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Mortality from Coronary Artery Disease in Japan, 1969-1982

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Abstract The number of deaths from coronary artery disease has increased from 1969 to 1982 in Japan. The age-adjusted death rates from coronary artery disease have decreased through this period. This change was considered to have been contributed by the change of constituent of population, the increasing number of elder people susceptible to fatal coronary artery disease. The characteristics of low mortality from coronary artery disease and the declining mortality were discussed in relation to the change of major risk factors.

Key Words : Coronary artery disease, Japan, Coronary risk factors

Introduction

The frequency of occurrence of coronary artery disease and its mortality are known to vary with the characteristics of person, place and time.[1] It has been noted that the incidence and mortality from coronary artery disease in Japan is low among the industialized countries.[2,3] Understanding the characteristics of low mortality rate from coronary artery disease in Japan may provide interesting material for speculation about possible role of genetics and enviroment. Furthermore, the declining mortality from coronary artery disease has been observed in several industrialized countries.[4,5] In the present study, the change of mortality rate from coronary artery disease in Japan is observed and the possible causal factors on this matter are discussed.

Data Sources

The population and the number of deaths from coronary artery disease by sex and age were obtained from the Vital Statistics Japan, 1969 edition to 1982 edition, published by the Ministry of Health and Welfare.[6] The death rates of coronary artery disease in this interval are based on the Japanese population, excluding non-Japanese in Japan. The proportion of non-Japanese to the total population is 0.6 per cent (about 600,000). Since the Okinawa Islands were returned from the United States to Japan, data from 1973 to 1982 include those of Okinawa Prefecture. The population of Okinawa Prefecture numbers about one mollion. The population by age group based on the cencus in 1975 was used as the standard population for the age-adjusted death rate by sex.

Results

The number of death from coronary artery disease in Japan from 1969 to 1982 is shown in Table 1. Fig. 1 illustrates the number of deaths from coronary artery disease. The number of deaths from coronary artery

Table 1 Number of death from coronary artery disease by sex, 1969-1982, Japan.

Year	Male	Female	Total
1969	21806	15730	37536
1970	22441	16645	39086
1971	21983	15997	37980
1972	22042	16717	38759
1973	23711	18688	42399
1974	24395	19667	44062
1975	24106	19714	43820
1976	24576	20014	44590
1977	24976	20190	45166
1978	25187	20433	45620
1979	24656	19688	44344
1980	26887	21460	48347
1981	26655	22305	48960
1982	26440	21951	48391

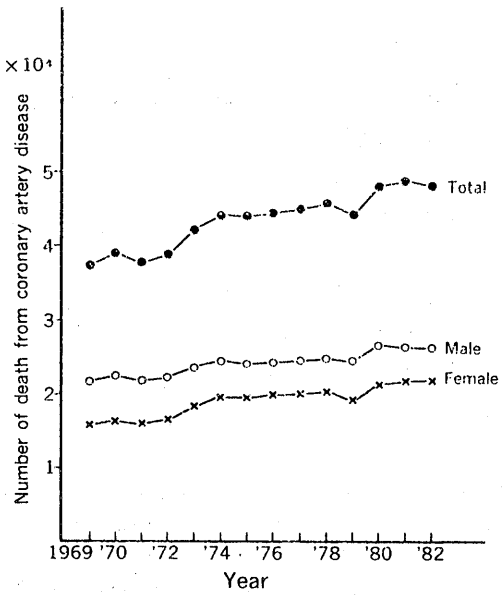

Fig. 1 Number of death from coronary artery disease by sex, 1969-1982, Japan. Rate per 100, 000 population.

Tabel 2 Age-adjusted and curde mortality rates from coronary artery disease by sex, 1969-1982, Japan. Rate per 100,000 population.

Year	*Male*		*Female*		*Total*	
	Age-adjusted rate	Crude rate	Age-adjusted rate	Crude rate	Age-adjusted rate	Crude rate
1969	47.56	43.52	35.18	30.29	41.97	36.79
1970	48.79	44.34	36.07	31.69	38.55	37.90
1971	46.17	42.91	34.22	30.11	39.70	36.39
1972	46.00	42.51	33.70	31.01	39.35	36.65
1973	46.11	44.73	35.95	33.93	42.10	39.22
1974	44.47	45.44	36.54	35.28	41.49	40.27
1975	43.38	44.04	34.87	34.87	39.38	39.38
1976	43.36	44.41	34.12	35.05	38.66	39.66
1977	42.42	44.71	32.80	35.02	37.54	39.76
1978	41.24	44.68	31.72	35.13	35.10	39.83
1979	38.95	43.38	29.24	33.58	33.98	38.40
1980	39.85	47.00	30.42	36.29	35.58	41.56
1981	39.15	46.23	30.24	39.44	34.58	41.77
1982	37.38	45.54	28.27	36.61	32.68	41.00

Appendix. Age-specific mortality rates from coronary artery diseases by sex, 1969-1982, Japan.
Rate per 100,000 population.

Year	25-34	35-44	45-54	55-64	65-74	75-84	85<
Male							
1969	2.82	10.19	34.41	122.18	338.52	769.74	1256.97
1970	2.75	11.57	34.52	121.35	334.83	766.37	1354.17
1971	2.87	10.90	32.30	114.55	316.65	726.48	1307.39
1972	2.61	10.42	31.61	109.47	300.36	732.31	1427.55
1973	2.60	9.54	30.88	106.70	316.83	782.72	1548.59
1974	2.29	10.51	30.42	104.05	309.78	792.58	1655.65
1975	1.83	9.12	27.80	98.16	297.35	751.15	1588.93
1976	1.93	8.55	29.70	95.68	282.96	753.59	1609.23
1977	1.60	7.86	30.30	94.81	277.52	732.61	1560.14
1978	1.94	7.71	28.38	93.93	266.49	711.96	1560.13
1979	1.90	7.14	29.38	89.09	258.02	658.11	1308.07
1980	1.74	7.60	29.61	92.88	269.18	711.59	1451.71
1981	1.57	7.11	28.88	83.37	257.29	690.60	1466.48
1982	1.58	6.59	27.23	79.64	247.97	665.98	1344.27
Female							
1969	1.01	3.45	13.16	51.09	185.82	505.09	933.49
1970	0.95	3.40	13.65	53.31	191.13	511.95	998.13
1971	0.77	3.01	11.86	49.05	176.14	481.73	921.19
1972	0.99	2.84	11.27	46.90	172.64	494.38	1043.30
1973	0.64	2.81	11.35	46.47	182.27	540.00	1174.05
1974	0.78	2.77	10.56	43.64	181.78	564.46	1238.73
1975	0.56	2.45	9.59	38.98	164.75	561.67	1221.58
1976	0.45	1.93	8.23	39.25	163.30	543.11	1210.24
1977	0.50	1.97	8.93	36.39	153.76	520.74	1215.30
1978	0.43	1.91	7.29	33.36	149.02	511.83	1199.67
1979	0.52	1.47	7.98	32.54	139.07	474.77	1015.17
1980	0.38	1.87	7.89	31.27	143.18	498.98	1130.47
1981	0.40	1.85	7.27	31.48	141.74	497.33	1153.52
1982	0.35	1.85	6.93	28.21	131.47	472.38	1086.98

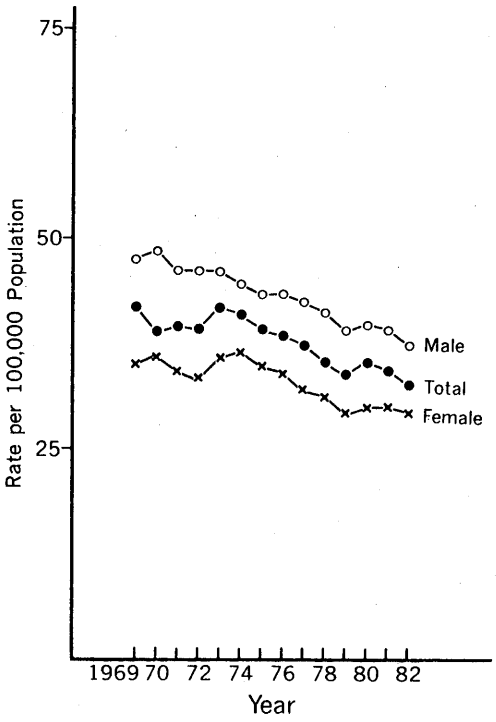

Fig. 2 Age-adjusted mortarity rate from coronary artery disease by sex, 1969-1982, Japan. Rate per 100,000 population.

disease has gradually increased from 1969 to 1982. The age-adjusted death rates from coronary artery disease in Japan from 1969 to 1982 are shown in Table 2. Fig 2 shows the age-adjusted death rates from coronary artery disease. The age-adjusted death rates from coronary artery disease have decreased in both males and females from 1969 to 1982. Fig. 3 (see Appendix for detailed numerical figures) illustrates the changes in the age-specific mortality from coronary artery disease by sex. The mortality from coronary artery disease increased with the advancing age in both males and females. In the younger age group, the mortality from coronary artery disease has been decreasing in both males and females.

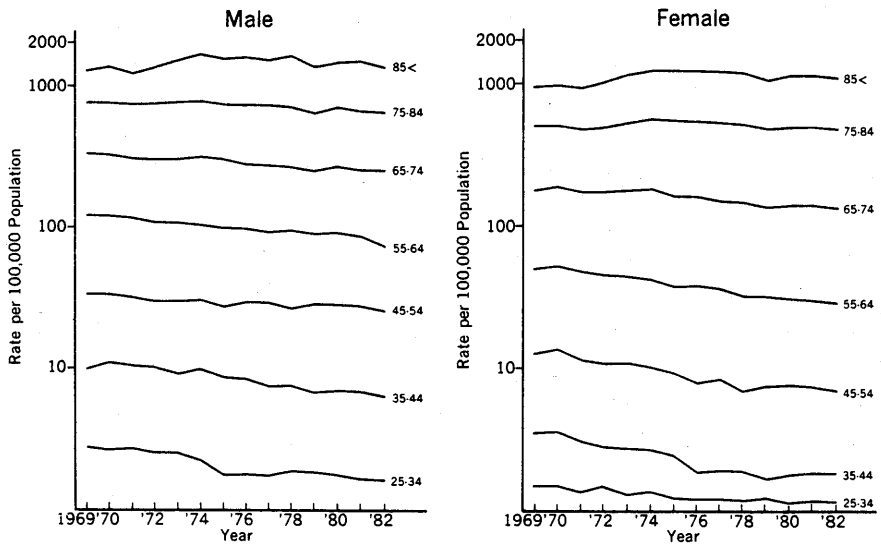

Fig. 3 Age-specific mortality rate from coronary artery disease by sex, 1969-1982, Japan. Rate per 100,000 population.

Discussion

Analysis of mortality statistics is based upon death certificates, and careful consideration has to be given to its interpretation. The revision of International Classification of Disease and changes in the diagnostic fashion must be taken into consideration in assessing the long term variations in the frequency of the disease. In Japan, the cause of death from mortality statistics from 1968 to 1982 was coded on the basis of the Eighth Revision of International Classification of Disease and one from 1979 to 1982 on the Ninth Revision. According to the Japanese Ministry of Health and Welfare, the comparability ratio for the change of classification from Eighth (=1) to the Ninth Revision was estimated at 0.9822.[7] In the present analysis, this ratio was not employed and date were taken as part of a continuous trends.

In Japan, the number of death from coronary artery disease has been increased from 1969 to 1982. However, the age-adjusted death rate from coronary artery disease has been declined through this period. This might be explained by the change of constituent of population. There has been an increasing number of elder people, who have more frequent mortality from coronary artery disease. Time is most important for the progression of coronary atherosclerosis.[8] The elder patients are more susceptible to severe and extended coronary artery disease.

Among the numerous recognized risk factors for the development of atherosclerosis, one of the most documented is the association of blood lipids with coronary artery disease.[4] Several prospective studies reported that the risk of coronary artery disease was directly related to the serum cholesterol level.[2,9,10] It has been reported that serum cholesterol level in the selected population of Japan was lower than those in western countries, which may explain the lower incidence of coronary artery disease.[2,11] The low serum cholesterol level in Japan was contributed to the low dietary intake of lipid composition. The serum cholesterol levels in Japan have been increasing.[11] The dietary life style in Japan has been changed in the last few decades. The proportion of fat in Japanese diet has tended to be increased at the expence of carbohydrate. However, the proportion of fat in Japanese diet is still lower than that in the western countries. Along with the gradual rise that has occurred in the total fat content of the diet in Japan, there has been a relative increase in the proportion of fat intake derived from animal sources and a correponding decrease in that from vegetable sources. Although it has been controversial and difficult to clarify the epidemiological correlation between dietary intake of fat and serum cholesterol,[2,12–14] low animal fat intake and low serum cholesterol level may explain the low mortality from coronary artery disease in Japan. However, the increase of animal fat intake and increase in serum cholesterol level over the past several clecade in Japan could not explain the decline of mortality from coronary artery disease in Japan. In the United States, there has been a decline in per capita consumption of tabacco, animal fats and oils, liquid, milk, cream, butter and eggs with an associated increase in consumption of vegetable fats and oils.[15] It is suggested that these recent changes in the life style or diet in the United States may correlate with the decline of vascular mortality. On the other hand, the trend in Japanese life style has gradually reversed to that in the United States has been occurred. However, the mortality from coronary artery disease has not been increasing in Japan.

Risk of every major clinical manifectation of coronary artery disease increases in patients with hypertension. As the average blood pressure rises with age, elevated blood pressure may be an important risk factor in the elderly.[16] Furthermore, not only are coronary attacks more likely to occur in hypertensives, but they are more likeky to be fatal.[16] According to the surveys by Japanese Ministry of Health and Welfare, the prevalence of hypertension has decreased from 1971 and 1972 to 1980.[17] The decline of mortality from coronary artery disease might be related to the decline of prevalence of hypertension. On the other hand, the prevalence of hypertension in Japan tends to be higher than that in other countries with higher mortality from coronary artery disease.[18] This international geographic dif-

ference does not explain the relation between hypertension and coronary artery disease. It is well known that the frequency of male cigarette smokers in Japan is much higher than that in the United States. A study of the Japan Tobacco Monopoly Bureau showed that 70 percent of Japanese men smoke cigarettes, whereas the study by U.S. Department of Health and Welfare showed 39 percent of American men smoke.[19] Although the smoking is one of the major risk factors, the higher frequency in cigarette smoking in Japanese men than that in the Unitid Stated could not explain the lower incidence of coronary artery disease in Japan than those in the United States. The relationship of cigarette smoking to the development of coronary artery disease must be complex, or related to other risk factors.

Clinically overt diabetes mellitus has long been recognized as one of the precursors of vascular disease, and this association has been documented in prospective epidemiological studies.[20,21] The incidence of coronary artery disease was reported to be higher among diabetics than among nondiabetics.[22] However, the relationship between the methods for control of hyperglycemia and the risk of developing coronary artery disease is confusing and controversial at the present time.[23,24] It is difficult to make accurate assessment of the national prevalence of diabetes and the role of diabetes on coronary artery disease in Japan has not been satisfactorily surveyed at present.

The characteristics of low mortality from coronary artery disease and the declining mortality in relation to the change of major risk factor in Japan were observed. The risk factors might be related to the coronary artery disease mortality to some extent and in some limited group. However, when the relation of risk factors to the mortality from coronary artery disease were observed in general population of Japan, the low mortality from coronary artery disease with its declining can not be explained by the prevalence of or change in risk factors. The characteristics of low coronary artery disease mortality in Japan might be mostly dependent on the ethenic difference rather than a risk factor's difference. Furthermore, the significance of each risk factor would be different in each place or country, as well as each individual.

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