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STUDIES ON MODIFICATION OF HEALTH HABITS AND RELATED REPORTS TO WHO— 1

A Study on Evaluation of Health and Life Habits in a Rural Area in Japan

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In order to improve people's general health condition so as to prevent cerebro-vascular diseases such as hypertension and ischemic heart disease, this study was designed with a purpose to collect basic data with which may contribute to preserving the health conditions of the people by means of a many-faceted survey of life habits, multiphasic screening test and test of sodium excreted in 24 hours' urine. Items of the survey of life habits include not only those related to the life habits of food, clothing and shelter, but items related to personality, mental and physical health and value system.

FOREWORD

The most serious problem in regard to the health of Japanese people is the high death rates of two diseases, namely, cerebral vascular disease and cancer. While the cause of stomach cancer, which shows the highest incidence among various cancers in Japan, has not been clarified; the primary and secondary preventive methods for cerebral vascular disease have been gradually made clear. It is therefore possible to lower the prevalence of this disease as well as death rate for these diseases among people exclusive of the aged, by providing them periodic health screening, helping them to avoid risk factors in their life habits, and successfully directing them to adapt to new life habits.

When we compare the death rate for cerebral vascular disease and cardiac disease among the Japanese and the White population of the United States, it is characterized by extremely high rate for

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cerebral vascular disease and very low rate for cardiac disease among the Japanese. Thus our future task is to consider measures to lower the high death rate for cerebral vascular disease, and at the same time, keep the low death rate for cardiac disease.

Since 1978, we have been asked to design a health promotion program at a rural village called Nakai-machi in Kanagawa Prefecture, one of the regions where the highest death rate for stroke is observed. Since then, we have annually conducted thorough health screening, and at the same time, evaluated and gave guidance on health and life habits of the inhabitants. We report the results of our work here.

METHODOLOGY

1,000 out of 9,000 inhabitants of Nakai-machi, a rural suburb of a city, voluntarily received health screening (blood pressure, ECG, urinalysis, random blood sugar, hemoglobin, hepatic function, serum cholesterol, etc.). As to the level of blood sugar, it was judged by NIH standard and people whose level of blood sugar after meals exceeded 140mg/dl were given 50g glucose tolerance test.

The sodium in 24 hours' urine was measured and converted into sodium chloride value on the assumption that each sodium is combined with a chlorine with a proportion of 1 to 1. (The correlation coefficient between the measured value of sodium and chlorine, and that of sodium chloride assumed is 0.983.)

Life habits survey was then carried out by distributing a questionnaire to each household and collecting them several days later. The questionnaire consisted of thirty scales and 245 items; (1) 11 scales and 99 items on life habits, (2) 10 scales and 82 items on personality, mental and physical health, (3) 8 scales and 64 items on value system, (4) a scale on the level of cultural maturity. Items on personality, mental and physical health were chosen with reference to the Yatabe-Gilford Test, THI (Tokyo University Health Index), and JMI (Juntendo University Medical Index). Items for value system were chosen on the basis of Spranger's six types of values. In addition, information on educational career, occupation, age, and residential area was gathered on the face-sheet.

FINDINGS

1) Results of the health screening

Prevalence of hypertension, which was diagnosed according to the WHO standard, among 968 inhabitants over the age of 35 (male: 275, female: 693) is 20.1% in male and 12.3% in female as shown in Table 1. When border line cases are included, it is as high as about half of male and 1/3 of female subjects. In regard to the average level of serum cholesterol, it is 185 ± 36 mg/dl for male and 195 ± 39 mg/dl for female, approximately the same as that of inhabitants in Tokyo area. However, as it is shown in Table 2, those with hypercholesterolemia over 250 mg/dl are 4.8% in male and 9.2% in female, while those with hypocholesterolemia below 140 mg/dl were 9.0% in male and 5.4% in female. When compared with the figures of inhabitants in Tokyo, the rate of hypocholesterol groups of both sexes are conspicuously higher in Nakai-machi than in Tokyo (Tokyo figures are 0.3% in male

Table 1. Distribution of levels of blood pressure
(by criteria of WHO)

	Male	Female	Total
Normal	48.5%	66.1%	61.1%
Border	31.4	21.6	24.4
Hypertension	20.1	12.3	14.5
Number of examinee (over 35 yrs. old)	275	693	978

Table 3. Detected Diabetes Mellitus
(by criteria of NIH)

	Male	Female	Total
Normal	89.8%	95.4%	92.7%
Border	5.8	3.0	3.7
D.M.	4.4	1.6	2.4

Table 2. Detected cases of abnormal values

	Male	Female	Total
Anemia (M: Hb < 13 g/dl F: Hb < 12g/dl)	12.8%	17.9%	16.3%
Impaired liver function (GOT \geq 50u/l)	4.0	1.6	2.2
(GPT \geq 50u/l)	3.3	1.7	2.1
Impaired renal function (Cre \geq 2mg/dl)	1.1	0.1	0.4
Hyperuricemia (Uric acid \geq 8mg/dl)	4.3	0.4	1.6
Hypercholesterolemia (cholesterol \geq 250mg/dl)	4.8	9.2	8.0
Hypocholesterolemia (cholesterol \leq 140mg/dl)	9.0	5.4	6.4

and 0.8% in female).

Prevalence of hyperuricemia is low, being 4.3% in male and 0.4% in female. The figures are not much different from the ones in Tokyo (Tokyo figures: 4.5% in male and 0% in female). Those who suffered from definite renal failure with elevated serum creatinine of over 2 mg/dl were only 0.4% of the total subjects including both sexes. Those with elevated level of GPT of over 50 u/l is 3.3% in male and 1.7% in female respectively, while those with elevated GPT was found in 8.4% in males in Tokyo, which is higher than in Nakai-machi.

In judging anemia, men with hemoglobin under level 13 g/dl and women with hemoglobin level under 12 g/dl were diagnosed as anemia. The result is shown in Table 2: anemia was found in 12.8% for male and 17.9% for female, which is apparently higher than that of Tokyo (Tokyo figures: 1.4% for male and 10.0% for female).

The figures for diabete are shown in Table 3: 4.4% for male and 1.6% for female. Higher rate is observed in male than in female.

The above findings indicates that prevalence of hypertension is definitely higher and so is of hypocholesterolemia among inhabitants in Nakai-machi than those in urban areas. At the same time, it is conspicuous that larger number of both male and female population suffer from anemia in Nakai-machi than those in urban areas. In terms of impaired function, it is slightly lower in inhabitants in Nakai-machi than in urban areas.

2) Results of the measurement of sodium in 24 hours' urine

The average amount of salt intake assumed from the measured sodium in 24 hours' urine conducted on 724 women in Nakai-machi is 13.7 ± 5.2 g. This figure is clearly higher than that of women in urban areas (Tokyo: 11.6 ± 3.9 g, Osaka: 10.4 ± 4.0 g). Yet, it is slightly lower than that of Nagano Prefecture (15.6 ± 4.8 g), where is one of the regions with the highest death rate for cerebral

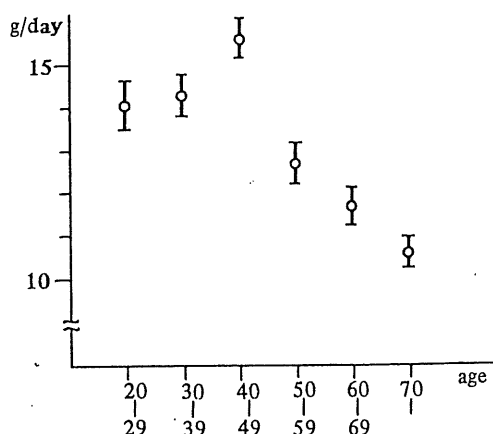


Figure 1 The average of NaCl excreted in 24 hours' urine (by age)

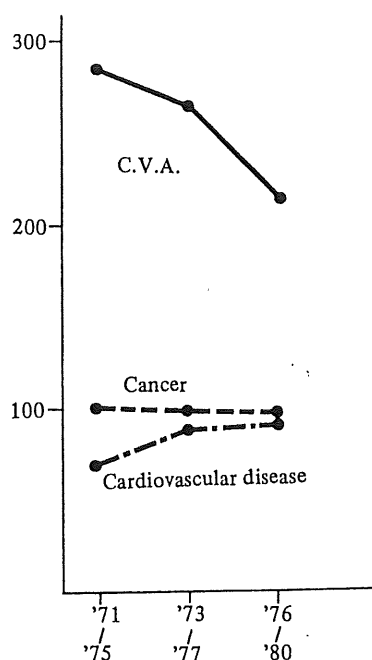


Figure 2 The moving average of mortality

vascular disease. From these figures, we can assume that inhabitants of rural villages, even though they are located in the surrounding areas of large cities, take greater amount of salt daily, thus inviting high prevalence of hypertension and stroke in its turn. The amount of salt intake is classified according to the age group in Fig 1. It is the highest in age group of thirties and forties and decreases as the age proceeds.

3) Results of life habits survey

a) Habitual intake of highly salted food decreases as the level of education become higher. Non-theoretical women with "amusement" and "economy" oriented value system take highly salted food more frequently.

b) Habitual intake of food rich in sugar decreases with aging. Positive correlation is observed between the intake of highly salted food and intake of food rich in sugar, and those with mental and physical multicomplaints tend to take greater amount of both highly salted food and food rich in sugar.

c) Habitual intake of fat and oil decreases with aging. It is conspicuous in working women, when classified according to occupation, as well as in graduates of universities and junior colleges, when classified according to the level of education. Those who are highly interested in cooking take greater amount of fat and oil as well as meat and fish, and they are apt to be favorable in their character, being voluntary, highly motivated and susceptible.

d) Motivation to exercise has negative correlation with aging and positive correlation with the level of education. Occupationally speaking, working women are least eager to take exercise. Those who are voluntary, highly motivated and susceptible in character and recognize the value of social welfare activities and theoretical thinking are more eager to take exercise.

e) Not many women in 20 – 29 age category blame their diseases on physical constitution or heredity; however, in 40 – 59 age category, tendency to do so increases as the level of education goes up. It is also found that depressive and emotionally unstable women are apt to be possessed with this

kind of thinking.

f) Housewives tend to strengthen their leadership in the family as they become older. Those with voluntary, highly motivated and susceptible character are likely to exert stronger leadership.

g) Hypertension and peptic and duodenal ulcers are frequently listed at previous disease record. Hypertension is more frequently found among those with higher educational level and traditional way of thinking. On the other hand, frequency of peptic and duodenal ulcer is higher among those with higher cultural level and theoretical way of thinking.

DISCUSSION AND CONCLUSION

From above findings of the survey, we come to the following conclusion. In rural villages, prevalence of hypertension of both sexes is higher than that of urban areas. This tendency is particularly significant in men. Moreover, obviously greater amount of salt intake of inhabitants in rural villages suggests that large amount of salt intake is one of the main causes for the high death rate of stroke in those regions. We conclude, from those findings, that diets to reduce the amount of daily salt intake and to enable proper intake of cholesterol, as well as diet for women to prevent anemia should be the mainstream of the guidance to be given to the inhabitants of Nakai-machi. In regard to the prevention of hypertension, it is more desirable to have the great amount of salt intake among people in their thirties and forties as a primary preventive measure than to limit the amount of salt intake of the aged, for effective countering of high prevalence of hypertension and high death rate by stroke in Nakai-machi.

The results of life habits survey point out the necessity of limiting the amount of salt and sugar intake especially among the middle aged people. The strong relation is found between the higher educational level and the low intake of salt and sugar, suggesting the importance of health education. Also, intake of protein and fat-and-oil is also relevant to academic career, occupation, and age to a substantially high degree. It is therefore important to consider the correlation among scales obtained by the survey, in giving diet guidance to correct the content of the diet.

Next, the trend of morbidity rate in Nakai-machi is shown in Fig 2. According to the figure, increase in heart disease cannot be denied while decrease in stroke is evident. It is thus desirable to elevate the level of cultural maturity of living toward the direction so as to avoid risk factors of coronary heart disease, amidst the westernization of life patterns.

As factors to change life habits, experimental learning, is effective health education; for example, we can estimate the amount of salt intake by measurement of sodium through 24 hours' storage of urine, feed back the results to inhabitants, and arouse their consciousness on the importance of reducing salt intake. Various strategies such as recognition education, experimental learning, motivation to health practice should be employed in making life guidance, and we are at present campaigning in this course.

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