Factors Related to Hospitalization or Institutionalization among the Frail Elderly in Sapporo, Japan; A Cohort Study

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Abstract: The present study was conducted to identify the risk factors which could lead to hospitalization or institutionalization among the frail elderly receiving in-home care in Japan. The follow up study was conducted in 7 nursing home stations in Sapporo, Japan. Informed consent was received from 86 pairs of caregivers and disabled elderly in October 2008. We excluded 15 patients aged 64 years or younger and their caregivers. Thus, in total we analyzed 71 pairs. Among the 71 pairs, 2 died at home. Dying at home is regarded as successful in-home care and therefore those 2 cases were included for the analysis in the present study. The follow-up period of the present study was defined as 6 months. We confirmed the current home health care situation by mail for family caregivers. Frail female elderly were revealed to be at a significant low risk of institutionalization or hospitalization (HR=0.17, 95%CI=(0.04, 0.80)). The present cohort study is now being produced, and we intend to continue to report on it in the future.

Keywords: hospitalization, institutionalization, family caregivers, frail elderly, Long Term Care Insurance

Introduction

In the past, the frail elderly were cared for in the traditional Japanese family system because most Japanese elderly, over 60% compared with 20% or less in the West, lived with their children (Campbell, 1992). However, the number of children in each family has dramatically decreased, and the nuclear family has now become more common (Kono, 2003). Therefore, caregivers often have to take care of the frail elderly without any help because other relatives often live too far away to provide assistance. It has been reported that caring for the frail elderly tends to induce depression in the caregivers (Barnes et al, 1992). Caregivers’ depression is a risk factor for caregivers’ discontinuing their provision of in-home care (Arai et al, 2001).

Further, the dramatic increase in the number of older people in Japan, which is now well documented (Campbell, 1992), has led to a concurrent increase in the number of elderly in need of care (i.e., frail elderly). It is estimated that the number of frail elderly will reach 3.9 million in 2010 (Maeda, 2003). Family members are often both physically and mentally burdened with caring for the frail elderly (Maeda, 2003). Our previous study in Kyushu from 1998 to 2003 (Oura et al, 2006) examined frail female elderly (HR=5.33, 95%CI; 1.21, 23.45), and in cases where the frail elderly were left at home unaccompanied (HR = 0.27, 95%CI; 0.10, 0.75) there was revealed to be a significant risk of institutionalization. The present study was conducted to identify the risk factors for hospitalization
or institutionalization among the frail elderly receiving in-home care in Japan.

**Subjects and method**

In order to identify the factors related to hospitalization or institutionalization among the frail elderly receiving in-home care, a follow up study began in 2008 in 7 nursing home stations in Sapporo, Japan. The present study is an interim report of the progress of that ongoing follow-up study. Informed consent documents were received from 86 pairs of caregivers and disabled elderly in October 2008. We excluded 15 patients aged 64 years or younger and their caregivers, because the main users of Public Long-term Care Insurance (LTC) are aged 65 or over. Thus we analyzed 71 pairs. The frail elderly included 31 males and 40 females with a mean age (± standard deviation; SD) of 81.1±8.0 years, while the caregivers included 20 males and 51 females with a mean age (±SD) of 65.7±11.6 years old. The kinship statuses of caregivers included 15 husbands (21.1%), 20 wives (28.2%), 4 sons (5.6%), 23 daughters (32.4%), 8 daughters-in-law (11.3%), and 1 son-in-law (1.4%). During the follow-up periods of the present study, 61 of the frail elderly continued staying at home, 6 were hospitalized, 2 entered into long-term care units, and 2 died. Dying at home is regarded as successful in-home care and those 2 were therefore included for analysis in the present study. The follow-up period of the present study was defined as 6 months (starting date:1st October 2008, ending date: 31st March 2009). We confirmed the current home health care situation and the date of the event by post-mail to family caregivers (response rate: 100%). This study was approved by the Ethical Boards of Sapporo Medical University.

The caregivers were asked to complete the following self-administered questionnaires regarding their health status and caregiving situation in the same manner as in our previous studies (Arai et al, 2001; Oura et al. 2007) : (i) questions regarding caregiver’s health status including the Center for Epidemiologic Studies Depression Scale (CES-D) (Radloff, 1977), (ii) questions regarding the demographic variables of the caregivers and the frail elderly, and (iii) questions regarding the care setting such as the time spent physically caregiving, the time used attending to frail elderly, and the duration of caregiving.

Information on the frail elderly was collected from medical records. The Barthel index (Mahoney and Barthel, 1965) was employed for physical disability. Visiting nurses assessed the physical disabilities of their charges. To determine whether the elderly had any behavioral disturbance associated with dementia, we asked the caregivers to review behavioral problems listed on the Dementia Behavioral Disturbance (DBD) scale (Baumgarten and Barthel, 1990). A diagnosis of dementia was obtained by reviewing the record of nursing care insurance.

All statistical analyses were conducted using the Statistical Package for Social Science (SPSS). The hazard ratios (HR) of institutionalization or hospitalization and 95% confidence intervals (95%CI) were estimated with Cox’s proportional hazards model. A level of 0.05 was used as the critical level of significance.

**Results**

Table 1 shows factors related to hospitalization or institutionalization. The frail female elderly were revealed to be at significant low risk (HR=0.17, 95%CI=(0.04, 0.80)).

**Discussion**

Frail elderly males receiving care had a high risk of hospitalization or institutionalization in the present study. Greater power is needed for caregiving men in comparison to women. However in our previous study in Kyushu (Oura et al, 2006), frail elderly males receiving care had a lower risk of institutionalization than their female counterparts, but the results of the present study were the reverse. We thought about this finding in the following manner: First, this study was conducted in a different location. Second, the event of the previous study (Oura et al, 2006) was defined as institutionalization, but the event of the present study was defined as hospitalization or institutionalization. In the present study, only 8 frail elderly were either hospitalized (6 persons) or entered into long-term care units (2 persons) during the follow-up periods. Therefore, we cannot evaluate the risk for these events separately. Third, the characteristics of the subjects may be different. For example, the percentage of male caregivers in the present study was 22%, whereas in the previous study it was 28%. As well the previous study reported caregivers’ depression as a risk factor for caregivers’ discontinuing their provision of in-home care (Arai et al, 2001), but this was not found to be a risk factor in the present study. As we continue this cohort study,
we would like to further clarify this. The previous study
(D’Souza et al, 2009) reported the hospitalization of
home- and community based elderly increased the most
in financially restrictive periods. We will consider the
assistance of the government in future studies.

Certain limitations to our study should be mentioned.
The present study is not geographically representative
of all of Japan. Our planned further studies will research
different districts to further clarify the issue of the risk of
institutionalization among the frail elderly in Japan. This
would facilitate a more informed and comprehensive
policy of action by the government to counteract this
increasing trend.

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caregivers of the frail elderly in Japan before and after
the introduction of the public long-term care insurance

Table 1. Factors related to institutionalization or hospitalization.

<table>
<thead>
<tr>
<th>Frail elderly</th>
<th>HR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Female / Male)</td>
<td>0.17 (0.04, 0.80)</td>
</tr>
<tr>
<td>Age, years old (80+ / -70)</td>
<td>1.46 (0.41, 5.18)</td>
</tr>
<tr>
<td>Dementia (yes / no)</td>
<td>0.33 (0.10, 1.15)</td>
</tr>
<tr>
<td>Dementia with behavioral disturbances* (yes / no)</td>
<td>1.17 (0.25, 5.53)</td>
</tr>
</tbody>
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<table>
<thead>
<tr>
<th>Caregivers</th>
<th>HR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender (Female / Male)</td>
<td>3.91 (0.50, 30.86)</td>
</tr>
<tr>
<td>Age, years old (65+ / -64)</td>
<td>1.21 (0.34, 4.28)</td>
</tr>
<tr>
<td>Depression** (yes / no)</td>
<td>0.99 (0.28, 3.53)</td>
</tr>
<tr>
<td>Consulted with a doctor about their own health (yes/ no)</td>
<td>3.41 (0.72, 16.08)</td>
</tr>
<tr>
<td>Spouse (yes/no)</td>
<td>1.55 (0.44, 5.50)</td>
</tr>
</tbody>
</table>

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<tr>
<th>Care setting</th>
<th>HR(95%CI): hazard ratio (95% confidence intervals)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Living together with a family member helps with care (yes/ no)</td>
<td>1.10 (0.31, 3.91)</td>
</tr>
<tr>
<td>People living apart helps with care (yes/ no)</td>
<td>1.09 (0.32, 3.76)</td>
</tr>
<tr>
<td>Able to go out without accompanying the elderly (yes/ no)</td>
<td>0.87 (0.18, 4.20)</td>
</tr>
</tbody>
</table>

*: corresponding up to 1 item; wandering or violence etc,
**: CES-D(16 and up is depression)
札幌市に在住する在宅要介護高齢者の入院または入所と関連する要因：コホート研究

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要旨：本研究では在宅要介護高齢者の入院・入所のリスク要因を検討した。追跡研究は札幌市内の7訪問看護ステーションで実施した。2008年10月に、86組からインフォームドコンセントが得られた。その内、15人の要介護高齢者は64歳以下であったので除外し、解析は71組で行った。2名が追跡期間中に死亡したが、在宅介護は成功したと考えて解析に含めた。追跡は6か月行い、郵送法で家族介護者から介護状況を確認した。女性介護者は男性介護者に比べ入院・入所のリスクは低かった（HR=0.17, 95%CI=(0.04, 0.80)）。本追跡研究は現在も継続しているので、将来の追跡結果も報告したい。

キーワード：入院、入所、家族介護者、要介護高齢者、介護保険