Relationship Between Preventive Health Services and Use of Inpatient and Outpatient Care by Residents Aged 40 or Older in 44 Municipalities in Osaka Prefecture, Japan

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We examined the relationships between preventive health services provided under the Law for Health and Medical Services for the Elderly and the use of inpatient and outpatient care by insured residents aged 40 or older covered by the National Health Insurance in 44 municipalities in Osaka Prefecture. Factor analyses showed that hospital admission rate and inpatient days per 100 insured persons, bed days per insured person, inpatient days per case, mean bed days, the proportion of long-stay (180 days or more), and the rate of long-stay per 1,000 insured persons accounted for the first factors of inpatient care with factor loadings of more than 0.82. Outpatient utilization rate and outpatient days per 100 insured persons comprised the first factors of outpatient care with factor loadings of more than 0.80. Patient cost per case and the proportion of high patient cost (600,000 Yen or more for inpatient care and 60,000 Yen or more for outpatient care) made up the second factors of either type of patient care with factor loadings of more than 0.87. The frequency of use of health check-ups and the numbers of instruction classes and participants in health education and health counseling per 100 residents showed negative correlations with indices of inpatient and outpatient care, except for patient cost per day. The scores for the first and second factors of inpatient care and for the first factor of outpatient care correlated negatively with all indices of the use of preventive health services. More active provision of preventive health services may therefore contribute to reducing the subsequent use of inpatient and outpatient care among residents aged 40 or older.

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In the coming century, Japan is expected to become an extremely aged society with about one-quarter of the population being elderly 1,2. In an effort to make the aged society of the 21st century one where everyone can be healthy and live a secure life, the Japanese government implemented the Law for Health and Medical Services for the Elderly in 1983 to develop a comprehensive social and economic system for a full-scale aged society. Under this Law, six health services are provided free or at low cost by municipalities to all people in Japan who hold a resident card, are at least 40 years old, and are not offered periodical health examinations at their place of work. These health services include the following: (1) health examinations, including health check-ups in the form of basic health examinations, and screening for stomach cancer, uterus cancer, lung cancer, breast cancer, and colon cancer, (2) issuance of a health notebook, (3) health education, (4) individual health counseling, (5) rehabilitation programs, and (6) home-visit guidance.

As for medical care, all residents in Japan have been covered by some kind of health insurance program since 1961 3,4. The insurance programs can be divided into two categories. One is the insurance system offered by employers for employees and their dependents. The other is the insurance system administered by the local governments or trade associations for the self-employed and their dependents who are not covered by their workplace. It also includes most of the elderly living on pensions (the rest are covered as dependents of their children). Furthermore, all elderly who are aged 70 or over as well as

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the number of persons insured by the National Health Insurance, with the municipal government acting as insurer, stood at 45.2 million in 1985 and 42.8 million in 1994, accounting for 37.4% and 34.2% of the population, respectively. Inpatient costs for all persons insured by the National Health Insurance totaled 3,207.8 billion Yen in 1985 and 5,118.0 billion Yen in 1994. Outpatient costs for the same years were 2,840.5 and 5,059.1 billion Yen, respectively. The total annual medical cost (inpatient cost plus outpatient cost) per person insured by the National Health Insurance was 133,800 Yen in 1985 and 237,800 Yen in 1991, an increase of 77.7%. These figures vividly illustrate the recent rapid increase in medical costs in Japan.

A salient question in regard to health care in Japan is how well the increasing economic burden caused by the aging of the population can be controlled or reduced. This study aims to examine whether there is any relationship between preventive health services provided for by law and the use of inpatient and outpatient care under the National Health Insurance Program administered by local governments, with special reference to the use of health check-ups, health education and health counseling.

METHODS

We investigated the use of all inpatient and outpatient care services and facilities in 44 municipalities in Osaka Prefecture in May 1995 by residents aged 40 or older (1,664,563 people) covered by the National Health Insurance Program and eligible under the Law for Health and Medical Services for the Elderly. Medical institutions file monthly claims with the municipal health insurance office in each of these municipalities. Data for these 44 municipalities could thus be collected by inspection of all claims filed in May 1995 (64,618 inpatient claims and 1,465,262 outpatient claims). Of these, 8,759 inpatient claims (13.6%) were from inpatients with mental health disorders, who were not included in this study because of their unusual pattern of medical service utilization.

Items surveyed for each patient were sex, age, inpatient days (days of hospital stay during May), outpatient days (with one visit to a clinic during May counted as 1 day), bed days during a single admission (total bed days per stay), and insurance points (the amounts billed for inpatient and outpatient care in May). The medical fee payment method of Japan’s medical insurance system is called an “itemized fee-for-service payment system”. This method allows for payments to be made as the sum of assessed values of itemized clinical services. The specific amount of the medical fee is calculated by adding the number of points (1 point is valued at 10 Yen) assigned to each clinical service rendered. For all 44 municipalities, the following variables were considered: (1) rates of hospital admission and outpatient utilization per 100 insured persons; (2) inpatient and outpatient days per 100 insured persons and per case, (3) inpatient and outpatient cost per insured person, per case, and per day, and proportion of high cost utilization (600,000 Yen or more for inpatient care and 60,000 Yen or more for outpatient care), (4) bed days per insured person, mean bed days (bed days per case), proportion of long-stay (180 days or more), and rate of long-stay per 1,000 insured persons. Each of these variables was calculated for five age groups (40-49, 50-59, 60-69, 70-79, 80+ years), according to sex, and for either inpatient or outpatient care. To adjust for the differences in age and sex distribution in the 44 municipalities, sex and age adjusted values were calculated to arrive at an index of patient care per case and per insured person for each municipality by using the following formulas; adjusted value for the index of patient care per case per municipality = (the sum of the mean values for the index of inpatient or outpatient care per case by age group and sex for each municipality x number of inpatients or outpatients by age group and sex in 44 municipalities) / total number of inpatient or outpatient cases in 44 municipalities, and adjusted value for the index of patient care per insured person per municipality = (the sum of the values for the index of inpatient or outpatient care per insured person by age group and sex for each municipality x number of insured persons by age group and sex in 44 municipalities) / total number of insured persons in 44 municipalities.

We also investigated the frequency of use of health check-ups and the numbers of classes and courses in health education and counseling, as provided for by the Law for Health and Medical Services for the Elderly in the year 1994 in 44 municipalities, as well as the number of participants. These data on preventive health services covered by law were provided by the municipal health offices. For the frequency of use of health check-ups, the age adjusted rate was calculated for each municipality by using the following formula: adjusted value for the rate of use of health check-ups per municipality = (the sum of the rates of use of health check-ups by age group for each municipality x number of residents eligible by law by age group in 44 municipalities) / total number of residents eligible by law in 44 municipalities.

Factor analysis was used for identification of broad dimensions of use of inpatient and outpatient care, as defined by the linear combination of 11 indices for inpatient care and 7 indices for outpatient care. Factor extraction followed by orthogonal Varimax rotation was performed separately to allow for the expression of differences in indices of patient care. Analyses using the default option (i.e., eigenvalue ≥ 1) yielded an estimate of the maximal number of factors. The factor scores were obtained by the following formula. For municipality K, for example, the score for factor i was estimated as
where $X_{ik}$ was the standardized value of variable $i$ for municipality $K$ and $W_{ji}$ was the factor score coefficient for factor $j$ and variable $j$. Pearson simple correlation coefficients were calculated to define the relationships between the use of preventive health services and the indices and factor scores of inpatient and outpatient care.

Data analysis was performed with the SPSS/PC statistical package (Marija J. Norusis/SPSS Inc., Chicago, IL, USA). All reported $p$-values were two-tailed and a $p$-value of less than 0.05 was considered significant.

**RESULTS**

Table 1 represents the characteristics of the use of preventive health services under the Law for Health and Medical Services for the Elderly in the year 1994 in 44 municipalities. There were large differences in the use of health check-ups, health education and health counseling, and the differences between minimum and maximum was larger for the use of health education or health counseling than for the use of health check-ups. Table 2 shows the sex and age adjusted values for indices of inpatient and outpatient care provided under the National Health Insurance scheme in May 1995 in 44 municipalities. Among the parameters of inpatient care, the largest difference between minimum and maximum values was seen in bed days, and the differences between minimum and maximum for the rate of long-stay (180 days or more) per 1,000 insured persons, bed days per insured persons, and mean bed days were more

| Parameter | Mean | Standard deviation | Maximum | Minimum | Range |
|-----------|------|--------------------|---------|---------|-------|
| Rate of use of health check-ups (%) | 34.3 | 13.4 | 69.8 | 11.7 | 58.1 |
| Health education | | | | | |
| No. of classes per 100 residents | 0.5 | 0.5 | 2.5 | 0.1 | 2.4 |
| No. of participants per 100 residents | 13.1 | 12.7 | 76.9 | 3.2 | 73.7 |
| Health counseling | | | | | |
| No. of classes per 100 residents | 0.8 | 0.6 | 2.7 | 0.1 | 2.6 |
| No. of participants per 100 residents | 14.3 | 15.2 | 59.3 | 0.8 | 58.5 |

| Parameter | Mean | Standard deviation | Maximum | Minimum | Range |
|-----------|------|--------------------|---------|---------|-------|
| Inpatient care | | | | | |
| Hospital admission rate per 100 insured persons | 3.3 | 0.4 | 4.2 | 2.4 | 1.8 |
| Inpatient days per 100 insured persons | 65.4 | 10.4 | 87.1 | 40.8 | 46.3 |
| Inpatient cost per insured person (1,000 Yen) | 14.4 | 1.6 | 18.3 | 10.8 | 7.4 |
| Bed days per insured person | 9.4 | 3.7 | 21.1 | 3.0 | 18.0 |
| Inpatient days per case | 19.9 | 1.3 | 22.5 | 15.0 | 7.5 |
| Inpatient cost per case (1,000 Yen) | 439.7 | 28.8 | 510.4 | 350.8 | 159.7 |
| Inpatient cost per day (1,000 Yen) | 22.2 | 2.1 | 29.0 | 19.0 | 10.0 |
| Mean bed days | 280.8 | 88.8 | 558.3 | 131.9 | 426.4 |
| Proportion of high inpatient cost, 600,000 Yen or more (%) | 18.2 | 3.2 | 24.9 | 10.1 | 14.8 |
| Proportion of long-stay, 180 days or more (%) | 23.6 | 5.3 | 36.6 | 11.1 | 25.5 |
| Rate of long-stay per 1,000 insured persons | 7.8 | 2.5 | 14.2 | 2.8 | 11.4 |
| Outpatient care | | | | | |
| Outpatient utilization rate per 100 insured persons | 84.4 | 5.4 | 93.8 | 67.9 | 25.9 |
| Outpatient days per 100 insured persons | 256.5 | 30.3 | 320.2 | 179.3 | 140.9 |
| Outpatient cost per insured person (1,000 Yen) | 17.8 | 1.3 | 20.4 | 13.7 | 6.7 |
| Outpatient days per case | 17.8 | 0.3 | 3.7 | 2.4 | 1.3 |
| Outpatient cost per case (1,000 Yen) | 21.2 | 1.4 | 24.0 | 17.8 | 6.2 |
| Outpatient cost per day (1,000 Yen) | 7.0 | 0.5 | 8.7 | 6.2 | 2.5 |
| Proportion of high outpatient cost, 60,000 Yen or more (%) | 5.1 | 1.0 | 7.9 | 2.6 | 5.4 |
than 4.0 times. As for outpatient care, the difference between minimum and maximum values for the proportion of high outpatient cost (60,000 Yen or more) was 3.0 times, but the differences for other indices for outpatient care were less than 1.8 times and smaller than those for inpatient care.

**Structural analysis of inpatient and outpatient care**

Table 3 shows the factor loadings for inpatient care as a result of factor analysis. The hospital admission rate and inpatient days per 100 insured persons, bed days per insured person, inpatient days per case, mean bed days, the proportion of long-stay of 180 days or more, and the rate of long-stay per 1,000 insured persons were identified as the top factors with factor loadings of more than 0.82. On the other hand, the factor loading of inpatient cost per day was -0.810. Factor loadings of the second factor were 0.934 for the inpatient cost per case and 0.874 for the proportion of high inpatient cost, 600,000 Yen or more. The eigenvalue of the third factor was more than 1, but factor loadings of the third factor were smaller than those of the first and second factors. The first factor accounted for 62.7% of the total variance, and the first and second factors for 82.5%. The cumulative percentage of the total variance was 91.5%.

Table 4 shows the factor loadings for outpatient care. The outpatient utilization rate and outpatient days per 100 insured persons topped the first factor with factor loadings of 0.809 and 0.941, respectively, while the factor loading for outpatient cost per day was -0.877. Factor loadings of the second factor were 0.993 for outpatient cost per case and 0.964 for the proportion of high outpatient cost of 60,000 Yen or more. The first

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**Table 3. Factor analysis for inpatient care in May 1995 in 44 municipalities, Osaka Prefecture.**

| Variable                                          | First factor | Second factor | Third factor |
|---------------------------------------------------|--------------|---------------|--------------|
| Hospital admission rate per 100 insured persons    | 0.844        | 0.032         | -0.514       |
| Inpatient days per 100 insured persons             | 0.945        | 0.122         | -0.297       |
| Inpatient cost per insured person (1,000 Yen)      | 0.706        | 0.527         | -0.429       |
| Bed days per insured person                        | 0.905        | -0.030        | 0.298        |
| Inpatient days per case                            | 0.861        | 0.256         | 0.096        |
| Inpatient cost per case (1,000 Yen)                | -0.189       | 0.934         | 0.189        |
| Inpatient cost per day (1,000 Yen)                 | -0.810       | 0.430         | 0.035        |
| Mean bed days                                      | 0.822        | -0.062        | 0.486        |
| Proportion of high inpatient cost, 600,000 Yen or more (%) | -0.270     | 0.874         | 0.092        |
| Proportion of long-stay, 180 days or more (%)      | 0.895        | 0.055         | 0.308        |
| Rate of long-stay per 1,000 insured persons        | 0.974        | 0.057         | 0.080        |

| Eigenvalue                                         | 6.853        | 2.192         | 1.017        |
| Cumulative eigenvalue                              | 6.853        | 9.054         | 10.062       |
| Percentage of variance                             | 62.3         | 19.9          | 9.2          |
| Cumulative percentage of variance                  | 62.3         | 82.2          | 91.5         |

**Table 4. Factor analysis for outpatient care in May 1995 in 44 municipalities, Osaka Prefecture.**

| Variable                                          | First factor | Second factor |
|---------------------------------------------------|--------------|---------------|
| Outpatient utilization rate per 100 insured persons | 0.809        | -0.377        |
| Outpatient days per 100 insured persons            | 0.941        | 0.327         |
| Outpatient cost per insured person (1,000 Yen)     | 0.727        | 0.547         |
| Outpatient days per case                           | 0.648        | 0.678         |
| Outpatient cost per case (1,000 Yen)               | 0.017        | 0.993         |
| Outpatient cost per day (1,000 Yen)                | -0.880       | 0.035         |
| Proportion of high outpatient cost, 60,000 Yen or more (%) | 0.049     | 0.964         |

| Eigenvalue                                         | 3.986        | 2.206         |
| Cumulative eigenvalue                              | 3.986        | 6.192         |
| Percentage of variance                             | 56.9         | 31.5          |
| Cumulative percentage of variance                  | 56.9         | 88.5          |
Use of preventive health services and use of inpatient and outpatient care

Table 5 shows the correlation coefficients for the use of preventive health services and indices of inpatient and outpatient care in 44 municipalities. The indices of inpatient care showing a significant negative relationship with the rate of use of health check-ups were the hospital admission rate and inpatient days per 100 insured persons, inpatient cost and bed days per insured persons, inpatient days per case, the proportion of long-stay (180 days or more), and the rate of long-stay per 1,000 insured persons. Inpatient cost per day showed a significant positive correlation with the use of health check-ups. As for outpatient care, outpatient days per 100 insured persons, outpatient cost per insured person, outpatient days per case, and the proportion of high outpatient cost (60,000 Yen or more) showed a significant negative correlation with the rate of use of health check-ups, while outpatient cost per day showed a significant positive correlation. The same tendencies were seen in the relationships between the use of health education and health counseling and the indices of inpatient and outpatient care.

Use of preventive health services and factor scores of inpatient and outpatient care

Table 6 shows the correlation coefficients between the use of preventive health services and factor scores for inpatient and outpatient care in 44 municipalities. The first factor scores for inpatient care showed a significant negative correlation with the rate of use of health check-ups and the number of classes for health education and health counseling per 100 residents. The second factor scores for inpatient care also showed a significant negative correlation with the number of classes for health education as well as with number of classes and participants for health counseling per 100 residents. First factor scores for outpatient care, on the other hand, showed a significant negative correlation with all the indices of the use of preventive health services. In contrast, the second factor scores for outpatient care showed a negative correlation only with the rate of use of health check-ups, and this did not achieve statistical significance.

Table 5. Pearson correlation coefficients for use of preventive health services and indices of inpatient and outpatient care in 44 municipalities, Osaka Prefecture.

| Variable | Rate of use of health check-ups | Health education | Health counseling |
|----------|---------------------------------|------------------|------------------|
| Inpatient care |                                 |                  |                  |
| Hospital admission rate per 100 insured persons | -0.385 ** | -0.281 * | -0.249 | -0.159 | -0.071 |
| Inpatient days per 100 insured persons | -0.462 ** | -0.275 * | -0.209 | -0.237 | -0.144 |
| Inpatient cost per insured person (1,000 Yen) | -0.357 ** | -0.330 * | -0.269 * | -0.231 | -0.263 * |
| Bed days per insured person | -0.269 * | -0.216 | -0.179 | -0.151 | 0.031 |
| Inpatient days per case | -0.504 *** | -0.230 | -0.086 | -0.378 ** | -0.277 * |
| Inpatient cost per case (1,000 Yen) | -0.036 | -0.229 | -0.123 | -0.294 * | -0.473 ** |
| Inpatient cost per day (1,000 Yen) | 0.366 ** | 0.129 | 0.070 | 0.180 | -0.033 |
| Mean bed days | -0.196 | -0.228 | -0.187 | -0.186 | 0.008 |
| Proportion of high inpatient cost, 600,000 Yen or more (%) | -0.070 | -0.306 * | -0.285 * | -0.341 * | -0.457 ** |
| Proportion of long-stay, 180 days or more (%) | -0.359 ** | -0.257 * | -0.153 | -0.318 * | -0.155 |
| Rate of long-stay per 1,000 insured persons | -0.402 ** | -0.287 * | -0.198 | -0.274 * | -0.119 |
| Outpatient care |                                 |                  |                  |
| Outpatient utilization rate per 100 insured persons | -0.238 | -0.400 ** | -0.409 ** | -0.415 ** | -0.544 *** |
| Outpatient days per 100 insured persons | -0.396 ** | -0.457 ** | -0.418 ** | -0.512 *** | -0.540 *** |
| Outpatient cost per insured person (1,000 Yen) | -0.398 ** | -0.322 * | -0.303 * | -0.328 * | -0.350 ** |
| Outpatient days per case | -0.357 ** | -0.304 * | -0.258 * | -0.360 ** | -0.314 * |
| Outpatient cost per case (1,000 Yen) | -0.210 | 0.059 | 0.075 | 0.074 | 0.169 |
| Outpatient cost per day (1,000 Yen) | 0.296 * | 0.505 *** | 0.448 ** | 0.570 *** | 0.598 *** |
| Proportion of high outpatient cost, 60,000 Yen or more (%) | -0.277 * | 0.012 | 0.026 | 0.076 | 0.219 |

Coefficients for no. of classes and no. of participants in health education and health counseling are based on figures per 100 residents.

* p<0.05, ** p<0.01, *** p<0.001.
DISCUSSION

In this study we have analyzed the structure of inpatient and outpatient care by means of factor analyses. The first factor of inpatient care comprised the hospital admission rate and inpatient days per 100 insured persons, bed days per insured person, inpatient days per case, mean bed days, the proportion of long-stay, and the rate of long-stay per 1,000 insured persons. The second factor comprised the inpatient cost per case and the proportion of high inpatient cost. As for outpatient care, the first factor comprised the outpatient utilization rate and outpatient days per 100 insured persons, and the second factor the outpatient cost per case and the proportion of high outpatient cost. The first factors of inpatient and outpatient care can be interpreted to represent the quantity of patient care, which is reflected by patients' behavior. On the other hand, the second factors of inpatient and outpatient care can be interpreted as representing the quality of patient care, which is reflected by the activities of medical service providers.

Health check-ups in this paper refers to examinations provided directly by local governments under the Law for Health and Medical Services for the Elderly of 1991; they include general physical examinations by doctors, measurement of blood pressure, urine analysis, and assays of red blood cell count, hemoglobin concentration, packed cell volume, concentrations of total serum cholesterol, high density lipoprotein cholesterol and triglyceride, blood glucose concentration, and aspartate aminotransferase, alanine aminotransferase and γ-glutamyl transpeptidase activities, all of which are done for eligible residents aged 40 or older who request health check-ups. Electrocardiography and eyeground inspection are performed optionally based on the doctor's judgment. Following health check-ups, health education and individual health counseling are provided by instructors such as doctors, dentists, public health nurses, and dietitians. Health education is divided into two classifications: general health education, with the aim of preventing non-communicable diseases and health promotion, and priority health education, which includes such topics as the prevention of lung cancer, breast cancer, and colon cancer. These courses are offered at municipal health centers, public halls, and other facilities under such names as health classes and health courses. As for individual health counseling, priority health counseling deals with such subjects as diabetes, improvement in dietary practices for different types of diseases, dental health and health for the aged. Although health education and health counseling are mainly targeted at those aged 40 or over, these services are also available for family members of eligible persons, depending on the subject of the class or the situation of the recipient.

As for the effects of health check-ups provided under the Law for Health and Medical Services for the Elderly, Tatara et al. 5, 6 reported on a nationwide survey that the use of such check-ups from middle-age proved to help reduce the use of inpatient care of those 70 years of age or older, and that the use of health check-ups has a positive effect on the use of other preventive health services such as respective cancer screening, health education and health counseling. Nakanishi et al. 7, 6 reported independent inverse associations between the use of health check-ups provided by law and the subsequent occurrence of disability and mortality in old age, and concluded that preventive health services may contribute significantly to the health of the elderly. However, an early review of cost-effectiveness studies of prevention pointed out that "few prevention programs, if any, reduce medical expenditures" and that "even when prevention costs less per person than acute care, its medical cost per unit of health can be as great or greater" 9. Large randomized controlled trials in the USA and UK also have cast doubts on the benefits of multiphasic screening, 10, 11 and Roworth 10 concludes that "there is an ethical obligation on the part of those who advocate screening in old age to show that it is beneficial." In Japan, even though evidence that screening was beneficial remained incomplete, the government started to
provide health check-ups in 1983 under the Law for Health and Medical Services for the Elderly of 1982, in part because of a long tradition of offering local health services in Japan and also with the expectation that health maintenance in middle-age would promote better health and contribute to the maintenance of health when these people became elderly 12,19.

In the present study, negative relations were seen consistently between the rate of use of health check-ups and the hospital admission rate per 100 insured persons and inpatient days per 100 insured persons and per case. We also reported negative associations between the rate of use of health check-ups and the inpatient cost per insured person and per case and the proportion of high inpatient cost. As for outpatient care, the outpatient days and cost per insured person and per case, and the proportion of high outpatient cost showed significant negative correlations with the rate of use of health check-ups. The same tendencies were seen in the relationships between the use of health education and health counseling and the indices of inpatient and outpatient care. Furthermore, the first and second factor scores for inpatient care and the first factor scores for outpatient care showed negative correlations with the rate of use of health check-ups and the number of classes for health education and health counseling and of participants per 100 residents. These results suggest that in municipalities that actively promoted preventive health services programs, the decrease seen in the use of outpatient as well as inpatient care might be to some extent the result of use of these services.

As for the hospitalization of long-stay patients, the phenomenon of elderly patients “blocking” or “misplacing” beds has been reported in other countries 14,15,16. In Japan, the main factor affecting differences in hospital use among municipalities has been found to be differences in admission rates among patients aged 70 or older 12,18. The main cause of a rise in hospital use was found to be an increase in use by long-stay elderly patients 70 years of age or older, which was related to the increase in the number of elderly insured persons. Another survey in a city in Osaka Prefecture pointed out that an increase over a period of 3 years from 34 to 69 elderly patients aged 70 or over who were hospitalized for 180 days or more accounted for half of the increase in total inpatient days for insured persons 18. In this study, we found that bed days per insured person, the long-stay hospitalization rate of 180 days or more, and the proportion of long-stay patients were negatively correlated with the rates of use of health check-ups, health education, and health counseling. These findings suggest that preventive health services under the Law for Health and Medical Services for the Elderly help reduce the use of long-term hospitalization.

However, there are several limitations to this study. One is that already sick people, who know their health conditions, have a tendency to prefer medical services to preventive health services and may not attend preventive health services. The second limitation is that there was a large variation in the population among 44 municipalities (6,458-2,570,388 people in 1 April 1995) surveyed in this study. That is, needs for preventive health services offered by the municipal government are considered to be low in a large city where a lot of medical facilities exist. On the other hand, preventive health services by the municipality are considered to be regarded as important in a small city, which is inadequately supplied with medical facilities. The third is that less use of preventive health services is one of the markers of less healthy cities. A large variation in the use of preventive health services between 44 cities also provokes the question whether or not other environmental factors, which could be more influential than preventive activities, operate between them. Further investigation should be needed to clarify whether preventive health services are simply associated with the use of inpatient and outpatient care or contribute to or are responsible for reducing the use of inpatient and outpatient care.

The Law for Health and Medical Services for the Elderly stipulates that municipalities issue a health handbook, provide health examinations, health education and health counseling, and offer functional training and home-visit guidance. Exactly which component of these preventive actions is most effective should be clarified, since a health service system for the aged may absorb much of the national health expenditure, but this question cannot be answered with the information at present available. However, some significant correlations have been demonstrated between the rates of use of health check-ups and other preventive health services provided by law; in municipalities that actively promoted health check-ups, the provision of preventive health services such as cancer screening, health education, health counseling, functional training, and home-visit guidance was high 5,6. The use of these health check-ups is thought to represent the levels of preventive activities and to be a major index of the general standard of comprehensive health services in Japanese municipalities.

Since local governments set their own goals based on current examination rates and other local characteristics, they are likely to be more responsive than the central government to various types of local and individual needs. It is therefore essential for local governments to continue to develop and promote these activities under the Law for Health and Medical Services for the Elderly.

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