Comprehensive Study of Elderly People Living in an Urban Community: The Koganei Study

Hiroshi Shibata
Department of Community Health, Tokyo Metropolitan Institute of Gerontology, Tokyo, Japan

The present paper reviews a comprehensive study of elderly people carried out for 15 years in an urban community, Koganei City, Tokyo. The Koganei Study consisted of three types of study: longitudinal studies, cross-sectional studies, and case studies for the disabled. Each type of study has a particular purpose, and therefore, three types of study should be done complementarily to determine efficacious ways for successful aging.

Longitudinal study, Cross-sectional study, Case study, Outcome, Aging

INTRODUCTION

Without exception, developed countries are being confronted by the problems caused by the rapid growth in the proportion of elderly population\(^{(1)}\). Japan has three demographic characteristics in terms of this problem. First, Japan took a much shorter time to reach 7% of elderly population, compared with most western countries. Second, the projected proportion in elderly population of Japan in the next century is the highest in the world. Third, the increase in proportion of so-called old-old would be most considerable in Japan. This urgent situation has stimulated both researchers and decision-makers to establish ways for coping with problems affecting an aging society.

In light of this urgency, a comprehensive study of elderly people living in the urban community, Koganei City was undertaken by Tokyo Metropolitan Institute of Gerontology in 1976\(^{(2)}\).

MATERIALS AND METHODS

Study area

The traits of the study area, Koganei City, have been described in detail elsewhere\(^{(2,3)}\). Therefore, only the necessities will be briefly described here. Koganei City is a suburb of Tokyo, 25 km west of the center of Tokyo Metropolis, and has a population of 100,000 in an area of 16 km\(^2\). Koganei has had the longest life expectancy at birth in the all cities and wards of Tokyo. Further, economic status and educational background of the citizens have been high.
Types of study

The Koganei Study consisted of 3 types of study: longitudinal studies, cross-sectional studies, and case studies for the disabled.

1. Longitudinal studies: longitudinal studies were considered to be absolutely essential for identifying risk factors for geriatric diseases or chronic conditions, and for searching for factors accelerating or decelerating the aging process. The first cohort of longitudinal study was enrolled from senior citizens aged 69–71 years living at home in 1976. All residents aged 69–71 living at home (n = 970) were regarded as eligible and were invited to a comprehensive survey carried out at city halls. Free transportation was provided for facilitating the frail elderly to participate in the survey. Despite every effort to enhance participation rate, only 402 persons participated in the survey. Out of the non-respondents, 20 persons were investigated at home. A total of 422 (197 men, 225 women) were regarded as the cohort for longitudinal studies (participation rate = 44%, 422/970).

In order to look into cohort difference in the fashion and the rate of aging process, a second cohort of the same age range as of the first cohort was chosen in 1981. Four hundred fifty-seven of 1,398 eligible persons participated in the comprehensive survey (participation rate = 32.7%).

Both cohorts were followed up using the same method. They were examined comprehensively every 5 years, during which time, outcome of the subjects was investigated according to residents’ registration in the municipality, or, by means of telephone and mail.

2. Cross-sectional studies: cross-sectional studies were considered necessary in order to identify problems affecting the community elderly and to determine services needs for them. As shown in Table 1, 4 mail surveys were conducted. In every mail survey, questionnaires were sent again to non-respondents to the initial mailing. This was one reason why high response rates (over 90%) were obtained.

<table>
<thead>
<tr>
<th>Year</th>
<th>No. of eligible persons</th>
<th>No. of respondents</th>
<th>Response rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1977</td>
<td>3,906</td>
<td>3,646</td>
<td>93.3 (%)</td>
</tr>
<tr>
<td>1982</td>
<td>7,184</td>
<td>6,620</td>
<td>92.1</td>
</tr>
<tr>
<td>1985</td>
<td>8,427</td>
<td>7,735</td>
<td>91.8</td>
</tr>
<tr>
<td>1986a</td>
<td>987</td>
<td>890</td>
<td>90.2</td>
</tr>
</tbody>
</table>

a) The sample was randomly selected from the respondents to the mail survey in 1985.
3. *Case studies for the disabled:* in 1977, researchers on nursing belonging to the Koganei Study's Project undertook home visits for those of bed-ridden status, and in 1982, they began home visits for the demented elderly. They not only investigated existing problems in the disabled, but also advised caregivers how to treat the disabled. The case studies thus were conducted to obtain basic information for an intervention study in the near future.

**Framework of study items**

Table 2 shows the framework of study items for longitudinal studies. The study items interdisciplinarily consisted of medical, sociological, and psychological disciplines.

In cross-sectional studies, study items were composed of medical and sociological disciplines, and were devised to examine needs concerning health care and social welfare.

**Table 2 List of items in the longitudinal studies**

<table>
<thead>
<tr>
<th>Medical</th>
<th>Sociological</th>
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<tbody>
<tr>
<td>Medical history</td>
<td>Education</td>
</tr>
<tr>
<td>Symptomatology</td>
<td>Living arrangement</td>
</tr>
<tr>
<td>Physical examination</td>
<td>Income</td>
</tr>
<tr>
<td>Self-rated health&lt;sup&gt;a)&lt;/sup&gt;</td>
<td>Occupation</td>
</tr>
<tr>
<td>Health care behavior&lt;sup&gt;a)&lt;/sup&gt;</td>
<td>Social activities</td>
</tr>
<tr>
<td>Food intake pattern</td>
<td>Subjective well-being</td>
</tr>
</tbody>
</table>

**Anthropometric measurements**

<table>
<thead>
<tr>
<th></th>
<th>Psychological</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grip strength</td>
<td>Benton visual retention test</td>
</tr>
<tr>
<td>Standing time on one foot with eye open or closed</td>
<td>W A I S&lt;sup&gt;b)&lt;/sup&gt;</td>
</tr>
<tr>
<td>A D L</td>
<td>Sentence completion test</td>
</tr>
<tr>
<td>Urinalysis</td>
<td>Ego-strength scale (Barron)</td>
</tr>
<tr>
<td>Blood components</td>
<td></td>
</tr>
<tr>
<td>Blood pressure</td>
<td></td>
</tr>
<tr>
<td>ECG</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a)</sup> These variables were added in 1981 for the second wave of the first cohort and the first wave of the second cohort, aged 69–71 years.

<sup>b)</sup> WAIS was performed for the first cohort aged 69–71 years in 1977 and for the first and second cohorts aged 69–71 years in 1982.
Project team for the Koganei Study

The project Team for the Koganei Study was established in 1976. The Project Team consisted of epidemiologists, internists, psychologists, sociologists, and researchers on nursing, and rehabilitation specialists inside the Institute. Some outside investigators also joined the study.

RESULTS

1. The first cohort has been followed up for 15 years, during which time 60% and 36% died in men and women, respectively. Survival curve according to life table method is shown in Figure 1.

![Survival Curve](image)

**Figure 1** 15-year survival rate in the first cohort

Predictors of all-cause mortality for 10 years were analyzed using the Cox proportional hazards model\(^{(10)}\). Body mass showed a U-shaped relationship to time-dependent 10-year mortality in both sexes. Ex-drinking, current-smoking, history of stroke, history of diabetes mellitus, low ADL, and ST and/or T changes in ELG had significant and direct effect on mortality in both sexes or either sex. Whereas, level of education, current-drinking, grip strength, visual retention, and serum albumin revealed significantly inverse relationship to mortality.

As for food intake patterns, drinking milk and frequent intake of fats and oils had favorable
effects on survivorship.

Contributions of variables at the baseline survey to level of activities of daily living (ADL) 10 years later were also examined using the logistic regression analysis in the first cohort\(^6\). Low level of social activities in both sexes, history of hypertension and ECG of normalities in men, and overweight and anxiety about present health status in women had significantly direct relationships to incompetence in ADL 10 years later.

2. Fashion and rate of aging were compared between the first and the second cohorts regarding the 5-year change of variable (ages 69–71 → 74–76). Serum albumin, shown as an index of aging\(^5\), declined in the first cohort, but did not in the second cohort.

3. Not only prevalence rates of low ADL and incontinence\(^7\), but also prevalence rate of low instrumental ADL increased according to advancing age\(^8\). Higher prevalence rates of chronic conditions in women turned out to be due to higher mortality in men with chronic conditions\(^9,10\).

4. Home visits for disabled were helpful in encouraging caregivers and for developing their techniques to care for the disabled at home.

**DISCUSSION**

Each study method has its particular purpose. In order to look into the aging process, longitudinal study is essential, because cross-sectional study alone cannot discriminate between age effect and cohort effect\(^2\). On the other hand, cross-sectional study is more useful than longitudinal study for detecting problems affecting the community elderly, since the cohort for longitudinal study is deprived of representativeness for the population due to the exclusion of emigrants, intervention effect, and dropouts from the follow-up\(^2\). Each type of study should be done complementarily to determine efficacious ways for successful aging.

Longitudinal interdisciplinary study aims at not only identifying predictors of outcomes\(^6,8\), but also finding out indices of aging *per se*\(^3,10,11\).

**REFERENCES**


