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Original Study

Incidence of Pressure Ulcers During Home and Institutional Care Among Long-Term Care Insurance Beneficiaries With Dementia Using the Korean Elderly Cohort

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A B S T R A C T

Objective: To assess whether type of long-term care service is a risk factor of the incidence of pressure ulcers among older adults with dementia who are receiving long-term care insurance (LTCI).
Methods: Data from LTCI beneficiaries (benefit level 1 or 2) with dementia, aged 60 and older (n = 7841), in the Korean Elderly Cohort data set from 2008 to 2013 were used. Type of long-term care service was categorized into home or institutional care using the LTCI Claims Database. The National Health Insurance Claims Database was used to identify the incidence of pressure ulcers as the outcome variable in a survival analysis using the time-dependent Cox proportional hazard model.
Results: Of the 7841 participants, 98 (1.2%) exhibited pressure ulcers. Compared with beneficiaries receiving home care, those receiving institutional care had a higher adjusted hazard ratio for pressure ulcers (hazard ratio 6.48, 95% confidence interval 3.48–10.86). These associations were particularly strong among beneficiaries without pressure ulcers during the mandatory assessment for benefit eligibility and who were partially ambulatory.
Discussion: Beneficiaries receiving institutional care were more likely to have pressure ulcers than were those receiving home care. The government must monitor the quality of institutional long-term care services and encourage service providers to improve such care.

South Korea (hereafter, Korea) has one of the most rapidly aging populations among all developed countries. The percentage of Korean elderly in the total population is projected to rise from 9% today to 38% by 2050.[1] Rapid aging is a major concern in Korea because of critical social environmental changes, such as fewer older adults living with their adult children, diminishing rates of informal or family caregiving, a sharp decline in fertility, increased hospitalization rates due to chronic disease, and limited long-term care (LTC) programs.[2–4]

To meet the care needs of older adults with poor health status and greater health care needs, the LTC insurance (LTCI) system was established by the Korean government in July 2008.[5,6] National Health Insurance (NHI) Corporation, government tax subsidies, and copayments jointly fund the LTCI system.[3] LTCI covers adults aged 65 and older and those younger than 65 with various geriatric or other diseases (eg, dementia, Parkinson disease, stroke), as determined at the national level by a presidential decree. LTCI operates as a form of social insurance, and offers 3 types of services: home care (HC), institutional care (IC), and special cash. The establishment of LTCI was received positively because of its role in lessening the burden of elderly patients and their families. In 2010, LTCI covered 5.6% of the elderly population; by 2013, the number of beneficiaries of LTC had increased from approximately 310,000 (in 2010) to approximately 387,000. The cost of LTCI was projected to reach $35 billion dollars (USD) in 2050.[7]

The quality of LTC services has been gaining considerable attention in not only Korea, but also Western countries, such as the United States, United Kingdom, Australia, and Canada, which introduced LTCI earlier than did Korea. The assessment and assurance of quality care is

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important in terms of responsibility for health care expenses, as well as for ensuring safe and beneficial LTC services.[8] However, despite the importance of high-quality care for elderly patients, it remains unclear whether care quality is consistent across different LTC services.

Many policymakers in developed countries are attempting to improve LTC service quality, focusing specifically on improving certain quality indicators of LTC services.[9] One such indicator is incidence of pressure ulcers, which has been deemed adequate for validly measuring LTC service quality, regardless of service type.[8] Pressure ulcers are a serious complication of hospitalization among elderly patients, and are associated with increased morbidity, mortality, health care expenditure, extended hospital stay, and patient suffering.[10] They can arise in mere hours or days, but can take weeks or months to heal, depending on their severity and accompanying circumstances; furthermore, appropriate treatment requires considerable resources, both monetary and human.[11]

Therefore, we investigated the association between LTC service type and incidence of pressure ulcers among elderly adults with dementia classified as LTC benefit levels 1 or 2, using a representative sample of Korean elderly adults.[5] We tested 2 hypotheses: (1) LTC services are associated with incidence of pressure ulcer, and (2) the association between LTC service type and incidence of pressure ulcer would differ by whether the patient had a pressure ulcer during mandatory assessment of benefit eligibility and ambulatory status.

Methods

Data

This observational study used data from the Korean Elderly Cohort for 2008 to 2013, which were collected by the NHI Corporation. This dataset, which is representative of the country's elderly population, contains health insurance and LTCI claims data, as well as national-level assessment data that the Korean government requires for determining eligibility of LTCI beneficiaries. The assessment data comprises 5 main sections: sociodemographic information, general health status, LTCI application and final decision, a LTC checklist, and preliminary and adjusted total assessment scores (LTC approval scores [LTCAS]). The national LTCI assessment was initially conducted in 2008 to identify the number of potential beneficiaries and to determine the severity of their conditions. This served as the baseline assessment for all beneficiaries in the dataset. The assessment and documentation followed specific guidelines to ensure data quality.

The LTC checklist is a standardized list used to evaluate the care needs of beneficiaries, which is the basis of allocating the national LTCI. It comprises 5 areas, totaling 69 functional assessment items: physical function (23 items, including activities of daily living [ADLs] and instrumental ADLs [IADLs]), cognitive function (10 items), behavioral symptoms (16 items), nursing and special treatments (10 items), and rehabilitation needs (10 items). Fifty-nine of these items (excluding IADLs) are used for calculating a preliminary LTCAS using a complex, highly nonlinear formula. Subsequently, the Need Assessment Committee, following national guidelines, adjusts the preliminary scores and issues a final benefit coverage level, which ranges from 1 to 3, after considering each individual's circumstances and special service needs and a physician's medical opinion. Higher levels indicate less dependency and a lower benefit amount. This study was approved by the Institutional Review Board of the Graduate School of Public Health, Yonsei University, Seoul, Korea. [IRB number 2-1040939-AB-N-01-2016-155].

Study Population

Inclusion criteria were a primary diagnosis of dementia and a benefit coverage level of 1 or 2; these criteria are most influential for determining the need for LTC services. Individuals of benefit level 1 or 2 can choose their preferred service between HC and IC. We excluded individuals of benefit level 3 because they can receive HC services only in special circumstances and are not comparable with individuals of the other 2 levels.[12] Among the 99,841 LTCI beneficiaries in July 2008, 35,421 who had a benefit level 1 or 2 were selected. Of these 35,421 beneficiaries, 10,491 had dementia. After excluding those who did not use LTC services and those diagnosed with pressure ulcer before becoming LTCI beneficiaries, 7841 beneficiaries were left in our final dataset.

Study Variables

Type of LTC service

We considered HC and IC as LTC services in our analysis, excluding the special cash type. HC comprises home help, home bathing, skilled nursing services, adult day and night care centers, and medical equipment rental (eg, wheelchairs, in-tub bath lifts, and specialty care mattresses); it allows recipients to combine various HC services within a monthly funding limit.[13] IC includes 24-hour nursing care, social and recreation therapy, rehabilitation, room and board, and other conveniences.[12]

Pressure ulcers

The incidence of pressure ulcer was defined as patients having a claim record indicating a diagnosis of pressure ulcer and treatment thereof. Specifically, we retrieved all claims records for outpatient visits or hospital admissions of patients aged 60 or older diagnosed with pressure ulcer (according to *International Classification of Diseases, Tenth Edition* [ICD-10] diagnostic codes: L89.1–4 and L89.9 [pressure ulcers grades 1–4 and unknown grade, respectively]). In addition, receiving pressure-ulcer–related treatment (ICD-10 procedure code: M0143 [position change]) was also considered with regard to position change as the most frequent intervention to prevent pressure ulcer.[14] The diagnosis codes were selected based on previous studies.[15]

Because identifying pressure ulcer cases solely based on diagnosis can lead to misclassification problems because of potential miscoding, we used the information from both diagnosis and surgical records. Although this rather conservative approach might lead to underestimation of the real incidence of pressure ulcer in Korea, it ensures the validity of those cases that were identified.

Although we sought to identify the association between incidence of pressure ulcer and LTC service type, not all diagnoses or operations for pressure ulcer are carried out under LTC services. Thus, we defined the incidence of pressure ulcer by LTC service type as the occurrence of a diagnosis of and treatment for pressure ulcer between the start and end dates of a given LTC service.

Control Variables

For sociodemographic variables, we assessed age (60–74, ≤80, ≤85, ≤90, >90), sex (male, female), region (urban, rural), equivalent household income level (high, middle, low), primary caregiver (spouse, children, care assistant, none), and cohabitant (living alone, spouse, family members, caregivers from LTC facilities, others). For health-related variables, we considered the following: having a diagnosis of pressure ulcer during mandatory assessment for benefit eligibility (yes, no), ambulatory status (possible, partially possible, or impossible), LTC benefit level (1, 2), Charlson comorbidity index ([CCI] 0, 1, 2, or ≥3),[16] LTC assessment score, ADL score, cognitive function score, and behavioral symptoms score. Only the comorbidity component of the CCI was calculated. All diagnostic information was collected from inpatient and outpatient billing data within the diagnosis year.