

Elderly Health and its Association with Nutrition in Japan

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Trends in the Distribution of Population in Japan

During the past 50 years in Japan, the rate of people 65 years of age or over has increased from 4.9 % to 17.5 % (Fig. 1). This rapid increase has occurred because of the improvement of living environment; nutritional status, medical technologies, and others. As the death rate has decreased for all age groups, life expectancy at birth has extended remarkably to the world's highest 84.6 years for females and 77.6 years for males as of 2000. Unfortunately this prolonged life span has been accompanied with a decrease of total fertility rate. With more years spent for education, the growing anxiety of having and caring for babies in small living spaces, and the lack of nursery schools, greater numbers of females are postponing marriage. Total fertility rate is expected to remain constant during the next 20 years, thus, in 20 years more than 1 out of 4 persons or more than 25% of Japanese will be 65 or older.

Because of the prevalence of high levels of lipids, hypertension, or high blood glucose becomes higher with aging, health measures should be emphasized to maintain a high quality of life and to lengthen the period during which people can live without suffering from dementia or being bed-ridden (Fig. 2).

Lifestyles of Young and Middle-aged Population

In order to make a society with fewer children and more aged people healthy, younger persons are asked to improve their lifestyles and to receive health examinations for early

detection and treatment of diseases. Recent results of the National Nutrition Survey (1999) has shown that the rate of smoking was highest in males in their 30's and in females in their 20's ; the rate of drinking was highest in males in their 50's and females in their 30's ; the rate of exercise was lowest in those in their 50's. These results revealed that those 20 to 40 years of age are strongly recommended to change their unhealthy lifestyles to avoid future risks of lifestyle-related diseases before reaching 65 years of age. Young adults must be advised to alter their bad habits, drinking, smoking, etc. as these are possibly the causes of diseases suffered at an elderly age (Fig. 3).

Primary Prevention from Diseases

1. Healthy Japan 21

Disease prevention and a behavior to maintain and promote healthy life are now a nationwide aim for Japanese people. In 2000, Japan started "National Health Promotion Movement in the 21st Century (Healthy Japan 21)." This consists of a variety of health promotion measures from the standpoint of primary prevention for lifestyle-related diseases and prolonging a healthy life span. The project was initiated with a ten-year target date for successful results on eating patterns, exercise, mental health, dental health, and so on.

In the "nutrition and eating" section, the goal for obesity is to decrease the prevalence of obesity to be no more than 15% for males and 20% for females. Improvement of excess fat and salt intake was recommended to lower the risk of atherosclerotic heart diseases, breast cancer, colon cancer, and hypertension. An increase of vegetable intake was recommended to supply enough potassium, fibers, and antioxidative vitamins. Also an increase of dairy products was promoted because of the consistent lack of calcium intake in all Japanese.

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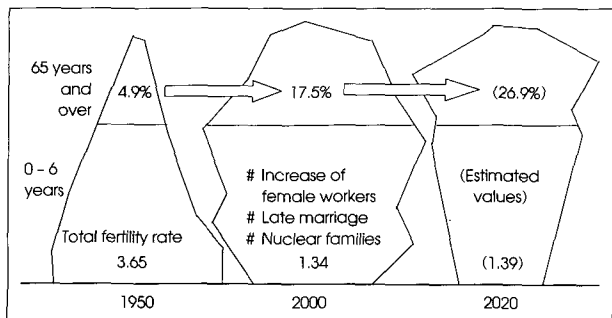


Fig. 1. Transition of population pyramid and distribution of the elderly in Japan (Ministry of Health, Labour and Welfare).

The goal for exercise rate and numbers of footsteps were indicated by considering recent trends in Japan and to approach 10,000 steps consuming ca. 30 kilocalories per day (Table 1).

2. Prevention of hypertension and its association with lifestyles

We have studied the association of lifestyle parameters with the future risk of hypertension in normotensive (SBP < 140mmHg and DBP < 90mmHg) subjects in a community (Kanda et al. 1999). A baseline questionnaire and a four-

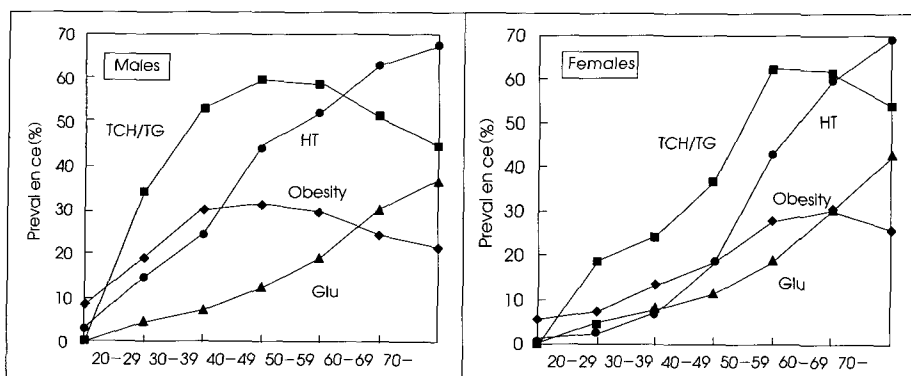


Fig. 2. Prevalence of high lipid levels, hypertension, obesity, and high glucose levels by sex and age groups (National Nutrition Survey 1999, Ministry of Health, Labour and Welfare).

TCH / TG : total cholesterol \geq 220 mg / dl or triglyceride \geq 150 mg/dl, HT : SBP \geq 140mmHg or DBP \geq 90 mmHg, obesity : BMI \geq 25kg/m², Glu : glucose \geq 110 mg/dl (3 hours after meal).

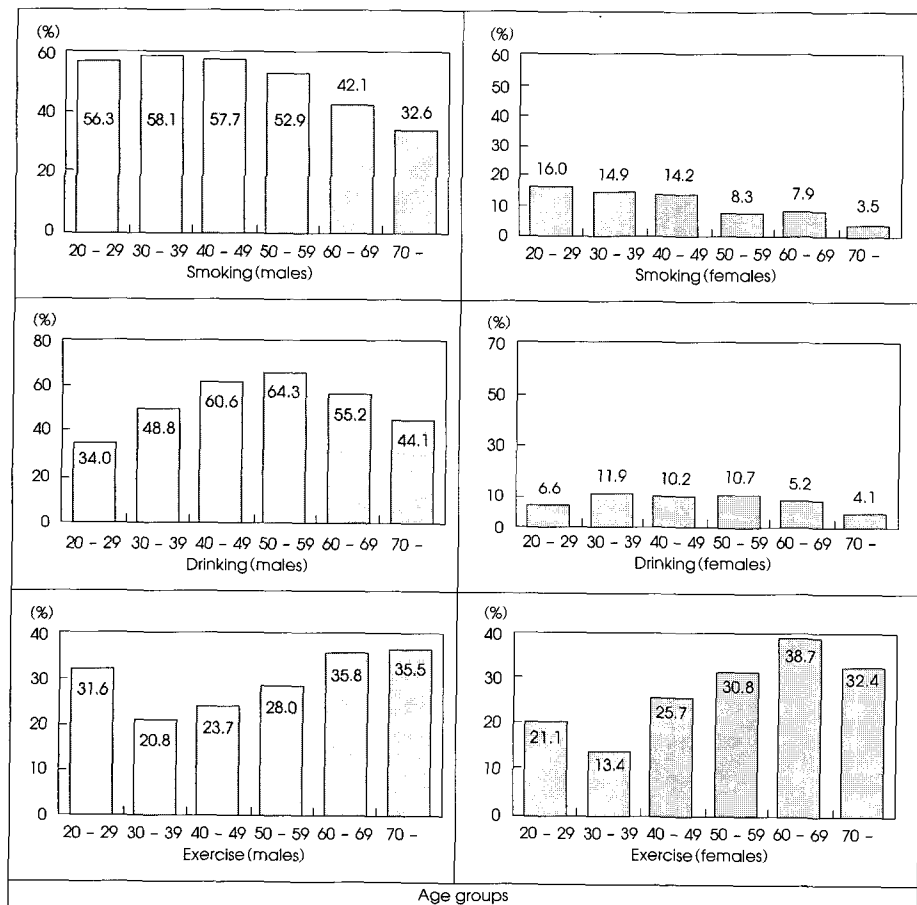


Fig. 3. Rate of smoking, drinking, and exercise by sex and age groups (National Nutrition Survey 1999, Ministry of Health, Labour and Welfare) Smoking : smoke every day or habitually, drinking : drink \geq 3 days/week and \geq ca. 30g of alcohol / day, exercise : \geq 30min / day and \geq 2days/week and continue \geq 1 year.

year follow-up were performed in 445 of normotensive Japanese at or over 35 years. Age distribution diagrams of the subjects at baseline (Fig. 4) have shown that only less than 50% were normotensive. Subsequently, we focused on 60 to 69 year old subjects which make up the largest age group and might be suitable as the target group for hypertension

Table 1. Baselines and targets for primary prevention from lifestyle-related diseases in "National Health Promotion Movement in the 21st Century (Healthy Japan 21)"

Prevalence	Baseline (1997)	Target (2010)
Obesity in males aged 20 to 60	24.3%	15%
Obesity in females aged 40 to 60	25.2%	20%
Fat intake (% of energy / day)	27.1%	25%
Salt intake (g / day)	13.5g	10g
Vegetable intake (g / day)	292g	350g
Dairy products intake (g / day)	107g	130g
Exercise in males*	28.6%	39%
Exercise in females**	24.6%	35%
Walking (steps / day)	8,300	9,200

* : Ministry of Health, Labour and Welfare, 2000

** : more than 30 min continuously twice a week for 1 year

prevention. The changes of blood pressure during four years were negatively correlated with the amount of boiled rice intake in man and with Japanese tea intake in women (Table 2).

Multiple logistic regression analysis revealed that miso-soup intake at more or equal to two bowls per day was protective against hypertension during follow-up (Table 3). One bowl of miso-soup usually contains 10 – 12g of miso and 1.5 – 2g of salt. Miso extract has been reported to lower blood pressure in laboratory experiments of rats (Iwashita et al. 1994). On the other hand, salt is considered to be a risk factor for hypertension as reported by Intersalt-2 study suggesting that efforts to reduce salt consumption are needed in the Japanese population for the prevention of hypertension. Our results on miso-soup have shown that the anti-hypertensive effect of miso is possibly above the hypertensive effect of salt (Nakagawa et al. 1999).

We have shown that factors associated with protection against hypertension are rice, tea, and miso-soup, basic menus of the Japanese-style meal. Japanese-style food might be

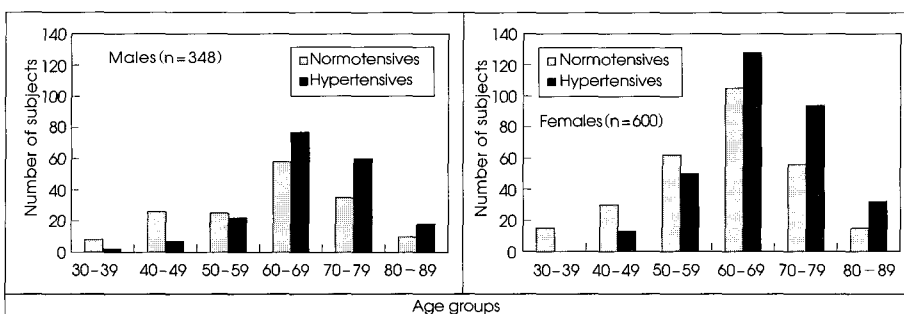


Fig. 4. Baseline age distribution diagrams of the study population in a community by normotensive or hypertensive. 162 (46.6%) men and 283 (47.2%) women were normotensive. Hypertensive subjects were omitted from this study and only normotensives were analyzed.

Table 2. Correlation coefficients of lifestyle parameters with changes of blood pressures in four years in a community

	Males				Females			
	N	d'SBP	N	d'DBP	N	d'SBP	N	d'DBP
Load of work	20	-0.28	20	-0.15	46	-0.14	46	-0.03
Exercise	25	-0.36	25	-0.09	56	0.04	56	0.02
Japanese pickles	25	-0.13	25	-0.35	63	0.05	63	0.13
Boiled rice	25	-0.19	25	-0.50*	64	-0.26*	64	-0.14
Miso-soup	25	-0.19	25	-0.28	65	-0.01	65	-0.11
Coffee	25	-0.03	25	-0.16	64	-0.03	64	0.08
Japanese tea	25	-0.03	25	-0.18	62	-0.24	62	-0.33**
Salad	25	-0.02	25	-0.32	64	0.09	64	-0.04
Garlic	25	-0.13	25	-0.17	64	-0.16	64	-0.05
Fruits	25	-0.24	25	-0.07	65	-0.02	65	-0.12
Seaweed	25	-0.21	25	-0.23	65	0.11	65	0.07
Meat	25	-0.07	25	-0.07	65	0.09	65	-0.06

Subjects are 60 to 69 years old and participated in the physical examinations for consecutive four years. SBP = $SBP_{\text{follow-up}} - SBP_{\text{baseline}}$
 $dDBP = DBP_{\text{follow-up}} - DBP_{\text{baseline}}$ * : $p < 0.05$, ** : $p < 0.01$ (Spearman correlation)

more effective in preventing hypertension because it is served often with vegetables, fish, and other seafood, which are reported to be anti-hypertensive foods.

The proposed lifestyle parameters, which may prevent hypertension, would be helpful to decrease the risk of future cardiovascular diseases and for further health promotion in communities.

Effective Utilization of Periodical Health Examinations

For secondary prevention of lifestyle-related diseases, the goal for the participation rate for both a basic health examination and a follow-up examination on diabetes or cardiovascular diseases is a 50 % increase in 10 years for "Healthy Japan 21." However, this participation rate must contain both persons who continue receiving examinations for existing diseases (old patients) and persons who show abnormal findings from screening (newly screened subjects). Thus, for evaluating the effectiveness of screening, it is necessary to follow up the health behavior of persons whose health problems are found for the first time on examination.

Kawaguchi and his group surveyed more than 4,000 newly screened subjects of 40 – 70 years of age on a yearly basic health examination in a community, then revealed that only 21.5% of new participants received a follow-up exa-

Table 3. Relative risk for incidence of hypertension during a four-year follow-up predicted by lifestyle parameters (60 – 69 years old) in a community

	Relative risk	95% Confidence intervals	p
Load of work (heavy)	1.36	0.06 – 31.36	
Exercise (almost every day)	1.77	0.23 – 13.40	
Japanese pickles (almost every day)	2.17	0.48 – 9.86	
Boiled rice (≥ 4 bowls / day)	0.50	0.05 – 5.09	
Miso-soup (≥ 2 bowls / day)	0.18	0.04 – 0.86	*
Coffee (≥ 2 cups / day)	3.23	0.36 – 28.86	
Japanese tea (≥ 6 cups / day)	1.03	0.23 – 4.57	
Salad (almost every day)	3.75	0.51 – 27.45	
Garlic (≥ twice / week)	0.10	0.01 – 1.51	
Fruits (almost every day)	5.61	0.82 – 38.23	
Seaweed (almost every day)	2.12	0.43 – 10.45	
Meat (≥ twice / week)	0.20	0.04 – 1.05	

* : $p < 0.05$, ** : $p < 0.01$ by unconditional logistic regression analysis adjusted by sex.

Dependent variable is the incidence of hypertension during four-year follow-up (yes = 1, no = 0)

mination (Sekiyama et al. 1996). Furthermore, we have reported that about 50% of 490 newly screened subjects could not recall their examination results after several months, and only 20–40% took medical care to recover from their health problems after examination (Kanda et al. 2000). In our ongoing study, 363 newly screened subjects who were found to be diabetic did not receive medical care for diabetes after screening. Health examinations would be most likely effective by increasing the number of participants who receive medical care to recover from health problems diagnosed by examination.

Problems on Rising Medical Expenditures

With the aging of population, changes in the disease structure and the application of high-cost technology for medical care, the medical expenditure continues to exceed the rise in the national income. In 2000, the national medical expenditure reached 230 billion dollars on 1,800 dollars/person/year (Fig. 5). The medical expenditure for the elderly has been reached 5,300 dollars/person/year (Fig. 6).

From the standpoint of lowering medical expenditures in Japan, the economic effectiveness of disease prevention or health promotion should be evaluated hereafter. We have studied the association of lifestyles in residents and their outpatient medical expenditures (Kawaguchi et al. 2001). Medical expenditures of one community of ca. 1,000 health-insured subjects 20 – 79 years of age were found to be higher in obese persons than in normal persons in each age

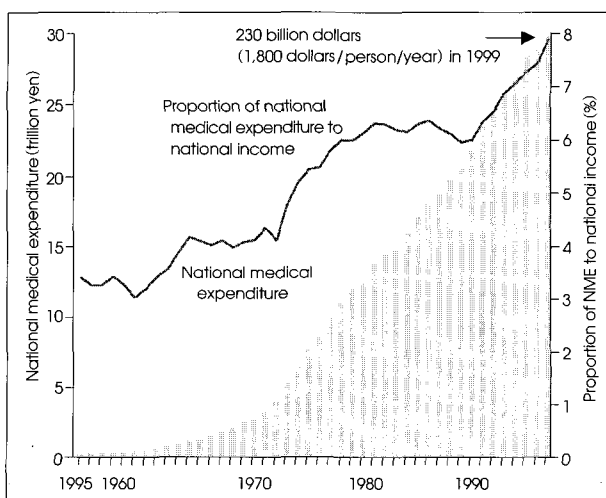


Fig. 5. Trends in national medical expenditure and its proportion to national income in Japan (ministry of health, labour and welfare).

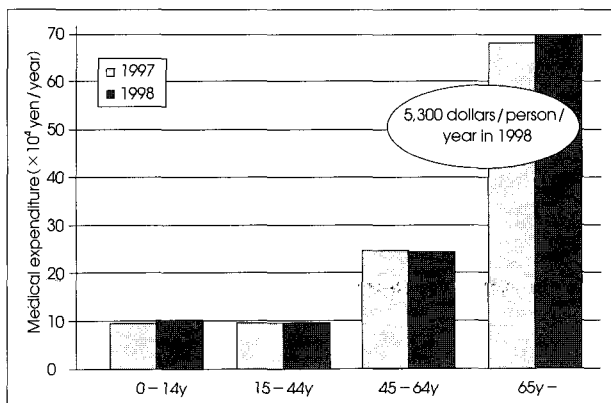


Fig. 6. National medical expenditure by age groups in Japan (Ministry of health, labour and welfare).

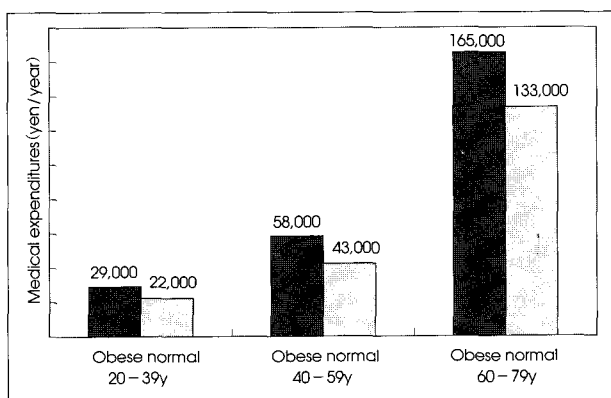


Fig. 7. Medical expenditures of outpatients by obesity and age groups in a community 917 subjects. Obesity : $> 25\text{kg/m}^2$.

group. The difference in expenditures became greater in the older age group (Fig. 7). The medical expenditure was lower in persons who walk over 7 km per day (Fig. 8). A preliminary intervention of exercise in a small group showed that the increase of yearly medical expenditure had been lowered in the treated group after one to two years.

Another study reported that yearly medical expenditures tend to become lower in areas where greater numbers of residents are familiar with health handbooks or functional training which are available as community health services for the elderly (Kamiyama et al. 2000).

Conclusion

Improving lifestyles is likely to be effective for the prevention of lifestyle-related diseases and for a prolonged healthy life for elderly, as well as increase the economic effectiveness of disease prevention or health promotion.

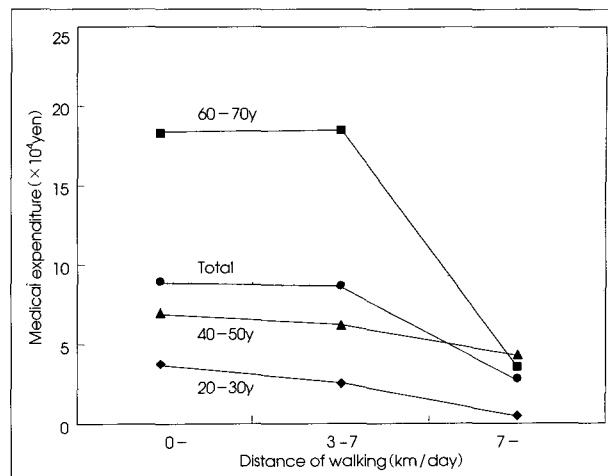


Fig. 8. Medical expenditures of outpatients by distance of walking and age groups in a community 316 subjects. $p < 0.05$ (Kruskal-Wallis test) among 3 groups divided by distance in 60-70y and total.

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