Cardiovascular Risk Factors in a Tourist Town: Association with Job-related Factors

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Abstract Previous studies have shown that mortality from cardiovascular diseases in fishing villages was lower than that in farming villages. In contrast, few reports on the population living in a tourist village have appeared. Then, we report here the characteristic features of a tourist town, and that in fishing and farming towns. The rural farming town in Gunma prefecture had a population of 15100. The population working in the primary industry was 17.1%, and the farming population was 17.0%. The fishing town in Shizuoka prefecture had a population of 11700. The population working in the primary industry was 11.0%, and the fishing population was 10.2%. The rural tourist town in Shizuoka prefecture had a population of 17800. The population working in the tertiary industry was 60.2%, and the wholesaling or retailing population was 16.6%. Standardized mortality ratios of cardiovascular diseases in the tourist town reported by Shizuoka health officials were higher than the fishing town. The rate of participation at ages of 50–59 years for the basic health examination in the tourist town was lower than the fishing and the farming towns. From the results of the health examination of residents at ages of 50–59 years, the high prevalence of obesity and hypertension in men and high prevalence of hypertension in women were found in the tourist town. In the tourist town, self-employed women at ages of 50–59 years had irregular time of meals and insufficient care of diet in comparison with employed women. Furthermore, the prevalence of hypertension in self-employed women was also higher than that of employed women. We could suggest that health status in communities might be associated with job-related factors. *J Physiol Anthropol* 21 (5): 223–227, 2002 <http://www.jstage.jst.go.jp/en/>

Keywords: fishing town, farming town, tourist town, obesity, hypertension

Introduction

Cardiovascular diseases are the main causes of death in Japan. Community health promotion was acknowledged as a critical target of the strategic planning process for preventing diseases. In order to establish programs of health promotion for communities, it is important to identify the characteristic features of communities.

Epidemiological studies have indicated that coastal areas such as fishing villages show a lower mortality from cardiovascular disease than do mountainous areas such as farming villages. These studies were conducted on native Greenland Eskimos (Dyerberg and Bang, 1979) and a population living in an island in the middle of the North Atlantic Ocean (Torres et al., 2000). In Japan, populations in Katsuura in Chiba (Hirai et al., 1989), Himi in Toyama (Hamazaki et al., 1986), Kohama in Okinawa (Kagawa et al., 1982), Fuse in Shimane (Yamori et al., 1985), Ushibuka in Kumamoto (Kimura et al., 1975; Takagi, 1982; Toshima et al., 1995), and Kamishima in Mie (Yamada et al., 2000) have been studied.

Tourist villages have many self-employed persons working in the service industries, such as hotels, restaurants and retail stores. Previously, Adamopoulos et al. (1990) reported that the prevalence of hypertension in a tourist town was larger than that in a remote rural village. However, there are so far few reports on the health status of the population living in a tourist village.

Socio-economic factors play an important role for incidence, prevalence and mortality of many diseases. Among socio-economic factors, the occupation caused inequality in chance of survival (Kagamimori et al., 1998). It has been reported that individuals working in the service industry, such as hotels and restaurants, scored significantly higher on the AUDIT (Alcohol Use Disorders Identification Test) than did other respondents (Larsen, 1994).

In this study, to identify the characteristic features of a tourist town on cardiovascular risk factors, we report on the population in a farming town, a fishing town, and a

tourist town, respectively. We also report on the lifestyles and prevalence of hypertension in self-employed women in a tourist town.

Methods

Towns

The rural farming town is located in Gunma prefecture, Japan, 100 km from Tokyo. This town covers an area of 24.4 km² and had a population of 15100. The population working in the primary industry was 17.1%, that in the secondary industry was 41.9%, and that in the tertiary industry was 40.9%. The farming population was 17.0%.

The fishing town is located in Shizuoka prefecture, Japan, 250 km from Tokyo. This town covers an area of 4.6 km² and had a population of 11700. The population working in the primary industry was 11.0%, that in the secondary industry was 40.4%, and that in the tertiary industry was 48.5%. The fishing population was 10.2%. Standardized mortality ratio (SMR, calculated by using the rate of population in Shizuoka prefecture during 1986–1995, reported by Shizuoka health officials) from cerebral infarction was 0.87 [95% confidence intervals (95% CI), 0.67 to 1.14, 57 deaths]. SMR from cerebral hemorrhage was 0.57 (95% CI, 0.34 to 0.90, 18 deaths). SMR from ischemic heart disease was 1.24 (95% CI, 0.95 to 1.61, 59 deaths).

The rural tourist town is located in Shizuoka prefecture, Japan, 150 km from Tokyo. This town covers an area of 69.4 km² and had a population of 17800. The population working in the primary industry was 5.5%, that in the secondary industry was 34.1%, that in the tertiary industry was 60.2%, and the wholesaling or retailing population was 16.6%, those who were self-employed individuals or worked in small companies represented by hot spring hotels, restaurants, and retail stores. SMR (calculated by using the rate of population in Shizuoka prefecture during 1986–1995) from cerebral infarction was 1.27 (95% CI, 1.01 to 1.51, 143 deaths). SMR from cerebral hemorrhage was 1.09 (95% CI, 0.84 to 1.43, 58 deaths). SMR from ischemic heart disease was 1.24 (95% CI, 1.01 to 1.51, 101 deaths). Thus, SMR of cardiovascular diseases in tourist town were higher than that in fishing town.

Health examination

The male and female residents aged 50 to 59 years in the three towns were used as an accessible population. The basic health examination was carried out based on Japanese law in 1996 in the fishing town, and in 1998 in the farming and tourist town. We investigated the ratios of consultation for these examinations among an accessible population. Body mass index (BMI), systolic blood pressure (SBP), diastolic blood pressure (DBP), serum total cholesterol (TC), serum high-density lipoprotein

cholesterol (HDL-C), and atherogenic index ($AI = TC/HDL-C$), were also investigated. We also investigated the prevalence of obesity ($BMI \geq 25 \text{ kg/m}^2$), hypertension ($SBP \geq 140 \text{ mmHg}$, or $DBP \geq 90 \text{ mmHg}$), and lipid abnormalities ($TC \geq 220 \text{ mg/dL}$, $HDL-C < 40 \text{ mg/dL}$, $AI > 4.5$ for male, or $AI > 3.5$ for female) among three towns.

Relationship between occupation and health

For the residents between the age, 50 to 59 years in the fishing town, who underwent the basic health examination conducted by the town, the differences in BMI, SBP, DBP, TC, HDLC and AI value were investigated between the fishermen ($n=25$) and men in other occupations ($n=37$).

In the tourist town, life styles and prevalence of hypertension were investigated among the self-employed women ($n=44$) and the employed women ($n=42$), aged 50 to 59 years, who underwent the basic health examination conducted by the town, and who also completed questionnaires concerning diet, alcohol, smoking, occupation and disease history of hypertension.

Statistical analysis

Statistical analysis was performed using StatView (Version 5.0, SAS Institute Inc., Cary, NC, USA). Chi-square test was employed to determine differences in the rates of consultation for basic health examination among the three towns. For analysis of health examinations among the three towns, Kruskal-Wallis test was employed. Chi-square test was employed for difference of prevalence of obesity, hypertension, and lipid abnormalities among three towns. For comparison between fishermen and men with other vocations on the results of health examination in the fishing town, Mann-Whitney U test was used. Chi-square test was employed to investigate life styles and prevalence of hypertension among the self-employed women and the employed women in the tourist town.

A P value < 0.05 was considered statistically significant.

Results

Health examination

Table 1 shows the ratio of participation for the basic health examination, which was carried out based on Japanese law. In the tourist town, the rates were 5.8% in male residents and 18.0% in female residents. There were significant differences in the rates of participation among the three towns, and the rates in tourist town were the lowest in both male and female residents. In the results of health examination, mean values of BMI, SBP and DBP in men were significantly different among three towns, and those in tourist town were high. SBP and DBP in women among towns were significantly different, and those in tourist town were high. In men, mean $\pm$ standard deviation of BMI was $24.1 \pm 2.6 \text{ kg/m}^2$ in tourist, $23.6 \pm 2.7 \text{ kg/m}^2$ in fishing, and $22.8 \pm 2.7 \text{ kg/m}^2$ in farming town. SBP was

139.1±22.6 mmHg in tourist, 125.3±14.3 mmHg in fishing, and 134.1±17.7 mmHg in farming town. DBP was 87.5±13.1 mmHg in tourist, 78.1±8.3 mmHg in fishing, and 80.9±10.3 mmHg in farming town. In women, SBP was 134.8±18.0 mmHg in tourist, 123.7±14.0 mmHg in fishing, and 134.5±18.7 mmHg in farming town. DBP was 82.8±13.1 mmHg in tourist, 75.0±8.7 mmHg in fishing, and 77.7±10.6 mmHg in farming town.

Table 2 shows the prevalence of obesity, hypertension, and lipid abnormalities among three towns. In the tourist town, high prevalence of obesity and hypertension were found in men, and high prevalence of hypertension was found in women. In contrast, low prevalence of hypertension was found in the fishing town in both genders.

Relationship between occupation and health

For the residents between the age of 50 to 59 years in the fishing town, who underwent the basic health

Table 1 Participation in the basic health examination in a population aged 50–59 years

	Population		Participation	
	Male	Female	Male	Female
Farming town	1011	975	130 (12.9)	229 (23.5)
Fishing town	754	832	62 (8.2)	178 (21.4)
Tourist town	1255	1305	73 (5.8)	235 (18.0)
			*	*

Values are expressed as number, and percentage in parenthesis. Health examinations were conducted in 1996 in the fishing town and in 1998 in the farming and the tourist towns. Population count was taken in 1996 in the fishing town and in 1998 in the farming and the tourist towns.

* $P<0.001$ compared among the farming, the fishing, and the tourist towns by Chi-square test.

examination conducted by the town, the differences in BMI, SBP, DBP, TC, HDLC and AI value were investigated between the fishermen ($n=25$) and men in other occupations ($n=37$). However, there was no significant difference between these fishermen and men in other occupations.

In the tourist town, self-employed women had irregular time of meals and insufficient care of diet in comparison with employed women. And there were tendencies of insufficient care of other life styles. Furthermore, the prevalence of hypertension in self-employed women was significantly higher than that of employed women (Table 3).

Discussion

Previous studies have shown that mortality from cardiovascular diseases in fishing villages was lower than that in farming villages. However, few reports on the population living in a tourist village have appeared. Then, we report here on cardiovascular risk factors of population in a tourist town from the viewpoint of the community ecology with fishing and farming towns.

In this report, it could not avoid the sampling errors when comparing the results of the health examination between the three towns, because of the low ratio of the participation in the basic health examination for the male and female residents aged 50 to 59 years, as an accessible population. In addition, it could not completely avoid measuring bias when comparing the results of the health examination.

However, in the results of the health examination, men in the tourist town showed a high prevalence of obesity and hypertension among three towns. In addition, women in the tourist town showed a large prevalence of hypertension between the three towns. These results were

Table 2 Prevalence of obesity, hypertension, and lipid abnormalities in the three towns

	BMI ≥25 kg/m ²	SBP ≥140 mmHg	DBP ≥90 mmHg	TC ≥220 mg/dL	HDLC <40 mg/dL	AI >4.5 (male) >3.5 (female)
Male						
Farming town (n=130)	28 (21.5)	40 (30.8)	28 (21.5)	25 (19.2)	17 (13.1)	33 (25.4)
Fishing town (n=62)	18 (29.0)	7 (11.3)	7 (11.3)	12 (19.4)	8 (12.9)	12 (19.4)
Tourist town (n=73)	28 (38.4)	33 (45.2)	34 (46.6)	21 (28.8)	11 (15.1)	28 (38.4)
	*	†	†			*
Female						
Farming town (n=229)	63 (27.5)	81 (35.4)	32 (14.0)	105 (45.9)	11 (4.8)	123 (53.7)
Fishing town (n=178)	48 (27.0)	20 (11.2)	9 (5.1)	68 (38.2)	7 (3.9)	86 (48.3)
Tourist town (n=235)	54 (23.0)	89 (37.9)	72 (30.6)	98 (41.7)	11 (4.7)	106 (45.1)
		†	†			

Values are expressed as number and percentage in parenthesis.

* $P<0.05$ and † $P<0.01$ compared between the three towns (Chi-square test).

BMI: body mass index, SBP: systolic blood pressure, DBP: diastolic blood pressure, TC: total cholesterol, HDLC: high-density lipoprotein cholesterol, AI: atherogenic index=TC/HDLC.

Table 3 Comparison between self-employed women and employed women in the tourist town

	Self-employed women	Employed women	
Breakfast			
Everyday	40 (90.9)	41 (97.6)	
Not everyday	4 (9.1)	1 (2.4)	
Time of meals			†
Regular	33 (75.0)	41 (97.6)	
Irregular	11 (25.0)	1 (2.4)	
Diet behavior			†
Take care always	5 (11.4)	16 (38.1)	
Not always	39 (88.6)	26 (61.9)	
Salt intake			
Take care always	16 (36.4)	21 (50.0)	
Not always	28 (63.6)	21 (50.0)	
Alcohol intake			
Everyday	6 (13.6)	3 (7.1)	
Not everyday	38 (86.4)	39 (92.9)	
Smoking			
Do	5 (11.4)	3 (7.1)	
Do not	39 (88.6)	39 (92.9)	
Hypertension			*
Have	17 (38.6)	6 (14.3)	
Do not have	27 (61.4)	36 (85.7)	

44 self-employed women and 42 employed women aged 50 to 59 years.

Values are expressed as number and percentage in parenthesis.

* $P < 0.05$ and † $P < 0.01$ by Chi-square test.

in accordance with the data of SMR from cerebral infarction, SMR from cerebral hemorrhage, and SMR from ischemic heart disease. From these results, it can be suggested that there were differences in the prevalence of cardiovascular risk factors between the three towns.

In our results, cardiovascular risk factors in the fishing town were less prevalent than those in the farming town which showed the average level for the three towns. In contrast, cardiovascular risk factors in the tourist town were more prevalent than those in the farming town. The characteristic feature in the fishing town is that there are many fishermen in the town. The tourist town includes various tertiary industries, which consist of many self-employed small companies. Therefore, we focused on fishermen in the fishing town, and on self-employed persons in the tourist town. However, male sample from the tourist town was small in size for analysis. Thus, we investigated the relation of occupation and lifestyles in female in the tourist town.

In the tourist town, the population working for the tertiary industry was the largest, and there were small companies such as hot spring hotels, restaurants and retail stores. Previously, increased prevalence and lower health scores for hypertension, anemia and glucosuria among small companies in comparison with those of larger companies have been reported (Huang et al., 1993). In our results, the prevalence of hypertension in self-employed women was higher than that in employed women. Okubo

et al. (2000) reported a relationship between the incidence of hypertension and job class. It has also been pointed out that the prevalence of hypertension in managers was higher than that in manual and clerical workers (Komachi et al., 1971). These reports support our results in self-employed women.

In the rates of participation for the basic health examination, the tourist town showed low ratios. In addition, the irregularity in diet behavior and the insufficiency of health care were also shown in self-employed women. Liu and Waterbor (1994) reported that elevations of suicide rates were observed in the wholesale trade, retail trade, finance, insurance and real estate in comparison to those in public administration. It can be postulated that self-employed persons and persons working in small companies cannot sufficiently take care of their health and life styles.

A tourist town in Shizuoka prefecture, Japan, where people worked in service industry, including self-employed small companies, had population with insufficient care of health. This town also showed high rate of mortality of cardiovascular diseases and large prevalence of obesity and hypertension. We could suggest that health status in communities might be associated with job-related factors.

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