Transition of the Place of Death and Total Number of Death in Japan

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Abstract
Along with a drastic demographic change with rapid aging and decreasing total fertility rate, the place of death for Japanese has been changed dramatically in 30 years. This phenomenon gives big problems for the medical resource allocation in Japan. So, in this literature I described that estimated transition of the place of death and total number of death in Japan 2010–2055. The transition of place of death in Japan is based on a demographic survey by the Ministry of Health, Labour and Welfare. Also, future number of death is from a demographic estimation by the National Institute of Population and Social Security Research. When current proportion of death at hospitals (79.7%) is assumed to be maintained, maximum number of death at hospitals is expected to be 1.32 million in 2040, increasing by 460 thousand compared with that in 2006. When current proportion is assumed to be decreased to 1990’s proportion (71.6%) in 2040, the number of death at hospitals in 2027 is expected to exceed 1.25 million, increasing by 300 thousand (1.4 times) compared with that in 2006, and this level is expected to continue until 2046. When current proportion is assumed to be decreased to 1980’s proportion (52.1%) in 2040, the number of death at hospitals is expected not to exceed 1 million, and decrease after the peak of 980 thousand in 2022. It is estimated from this result that when the current proportion of place of death is maintained, the maximum number of death at hospitals is expected to reach 1.32 million in 2040, being 1.5 times compared with that in 2006. When the purpose is to maintain the current number of death at hospital, 4.5% annual increase in the number of death at home or 1.4% annual decrease in the number of death at hospitals should be aimed to improve the home care service.

Key words: place of death, number of death, health resource, Japan

Introduction

Place of death is a big problem for individuals. Place of death may correlate with pain and comfort of individuals, and cause individual decision-making and ethical problems. Aside from these individual problems, rapid aging associates place of death with medical care system problems. Among the world, Japan is specifically in the growth of rapid aging with fewer children. Generally, as one is near to death, opportunities of medical interventions increase. Further, aging increases the proportion of chronic diseases, such as cardiovascular disease and cancer. This change also requires the reallocation of medical resources. For example, there have been discussions about how much investments are necessary to maintain the current systems.

The place of death for Japanese has been changed dramatically in the last 30 years. Proportion of death at hospitals was 52% in 1980, but has become substantially increased to 80% in 2006 (Table 1). During this period, the number of death at hospitals has tremendously increased by 2.3 times. Various factors are considered for the background of increase in death at hospitals. Such factors include an easy access to hospitals due to the increase in the number of hospitals...
and shift of a terminal care to hospitals caused by the trend of nuclear families. The problem of place of death has attracted the concern of researchers. For example, previous literatures described the difference in place of death by prefecture from demographic statistics\(^1\), \(^2\). However, these analyses have limited the scope to static analysis and not refereed to requirement of health policy.

In 2040, the number of death will be expected to reach 1.66 million, being 1.5 times of current number. There are various problems in responding to this increase in death with the medical resource in Japan. Such problems include change in disease structure; increase in nursing care demand; and decrease in healthcare providers.

Will it be possible to maintain 80% of the current proportion of death at hospitals in future? If the current proportion of place of death is maintained, to what extent will number of death at hospitals increase? Considering the high cost of terminal care provided at the hospitals, it will not be easy to maintain this proportion. On the contrary, in order to maintain the current number of death at hospitals, to what extent do we need to decrease the number of death at hospitals? In order to answer these questions, this report will analyze the transition of the place of death and total number of death under different scenarios.

❖ Data and Method

An estimation period in this paper is for 45 years from 2010 to 2055. Two data was used for the estimation of the number of death by place. The transition of place of death in Japan is based on a demographic survey by the Ministry of Health, Labour and Welfare (MHLW). Also, future number of death is from a demographic estimation by the National Institute of Population and Social Security Research. The proportion of place of death in 2010 is set to be the same as that in 2006, and 3 scenarios are set as the proportion of place of death in 2040. The transition is set as what changed exponentially. In order to set the total proportion to be 100%, errors are included in the remaining item.

Scenario 1—High proportion of death at hospitals—
This will maintain current proportion of death at hospitals

Scenario 2—moderate proportion of death at hospitals—
This will be the same as the proportion of death at hospitals in 1990 in 30 years. In 2040, the proportion of death at hospitals will decrease to 75% being the proportion in 1990.

Scenario 3—low proportion of death at hospitals—
This will be the same as the proportion of death at hospitals in 1980 in 30 years. In 2040, the proportion of death at hospitals will decrease to 52% being the proportion in 1980.

❖ Result

Total number of death as of 2006 is 1.08 million; number of death at hospitals is 860 thousand (79.7% by proportion). Further, according to the estimation of total number of death by the National Institute of Population and Social Security Research, in 2040, the number of death in Japan is expected to continue to increase, and reach to 1.66 million, being 1.5 times of 2006.

In case of scenario 1, 79.7% of the proportion of death at hospitals is assumed to be maintained. In this case, the number of death at hospitals is expected to increase by 140 thousand to more than 1 million, compared with that in 2006. In 2031, the number of death

<table>
<thead>
<tr>
<th>Year</th>
<th>No. death</th>
<th>Hospital (%)</th>
<th>Clinical (%)</th>
<th>Health care facility for the elderly (%)</th>
<th>Nursing home (%)</th>
<th>Home (%)</th>
<th>Other (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1952</td>
<td>765,068</td>
<td>9.7%</td>
<td>2.7%</td>
<td>81.3%</td>
<td>6.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1960</td>
<td>706,599</td>
<td>18.2%</td>
<td>3.7%</td>
<td>70.7%</td>
<td>7.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1970</td>
<td>712,962</td>
<td>32.9%</td>
<td>4.5%</td>
<td>56.6%</td>
<td>5.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1980</td>
<td>722,801</td>
<td>52.1%</td>
<td>4.9%</td>
<td>38.0%</td>
<td>5.0%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1990</td>
<td>820,305</td>
<td>71.6%</td>
<td>3.4%</td>
<td>21.7%</td>
<td>3.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2000</td>
<td>961,653</td>
<td>78.2%</td>
<td>2.8%</td>
<td>13.9%</td>
<td>2.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>1,084,450</td>
<td>79.7%</td>
<td>2.6%</td>
<td>12.2%</td>
<td>2.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
at hospitals is expected to increase by 410 thousand to more than 1.6 million, and this level is expected to continue until 2049. Maximum number of death at hospitals is expected to be 1.32 million in 2040, increasing by 460 thousand compared with that in 2006.

In case of scenario 2, the proportion of death at hospitals is assumed to decrease to 75% in 2040, and the number of death at hospitals is assumed to decrease 0.4% annually. In this case, the number of death exceeds 1 million in 2040. In 2027, the number of death at hospitals is expected to exceed 1.25 million, increasing by 300 thousand (1.4 times) compared with that in 2006, and this level is expected to continue until 2046.

In case of scenario 3, the proportion of death at hospitals is assumed to decrease to 52% in 2040, and the number of death at hospitals is assumed to decrease 1.4% annually. In this case, the number of death at hospitals is expected not to exceed 1 million, and decrease after the peek of 980 thousand in 2022.
Discussion

According to the results of this study, when the current proportion of place of death is maintained, the maximum number of death at hospitals is expected to reach 1.32 million in 2040, being 1.5 times compared with that in 2006. Will it be possible to respond to the increase by 460 thousand from the current number of death at hospitals with the current number of hospitals? It is less obvious whether the substantial increase in medical budget can be expected, and whether the discussion on the increase in the number of physicians can be solved.

The change in population structure will further worsen the situation. While the population requiring an acute medical care is expected to increase due to the change in disease structures, it will become more difficult to provide a terminal care at hospitals. In order to increase the number of death at hospitals by 1.5 times, the increase in the number of hospitals and beds will be inevitable. However, this idea is not considered to be an effective investment, since there is doubt about whether the increased number of hospitals can be maintained in the decreasing number of population.
in Japan.

In order to maintain 900 thousand of the current number of death at hospitals, it is expected to be necessary to maintain 1.4% annual decrease in the number of death at hospitals for 30 years. The 1.4% annual decrease in the proportion of death at hospitals is maintained, the home death needs to be increased by 2.5 times (the proportion of death at facilities is set to be the same as that in 2006). In order to achieve this, about 4.5% annual increase in home death is necessary. In order to realize such a rapid and long-term change in the place of death, a substantial change of health policy is necessary.

In the postwar period, a medical care in Japan has experienced a large growth with the rapid economic expansion; the number of medical staffs and hospitals substantially increased. Concurrently, the proportion of death at hospital from 1970 to 2000 annually increased by 2.9%. Considering the financial limitation estimated in future, it may be feasible to annually decrease the number of death at hospitals by 1.4%. In order to realize this policy scenario, however, the current policy on home care and medical facility services must be modified.

What kinds of policy are necessary to achieve this scenario? Various methods can be considered; for example, to limit the patient’s access by setting some disincentives (e.g., payment) to patients or hospitals. Reconstruction of hospitals to health service facilities and home nursing facilities can be another option.

What is the factor of reducing the number of death at hospitals? There are some documents analyzing the difference in the proportion of place of death by prefecture. Sadamura has clarified that an investment of home care service resource is associated with the low proportion of death at hospitals\(^1\). Further, Miyaishi has clarified that a positive correlation exists between the death rate of natural causes and the proportion of home death\(^2\). Limin demonstrated that older patients and males were more likely to die at home\(^3\). These literatures have showed that improvement of home care service for elderly is necessary to reduce the proportion of death at hospitals. When the purpose is to maintain the current number of death at hospital, 4.5% annual increase in the number of home death or 1.4% annual decrease in the number of death at hospitals might be attained by improvement of home care services.

This study has a number of limitations. No considerations are given to a transition of medical care facilities and medical staffs, as well as to disease structures. Also, medical economic evaluations on the difference between death at hospitals and death at other place have yet to be performed. This study only focused on the inflow of death patients. Also, warranty of safety is a major problem. Many advanced treatments such as a ventilator support and the placement of central venous lines are performed in a terminal phase. Sufficient discussions are needed on whether the safety of such treatments can be warranted in a home and non-medical facility care. With above-described limitations, no sufficient discussions can be achieved on the provision of idealistic and effective services, and the feasibility of scenarios. Further studies will be needed.

This study allowed the discussions on the number of death at hospitals, based on the 3 scenarios. In order to obtain the consensus from the nation for a substantial policymaking, further discussions based on the concrete data are considered to be important.

\*References\*