>	
Intellectual and Cultural Activities	6.1 \pm 3.0
Entertainment	5.4 \pm 2.0
Spirit of Social Service	7.2 \pm 3.1
Sense of Love and Duty	11.5 \pm 2.5
Thrift	10.8 \pm 2.2
Traditional	11.8 \pm 2.5
Personal Hygiene	10.9 \pm 2.9
Wife-leadership Type	9.2 \pm 2.4
Emotionally Unstable	6.2 \pm 3.1
Many Typical Complaints	3.3 \pm 2.8
Unhealthy	5.7 \pm 3.6
Extrovert	7.3 \pm 3.7
Voluntary	7.2 \pm 3.1
Sympathetic	11.2 \pm 2.5
Exercise	4.5 \pm 3.0
Salt	7.4 \pm 3.4
Sugar	6.4 \pm 3.1
Meat and Fat	6.1 \pm 2.4
Western Style Diet	7.3 \pm 2.6
Regular Intake of Meals	12.9 \pm 3.1
Motivation and Interest in Cooking	4.6 \pm 2.8
Alcohol and Smoking	4.4 \pm 3.1

Table 3. Summaries of biomedical and LPV-LHI measures in the Shirahama group. (n=342, mean \pm 1S.D.)

Japanese male population and also life habit parameters characterized by 23 life habit scales obtained from these subjects in this study showed almost similar tendencies in general comparing to those obtained from female populations of which data had already been published elsewhere.²⁾ Detailed comparisons of the data reveals significant differences in most of the scales except for following three items; motivation and interest in cooking, emotional instability, and sugar intake. Since two groups were different in each other with regard to age distribution of the subjects, data were compared in each age category from fortieth to seventieth generation.

In the fortieth category, 12 of 23 scales showed significant differences. Tokyo metropolitan area revealed higher values in the following items; extroversion, intellectual and cultural activity, entertain-

Items for the Comparison	Tokyo Metropolitan Area Group (n=226)	Shirahama Area Group (n=59)	p-Values
<u>Biomedical Measures</u>			
Obesity Index(%)	11 ± 11	12 ± 13	<0.005
Systolic Pressure (mmHg)	114 ± 14	122 ± 16	<0.0005
Diastolic Pressure (mmHg)	76 ± 10	79 ± 10	ns
t-Cholesterol (mg/dl)	212 ± 37	193 ± 33	<0.0005
HDL-Cholesterol	55 ± 13	51 ± 13	ns
GOT (U/L)	24 ± 8	24 ± 12	ns
GPT (U/L)	30 ± 19	26 ± 21	ns
<u>LPC-LHI Measures (scores)</u>			
Extrovert	9.1 ± 4.0	7.9 ± 3.4	<0.05
Spirit of Social Service	6.5 ± 2.9	7.9 ± 3.0	<0.005
Entertainment	6.6 ± 2.2	6.0 ± 2.0	<0.05
Intellectual and Cultural Activities	7.4 ± 2.5	6.3 ± 2.6	<0.005
Unhealthy	3.9 ± 2.6	4.4 ± 2.9	ns
Alcohol and Smoking	5.3 ± 3.1	5.0 ± 2.9	ns
Wife-leadership Type	8.2 ± 3.0	9.2 ± 2.4	<0.01
Exercise	7.1 ± 3.3	5.1 ± 3.3	<0.0001
Motivation and Interest in cooking	4.7 ± 3.0	4.9 ± 2.6	ns
Meat and Fat	7.0 ± 2.4	6.4 ± 2.4	ns
Western Style Diet	8.8 ± 2.6	7.7 ± 2.2	<0.005
Many Typical Complaints	4.2 ± 3.0	3.7 ± 3.0	ns
Traditional	10.8 ± 2.4	11.2 ± 2.6	ns
Regular Intake of Meals	10.7 ± 3.5	11.3 ± 4.0	ns
Health Image	7.1 ± 2.4	7.8 ± 2.9	ns
Thrift	8.9 ± 2.4	10.1 ± 2.6	<0.001
Salt	7.0 ± 3.5	8.0 ± 3.6	ns
Sense of Love and Duty	9.4 ± 2.4	11.1 ± 2.3	<0.0001
Personal Hygiene	12.0 ± 2.3	11.2 ± 2.7	<0.05
Sympathetic	10.9 ± 2.6	11.4 ± 2.6	ns
Voluntary	10.0 ± 3.0	9.5 ± 2.7	ns
Emotionally Unstable	6.0 ± 3.0	7.0 ± 3.4	<0.05
Sugar	6.1 ± 2.8	7.3 ± 3.2	<0.005

Table 4. Comparisons of biomedical and LPV-LHI measures in fortieth generation between Tokyo metropolitan and Shirahama areas. (mean±1S.D.)

ment, exercise, western style diet and personal hygiene. On the other hand, Shirahama area revealed higher tendencies in the following scales; voluntary, wife leadership type, thrift, sense of love and duty, emotional instability and sugar intake (Table 4).

In the fiftieth category, 12 of 23 scales also showed significant differences. Tokyo metropolitan area revealed higher values in the following items; extroversion, entertainment, intellectual and cultural activity, exercise, meat and fat, western style diet, personal hygiene and voluntary. Shirahama area, on

Items for the Comparison	Tokyo Metropolitan Area Group (n=137)	Shirahama Area Group (n=89)	p-Values
<u>Biomedical Measures</u>			
Obesity Index(%)	8 ± 11	10 ± 13	ns
Systolic Pressure(mmHg)	123 ± 17	131 ± 18	<0.0005
Diastolic Pressure(mmHg)	81 ± 11	82 ± 10	ns
t-Cholesterol(mg/dl)	225 ± 41	199 ± 33	<0.0001
HDL-Cholesterol	55 ± 13	52 ± 14	ns
GOT(U/L)	27 ± 16	25 ± 16	ns
GPT(U/L)	32 ± 20	23 ± 21	<0.005
<u>LPC-LHI Measures (scores)</u>			
Extrovert	8.9 ± 3.6	7.1 ± 4.0	<0.001
Spirit of Social Service	6.7 ± 2.7	7.1 ± 3.2	ns
Entertainment	6.2 ± 2.1	5.7 ± 1.9	<0.05
Intellectual and Cultural Activities	7.7 ± 2.5	6.2 ± 3.0	<0.0001
Unhealthy	4.7 ± 2.7	5.2 ± 3.6	ns
Alcohol and Smoking	5.2 ± 3.1	4.4 ± 3.3	ns
Wife-leadership Type	7.9 ± 3.0	9.2 ± 2.6	<0.005
Exercise	6.9 ± 3.4	4.1 ± 2.6	<0.0001
Motivation and Interest in cooking	5.0 ± 2.8	4.8 ± 3.0	ns
Meat and Fat	6.6 ± 2.5	5.9 ± 2.2	<0.05
Western Style Diet	8.7 ± 3.0	7.1 ± 2.6	<0.0001
Many Typical Complaints	4.0 ± 2.9	3.3 ± 2.9	ns
Traditional	11.8 ± 2.0	11.6 ± 2.6	ns
Regular Intake of Meals	11.9 ± 3.2	12.7 ± 2.9	ns
Health Image	7.8 ± 2.5	8.4 ± 2.6	ns
Thrift	9.1 ± 2.2	11.2 ± 2.0	<0.0001
Salt	6.1 ± 3.3	7.9 ± 3.6	<0.0005
Sense of Love and Duty	9.6 ± 2.2	11.3 ± 2.8	<0.0001
Personal Hygiene	12.1 ± 2.4	10.7 ± 2.7	<0.0001
Sympathetic	11.3 ± 2.5	11.4 ± 2.4	ns
Voluntary	10.4 ± 2.9	9.0 ± 3.0	<0.001
Emotionally Unstable	6.3 ± 3.1	6.1 ± 3.2	ns
Sugar	6.0 ± 3.0	6.1 ± 3.2	ns

Table 5. Comparisons of biomedical and LPV-LHI measures in fiftieth generation between Tokyo metropolitan and Shirahama areas. (mean±1S.D.)

the other hand, revealed higher values in the following items; wife-leadership type, thrift, high salt intake, and sense of love and duty (Table 5).

In the sixtieth category, 9 of 23 scales showed significant differences. Tokyo metropolitan area revealed higher values in the following items; extroversion, intellectual and cultural activity, exercise, western style diet and personal hygiene. Shirahama area showed higher values in wife-leadership type, thrift, high salt intake and sense of love and duty (Table 6).

In the seventieth category, only 5 of 23 scales showed significant differences: Tokyo metropolitan

Items for the Comparison	Tokyo Metropolitan Area Group (n=43)	Shirahama Area Group (n=140)	P-Values
<u>Biomedical Measures</u>			
Obesity Index (%)	9 ± 12	9 ± 14	ns
Systolic Pressure (mmHg)	124 ± 17	134 ± 19	<0.005
Diastolic Pressure (mmHg)	78 ± 8	79 ± 10	ns
t-Cholesterol (mg/dl)	218 ± 42	200 ± 34	<0.005
HDL-Cholesterol	55 ± 11	57 ± 16	ns
GOT (U/L)	25 ± 7	23 ± 12	ns
GPT (U/L)	27 ± 14	19 ± 18	<0.005
<u>LPC-LHI Measures (scores)</u>			
Extrovert	8.6 ± 3.3	7.2 ± 3.8	<0.05
Spirit of Social Service	6.6 ± 3.3	7.1 ± 3.2	ns
Entertainment	5.5 ± 1.9	5.0 ± 2.0	ns
Intellectual and Cultural Activities	8.0 ± 2.3	5.6 ± 3.0	<0.0001
Unhealthy	5.0 ± 3.3	6.2 ± 3.7	ns
Alcohol and Smoking	4.4 ± 3.1	4.5 ± 3.2	ns
Wife-leadership Type	8.4 ± 3.1	9.6 ± 2.3	<0.05
Exercise	6.3 ± 3.3	4.3 ± 3.0	<0.0005
Motivation and Interest in cooking	5.3 ± 3.3	4.6 ± 2.9	ns
Meat and Fat	6.8 ± 2.7	6.0 ± 2.5	ns
Western Style Diet	8.9 ± 3.1	7.1 ± 2.7	<0.0005
Many Typical Complaints	3.1 ± 2.9	3.1 ± 2.8	ns
Traditional	12.1 ± 2.8	12.1 ± 2.3	ns
Regular Intake of Meals	14.0 ± 2.1	13.5 ± 2.7	ns
Health Image	8.1 ± 3.3	8.7 ± 2.9	ns
Thrift	8.9 ± 2.5	11.0 ± 2.2	<0.0001
Salt	5.8 ± 3.4	7.2 ± 3.3	<0.05
Sense of Love and Duty	10.0 ± 2.7	11.8 ± 2.4	<0.0001
Personal Hygiene	11.8 ± 2.2	10.7 ± 3.0	<0.01
Sympathetic	11.0 ± 2.9	11.1 ± 2.6	ns
Voluntary	9.9 ± 2.8	9.2 ± 3.2	ns
Emotionally Unstable	7.2 ± 3.8	6.0 ± 3.0	ns
Sugar	6.1 ± 3.4	6.5 ± 3.0	ns

Table 6. Comparisons of biomedical and LPV-LHI measures in sixtieth generation between Tokyo metropolitan and Shirahama areas. (mean±1S.D.)

area revealed higher values in entertainment, intellectual and cultural activity, exercise and western style diet, and lower value only in wife-leadership type than Shirahama area did (Table 7).

Concerning biomedical data, total cholesterol level revealed higher value in Tokyo metropolitan area than in Shirahama area throughout all age categories. On the contrary, however, systolic blood pressure revealed higher level in Shirahama area than in Tokyo metropolitan area from fortieth to sixtieth category (Table 4-7).

Items for the Comparison	Tokyo Metropolitan Area Group (n=17)	Shirahama Area Group (n=46)	p-Values
<u>Biomedical Measures</u>			
Obesity Index(%)	11 ± 12	9 ± 15	ns
Systolic Pressure (mmHg)	134 ± 24	139 ± 22	ns
Diastolic Pressure (mmHg)	78 ± 11	80 ± 11	ns
t-Cholesterol (mg/dl)	227 ± 34	202 ± 32	<0.05
HDL-Cholesterol	57 ± 18	52 ± 13	ns
GOT (U/L)	25 ± 7	23 ± 12	ns
GPT (U/L)	27 ± 14	19 ± 18	<0.005
<u>LPC-LHI Measures (scores)</u>			
Extrovert	10.6 ± 2.7	7.4 ± 3.4	ns
Spirit of Social Service	7.6 ± 3.7	7.5 ± 3.3	ns
Entertainment	6.4 ± 1.6	5.0 ± 1.8	<0.05
Intellectual and Cultural Activities	9.3 ± 2.1	6.8 ± 3.5	<0.05
Unhealthy	5.2 ± 3.6	7.3 ± 3.3	ns
Alcohol and Smoking	3.0 ± 2.4	3.2 ± 2.6	ns
Wife-leadership Type	5.9 ± 3.5	8.3 ± 1.9	<0.05
Exercise	7.6 ± 3.4	4.8 ± 3.3	<0.05
Motivation and Interest in cooking	4.5 ± 2.3	4.3 ± 2.4	ns
Meat and Fat	6.8 ± 2.2	6.0 ± 2.3	ns
Western Style Diet	10.6 ± 2.9	7.5 ± 2.87	<0.005
Many Typical Complaints	2.9 ± 2.1	3.2 ± 2.4	ns
Traditional	13.1 ± 2.7	12.2 ± 2.8	ns
Regular Intake of Meals	14.6 ± 1.3	13.4 ± 2.9	ns
Health Image	7.2 ± 1.5	8.0 ± 2.9	ns
Thrift	9.3 ± 3.0	10.4 ± 2.1	ns
Salt	5.3 ± 3.0	6.5 ± 2.9	ns
Sense of Love and Duty	10.2 ± 3.2	11.4 ± 2.3	ns
Personal Hygiene	11.7 ± 2.2	10.8 ± 3.3	ns
Sympathetic	11.8 ± 3.0	11.2 ± 2.7	ns
Voluntary	10.2 ± 2.4	9.1 ± 3.1	ns
Emotionally Unstable	6.4 ± 3.0	5.8 ± 2.5	ns
Sugar	6.4 ± 2.1	5.3 ± 2.7	ns

Table 7. Comparisons of biomedical and LPV-LHI measures in seventieth generation between Tokyo metropolitan and Shirahama areas. (mean±1S.D.)

2. Life habit scales related to demographic data.

Twenty three life habit scales obtained from subjects living in Tokyo metropolitan area were examined for correlations to age and school career. The results were shown in Table 8, in which only scales showing statistically significant difference were listed. These results were almost similar to those already been described for female populations elsewhere.²⁾

Scales related to age:

Positive correlation: Regular meal intake, Unhealthy, Voluntary Sympathetic, Sense of love and duty, Spirit of social service, Traditional and neutral, Healthy image, (High sugar intake)

Negative Correlation: Neatness, Emotionally unstable, (Meat and fat, Western style diet, Smoking)

Scales related to school carrier:

Positive correlation: Interest in cooking, Wife-leadership type, Western style diet, Intellectual health awareness, Voluntary, Spirit of social service, (Drinking/smoking, Neatness, Exercise, Extroversion)

Negative correlation: High salt intake, Sense of love and duty, Traditional & neutral, (Regular meal intake, Many physical complaints, Unhealthy, Thrift, Health image)

Regional difference in scales:

Urban: Spirit of social service, Interest in cooking, Wife-leadership type, Western style diet, Intellectual health awareness, Extroversion

Rural: High salt intake, Sense of love and duty, Thrift, Entertainment, Meal & fat

Regionally unrelated scales: Regular meal intake, High sugar intake, Many physical complaints, Unhealthy, Exercise, Emotionally unstable, Voluntary, Health image

Table 8. Correlations among demographic and LPC-LHI measures
(n=545, $p < 0.0001$)

	Obesity	HighBP	GTT-abn.	Liv. dys.	CHOL ↑	TG ↑	Smoking
Obesity	—	0.2274	0.2599	0.2394		0.2948	
HighBP	0.2274	—		0.2421			
GTT-abn.	0.2599		—				
Liv. Dys.	0.2394	0.2421		—		0.2949	
CHOL ↑					—	0.2287	
TG ↑	0.2948			0.2949	0.2287	—	
Smoking							—

Table 9. Mutual correlations among selected biomedical problems
(n=545, $p < 0.001$)

3. Mutual correlations among biomedical problems.

Biomedical data obtained from subjects in Tokyo metropolitan area were subjected to the analysis for mutual correlations among biomedical problems especially related to the atherosclerotic cardio-

1. Obesity	2. Hypercholesterolemia
a. Hypertension, Liver dysfunction	and/or Hypertriglyceridemia
b. Glucose intolerance	3. Smoking
c. Hypertriglyceridemia & Liver dysfunction	

Table 10. Summary of biomedical problems

-
- 1-a) Obesity, Hypertension, Liver dysfunction:
Intellectual Cultural Activity, Health Awareness, Interest in Cooking,
Traditional, Regular Meal Intake, Health Image, Sense of Love and Duty
High Sugar Intake ↓
 - 1-b) Obesity, Glucose Intolerance:
Interest in Cooking, Health Image, Sense of Love and Duty, High Sugar
Intake ↓
 - 1-c) Obesity, Hypertriglyceridemia, Liver function abnormality:
Health Image, Sense of Love and Duty
-

Table 11. Life habit scales related to biomedical problems
(n=545, $p < 0.0001$)

and cerebrovascular diseases. For those purposes, 6 major risk factors and one additional factor were selected; obesity, hypertension, abnormalities in glucose tolerance, hypercholesterolemia, hypertriglyceridemia, smoking and liver function abnormalities. Cross correlations for each parameter were shown in Table 9, in which only statistically significant correlation indices were listed. From these results, biomedical problems were categorized into such 3 major categories as (1) obesity, (2) hyperlipidemias and (3) smoking which were mutually independent. Four other factors including hypertension, glucose intolerance, hypertriglyceridemia and liver function abnormalities showed a significant correlation to obesity and each of these was independent from each other except for liver function abnormalities that was significantly correlated to hypertension and hypertriglyceridemia. Thus, three other subcategories belonging to obesity category were determined as follows; (1) hypertension with liver dysfunction, (2) glucose intolerance and (3) hypertriglyceridemia with liver dysfunction. Summary of the biomedical problem categorization was shown in Table 10.

4. Life habit scales related to obesity bound biomedical problems.

Three subcategories of biomedical problems bound to obesity revealed statistically significant correlations to certain scales of life habits that were shown in Table 11.

5. Correlations among coronary risk factors and life habit scales.

Life habit scales that revealed statistically significant correlations to such risk factors as age, obesity, blood pressure, fasting serum glucose level and smoking habit were shown in Table 12. Life habit scales

<u>Age</u>		<u>Diastolic pressure</u>	
Entertainment	-0.2313 (p<0.0001)	Interest in cooking	0.1921 (p<0.0001)
Intellect. cult. activt.	0.2395 (p<0.0001)	Health image	0.1925 (p<0.0001)
Smoking	-0.2122 (p<0.0001)	High sugar intake	-0.1709 (p<0.0001)
Traditional	0.3381 (p<0.0001)		
Regular meal intake	0.4119 (p<0.0001)	<u>FBS</u>	
High salt intake	-0.1844 (p<0.0001)	Interest in cooking	0.1517 (p<0.0005)
		Sense of love and duty	0.1392 (p<0.001)
		High sugar intake	-0.2094 (p<0.0001)
<u>Obesity</u>			
Health image	0.1763 (p<0.0001)		
Sense of love & duty	0.1619 (p<0.0001)	<u>Smoking</u>	
		Entertainment	-0.1346 (0.01)
<u>Systolic pressure</u>		Intellect. cult. activt.	0.1508 (p<0.005)
Intellect. cult. activt.	0.1944 (p<0.0001)	Meat & fat	-0.2340 (p<0.001)
Interest in cooking	0.1796 (p<0.0001)	Physical complaints	-0.1386 (p<0.001)
Traditional	0.1883 (p<0.0001)	Traditional	0.2445 (p<0.0001)
Regular meal intake	0.2067 (p<0.0001)	Regular meal intake	0.2950 (p<0.0001)
Health image	0.1728 (p<0.0001)	Health image	0.1346 (p<0.01)
High sugar intake	-0.1644 (p<0.0001)		

Table 12. Correlations among CHD risk factors and life habit scales (n=545)

Extrovert	0.2522 (p<0.0001)
Spirit of social service	0.3092 (p<0.0001)
Entertainment	0.2459 (p<0.0001)
Intellectual cultural activity	0.2318 (p<0.0001)
Interest in cooking	0.1856 (p<0.0001)
Traditional	0.2373 (p<0.0001)
Thrift	0.1835 (p<0.0001)
Sense of love and duty	0.2611 (p<0.0001)
Sympathetic	0.2183 (p<0.0001)
Voluntary	0.3040 (p<0.0001)

Table 13. Correlations between exercise and other life habit scales.

revealing statistically significant correlation to exercise habit were also shown in Table 13.

6. Eat behaviors relating to the life habit scales.

Two eat behaviors like selfawareness for the diet and dine-out habit were examined for correlations to life habit scales. The results were shown in Table 14.

Discussion:

In this study, a new system for LPC-LHI recently revized from the previous one originally developed

<u>Factors related to Diet</u>		<u>Factors related to dine out</u>	
Age	0.3025 (p<0.0001)	Age	-0.1811 (p<0.0001)
Ps	0.2739 (p<0.0001)	WBC	0.1807 (p<0.0001)
Pd	0.2393 (p<0.0001)	γ -GTP	0.1661 (p<0.0005)
2BS	0.2280 (p<0.0001)	Marriage	-0.2207 (p<0.0001)
Meat & fat	-0.1661 (p<0.0001)	Extrovert	0.1336 (p<0.005)
Traditional	0.1725 (p<0.0001)	Drinking/Smoking	0.2092 (p<0.0001)
Regular meal intake	0.2682 (p<0.0001)	Traditional	-0.1850 (p<0.0001)
Health image	0.1694 (p<0.0001)	Regular meal intake	-0.3766 (p<0.0001)
High salt intake	-0.3058 (p<0.0001)		
Personal hygiene	0.1508 (p<0.0005)		
High sugar intake	-0.2123 (p<0.0001)		
Smoking	-0.1831 (p<0.0001)		

Table 14. Eat behaviors relating to LPC-LHI scores.

in 1982 was adopted and subjects who received the test could understand the result that was quantitatively and graphically expressed in a result sheet.

In the comparative study of the life habit between Tokyo metropolitan and Shirahama areas clearly demonstrated significant differences in several life habit scales. Throughout all age categories, Tokyo metropolitan area showed consistently higher values in intellectual and cultural activity, exercise and western style diet than Shirahama area did. On the other hand, the latter revealed higher scores only in wife-leadership type than the former did. Fortieth and fiftieth generations in Shirahama area revealed higher salt intake than the same generations in Tokyo metropolitan area did. Corresponding to these life habit differences, systolic blood pressure was higher in Shirahama area than in Tokyo metropolitan area and total cholesterol level was higher in the latter than in the former.

Life habit scale scores were also influenced by age, educational background and the site of residence (urban or suburban). The influence of gender is another interesting topic that was not included in the present study.

Biomedical problems derived from physiological and biochemical data were classified into 3 major categories and 3 other subcategories to which several life habit scales showed statistically significant correlations except for the category of hypercholesterolemia. The reason that any life habit scales did not show significant correlation to hypercholesterolemia is not clear, although two possibilities are raised: (1) the LPC-LHI itself is not enough to be sensitive to detect the lipid abnormality and/or (2) subjects included in the present study may not be appropriate candidates for analysis with regard to dietary habits, since cholesterol level in this generation might not be strongly influenced from dietary habit. In this respect, younger generation of which cholesterol level might be influenced from diet rich in saturated fat must be selected for the same kind of study to evaluate the sensitivity of the test itself.

Other coronary risk factors including hypertension, glucose intolerance, obesity, exercise habit showed statistically significant correlations to certain life habit scales. Also, self-awareness to diet and dine-out behavior seemed to play an important role to maintain an ideal health condition. These results,

however, could not elucidate whether statistically significant correlations between life habit scales and biomedical data found in the present study revealed cause or result. Most of the life habits specifically related to the diet could be the results due to certain biomedical problems. On the otherhand, the life habits related to general social behaviors might not be the results of abnormalities in biomedical measures. Further interventional studies must be carried out to clarify some of these fundamental problems.

Summary:

LPC-LHI was carried out on 887 male subjects living in Tokyo metropolitan area and Shirahama area (rural). Age adjusted comparisons of life habits between two culturally different areas revealed significant differences in several life habit scales which might be related to the specific biomedical problems including hypertension and hypercholesterolemia. Coronary risk factors characterized by age, obesity, hypertension, blood sugar level and smoking also revealed significant correlations to several life habit scales. All these results may be relevant to understand the current status of health condition both in individuals and as a group. It is also possible to utilize this survey system to modify unwanted life habits particularly related to atherosclerotic cardiovascular diseases. Farther interventional studies with LPC-LHI must be needed to clarify its significant roles in the sense of preventive measures.

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