

## Premature death from cerebro- and cardiovascular diseases in a rural area: home survey conducted by medical students

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This paper deals with the results of a home visit survey carried out by Nagoya University medical students in connection with a medical practicum arranged to pinpoint risk factors associated with premature death from cerebro- and cardiovascular diseases (coronary heart disease and stroke). The site for survey was a rural community in Nagano Prefecture, Japan. Persons who had died between 40 and 70 years of age during the past 10 years of period were identified and members of the bereaved's family were asked to recall the lifestyle and personal health practices of the deceased. Factors found to have a significant link with cerebro- and cardiovascular mortality for this age group were heavy workload, past history of treated illness, strong sense of obligation, preference for sweet or salty food, lack of exercise, and failing to obtain an annual health check-up. Also learned in this educational program was the activities of voluntary neighborhood organizations, details about which are also discussed in this paper.

### INTRODUCTION

In the era of the world's highest life expectancy which Japan has enjoyed recently, we see the average age of death for years ago as an early decease for now; even early post-retirement age, e.g. 70 years, might be young enough for demise, let alone the death at the middle age. The authors defined premature death as the deprivation of life at age 70 or younger, and carried out a survey in a rural community. The survey constitutes a part of an educational program in a medical course at Nagoya University School of Medicine. Medical students were given a practicum in preventive medicine at the community level through their active involvement and expected to learn lessons of preventing premature death.

### SUBJECTS AND METHODS

Located in the southwest Nagano Prefecture where orchard farming is a dominant industry, the area selected for this study, Matsukawa Town, is a rural community with a census population of 13,500 in 1985. The survey subjects were persons who died between 40 and 70 years of age from 1979 through 1988, those whose certified cause of death was stroke or coronary heart disease, and those whose bereaved family were residents of Matsukawa in July of 1990. The ascertainment of the cause of death was done through reviewing death certificates by the public health nurses at the Town Office. Aged people over 70 were excluded because we narrowed our focus to premature mortality, i.e. death at pre-retirement or early retirement ages. A total of 31 subjects met these criteria, of whom 26 were

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found to have died of stroke and the rest of ischemic heart disease. Twelve medical students from Nagoya University performed home visits to interview the bereaved families on July 7 and 8 in 1990. Questionnaires were drawn up to gather information on demographics and lifestyle of the subjects prior to their deaths.

Arrangements were set for medical students to attend an evening gathering to become acquainted with neighborhood health activity at the grass-roots level. Thanks to the cooperation of *Hatsuka-kai* and *Ichino-kai*, both voluntary-based community health study groups of those diagnosed as having mild hypertension, the students had this opportunity to reach our educational goal. A total of 47 members from these two group participated in the evening meeting held on July 7 in 1990 and detailed their activity. They also agreed to contribute to our educational program by completing the questionnaire sheet in the same format used in the home visits, and these serves as a reference for comparison.

For determination of risk factors associated with cerebro- and cardiovascular mortality, a logistic linear regression model was applied with the statistical software SAS run at the Nagoya University Computation Center.

## RESULTS

As for those deceased, the mean age at the time of death, maximum and minimum ages for the 31 subjects were 59, 70, and 46, respectively. The corresponding figures at the time of survey for the reference group were 60, 70, and 41, respectively. Therefore, the age distribution was seen as fairly close between the two groups. The gender distribution for the two groups is shown in Table 1. As seen, female over-representation in the reference is apparent, compared with the case group. This dissimilarity necessitated adjust-

ment for the effect of sexuality in calculating the risk ratio for each variable. Although age structure differs to the minimal extent as mentioned, the effect of age was also adjusted in the logistic regression analysis in addition to gender.

**Table 1.** Sex distribution in the case group and reference

|          | Male | Female | Total |
|----------|------|--------|-------|
| Cases    | 20   | 11     | 31    |
| Controls | 17   | 30     | 47    |

The majority of the individuals (97% in the cases vs. 100% in the reference) lived in their own home, and over 70% had 4 or more family members inclusive of the deceased. About two-thirds of the subjects and the reference had high school or higher levels of education. Most (94% in the cases vs. 91% in the reference) had been community residents for the past 20 or more years. More than half of the individuals in both groups were or had been engaged in agriculture during their lifetime.

Table 2 shows the sex- and age-adjusted odds ratios on the basis of presence or absence of each factor ascertained from the home visits and the evening meeting. All variables but age were dichotomized prior to running the logistic regression analysis, and the category for the presence of risk is as shown in the table. Statistically significant odds ratios for cardiovascular mortality were observed for physical and mental workload, past history of treated illness, sense of obligation, preference for sweet and salty tastes, habits of walking or calisthenics, and obtaining annual health check-ups. Neither smoking nor drinking habits showed any significant association with the case-reference status. Shorter sleeping hours or less habit of sports or athletics failed to significantly elevate the mortality risk.

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**Table 2.** Sex- and age-adjusted odds ratio for cerebro- and cardiovascular mortality according to the presence or absence of each factor

| Entry factor                                | Criteria for presence     | Odds ratio (95% bounds) |
|---|---------------------------|-------------------------|
| Perceived workload                          |                           |                         |
| Physical load                               | Heavy                     | 3.57* (1.00, 12.69)     |
| Mental load                                 | Heavy                     | 2.99* (1.02, 8.71)      |
| Overall health status                       | Prone to illness          | 0.23 (0.05, 1.17)       |
| Past history of illness                     | Yes                       | 3.45* (1.11, 10.71)     |
| Family physician                            | Yes                       | 0.74 (0.26, 2.10)       |
| Personal relationships                      | Very sociable             | 0.42 (0.15, 1.16)       |
| Sense of obligation                         | Always strong             | 6.53* (1.33, 32.20)     |
| Sleeping hours                              | ≤ 6 hrs/day               | 1.17 (0.32, 4.26)       |
| Habitual consumption of alcohol and tobacco |                           |                         |
| Drinking of sake                            | Daily                     | 0.50 (0.10, 2.45)       |
| Smoking                                     | Smoker                    | 1.08 (0.31, 3.71)       |
| Taste preference                            |                           |                         |
| Sweet                                       | Strong preference         | 3.63* (1.05, 12.55)     |
| Salty                                       | Strong or mild preference | 3.12* (1.03, 9.46)      |
| Greasy                                      | Strong or mild preference | 1.02 (0.35, 3.02)       |
| Exercising habit                            |                           |                         |
| Walking or calisthenics                     | None                      | 35.7* (7.69, 166.6)     |
| Sports or athletics                         | None                      | 2.56 (0.83, 8.33)       |
| Character                                   | Very stubborn             | 1.26 (0.45, 3.55)       |
| Hobbies                                     | None                      | 2.27 (0.79, 6.67)       |
| Annual health check-up                      | Rarely if ever            | 7.69* (2.50, 25.0)      |

\*Significant at 5% level

Interviewing the members of the *Hatsuka-kai* (The Association of 20th of the Month) and *Ichino-kai* (The Association of 1st of the Month) was another focus of our survey. These two community organizations were developed by mild hypertensives to promote among themselves health awareness backed by proper scientific knowledge, and their activities involve mutual learning opportunities on a once-a-month, scheduled basis, as indicated in the name of the organizations. Public health nurses and other health professionals are expected to play facilitative roles rather than leadership ones. No lines of pecking orders ever exists, and the participants' volitions are highly valued.

## DISCUSSION

The questionnaire used this time was geared to focus on workload, lifestyle and health practices in quite a straightforward manner. One might indicate that blood pressure measurements, ECG findings, urinalysis, or blood chemistry results are of importance as independent variables. However, the failure of the subjects under study to obtain regular health check-ups, which itself registered a significant link with the premature death, made this consideration infeasible. Earlier identified risk factors for ischemic heart disease in a rural community-based survey were <sup>3)</sup> high blood pressure, ventricular conduction defect and arrhythmias found in ECG, and hypertensive or

sclerotic changes in fundus photographs; heavy smoking failed to show a significant risk ratio. In another study<sup>2)</sup> hypertension and ECG abnormalities were demonstrated to cause an unduly high incidence of coronary heart disease and stroke in a rural community.

The interpretations of the results obtained in this study is subject to some methodological shortcomings. Because this survey was conducted retrospectively, the responses relied inevitably on the recall of the families of the deceased, not the subjects themselves who comprised the case group. It is uncertain, however, whether this shortcoming gave birth to overestimation or underestimation of the outcomes. Another factor to be heeded is related to the sampling source of the reference; they were all mild hypertensives and more or less active participants in community organizations. It stands to reason that their health awareness level had been raised through their voluntary learning, and their daily health practices would be preferably intervened, even compared to the general population. This could lead to the enhancement of the contrast for some factors between the cases and the reference.

In spite of the questionable representativeness of the reference group selection method employed, we believe the risk factors indicated in the statistical analysis were quite accountable.

Through reviewing the work and life situations of the deceased immediately before the onset of the disease or the event of death, we confirmed that many of the cases had been involved in heavy work or stressful environments, and/or had eaten too much sweet or salty food.

To reduce the risks associated with premature death, more community commitment to the development of grassroots organization should be called for.<sup>1)</sup> In this connection, community activity should be arranged on the basis of collaboration between the official health agencies/specialists and the community residents to increase their mastery over the health affairs of the neighborhood.

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