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Original Article

Utilization and patterns of community healthcare services for senior residents in long-term care facilities in Taiwan: A nationwide study

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Abstract

Background: Community healthcare is one of the many important services used to care for the disabled elderly in aging societies. The aim of this study was to evaluate the utilization and patterns of community healthcare services used by senior residents in long-term care facilities (LTCFs) in Taiwan.

Methods: Secondary data analyses were conducted of the Taiwan National Health Insurance Research Database for 9338 LTCF senior residents receiving community healthcare services throughout the 2004 calendar year. The community healthcare services used by male and female LTCF senior residents were also compared by Chi-square testing. Descriptive statistics are used to present the patterns of professional visits and services by contracted healthcare facilities.

Results: About one-third of those senior residents living in LTCFs in Taiwan in 2004 received community healthcare services. Female residents received a higher percentage of community healthcare services than males in all age groups ($p < 0.001$). Community home nursing care institutions provided 67% of healthcare visits and professional visits. Of those services provided to patients, the majority of the skilled nursing services were attributable to replacement of nasogastric tube (55%) and urinary catheter (38%).

Conclusion: Whether or not the replacement of nasogastric tubes and urinary catheters among the LTCF senior resident population is an appropriate use of time and targeted medical resources needs further investigation. When addressing concerns about the community healthcare needs of senior residents of LTCFs, policymakers should carefully consider the current shortage of professional healthcare workers as they assess strategies to best meet the needs of the elderly in Taiwan.

Keywords: community healthcare service; gender differences; healthcare utilization; long-term care facilities; senior residents

1. Introduction

The elderly population with physical disabilities has become an important issue in Taiwan, as the demand for long-term care services increases dramatically with age in developed and developing nations worldwide.[1–3] Taiwan was identified as an aging society by the World Health Organization in 1993, and the predicted percentage of the Taiwanese

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population older than 65 years will double by 2017.[4] A rapid increase in the elderly population brings its own complex effects and impacts, and induces challenging problems within long-term care systems in Taiwan.[5]

Community healthcare is one of the continuum healthcare services in many countries. In Taiwan, the community healthcare services are reimbursed by the National Health Insurance (NHI) program for those eligible people living in community homes or in long-term care facilities (LTCFs).[6,7] According to the Home Nursing Care Payment Regulations of the NHI in Taiwan, community healthcare service reimbursements are limited to situations where services have been provided by medical or nursing institutions that meet the requirements of the Department of Health. Patients have to fulfill the following criteria to receive these services: (1) limited self-care ability with chair-bound or bed-bound conditions (>50% of the time during waking hours); (2) definite medical or nursing care needs; (3) chronic conditions requiring long-term nursing care; or (4) continual nursing care needs following hospital discharge.[8] The frequency of visits by medical professionals, including physician visits (once every 2 months), and nursing visits (once every 2 weeks) is determined by the NHI.[8] Certified nurses who comprise the majority of direct care providers in most facilities need sufficient training to strengthen the direct care force. To become a certified nurse for community healthcare in Taiwan, the training courses include coursework in long-term care, infection control, care of the disabled, nutrition care, physical examination, terminal care, swallowing and speech care, and maintenance of activities of daily living. These requirements, along with practical internships in home healthcare and LTCF need to be completed and qualified by registration.[9]

Community healthcare services, which are typically subject to reimbursement by the NHI in Taiwan include general nursing services, skilled nursing services, laboratory tests, nurse visits, and physician visits.[8] The general nursing care services include physical evaluations, nursing instructions, drug injections, and fecal extraction. Skilled nursing services consist of replacing nasogastric tubes, urinary catheters, tracheostomy tubes, nephrostomy, and cystostomy catheters; changing the dressings of Stage III and IV pressure sores and administering intravenous fluid and ostomy care.[8] The NHI reimburses for home nursing visits with a range of fixed rates according to the resource utilization groups (RUGs): RUG-1 are patients who need general nursing care services only; RUG-2 are patients who need a single additional skilled nursing care service besides the general nursing care; RUG-3 are patients who need two additional skilled nursing care services; and RUG-4 are patients who need three additional skilled nursing care services.[8] The physicians contracting with the LTCF need to be qualified by both the NHI and the local health authority. They visit patients, provide physical examinations as well as medical recommendations every 2 months, and renew the patients' prescriptions according to their medical conditions every 4 months. The reimbursements for physician visits based on a fixed payment are also regulated by NHI.[8]

LCTFs for the disabled are governed by the Ministry of the Interior in Taiwan. Residents can apply for community healthcare services from healthcare institutions that are contracted with the LTCF. There was a total number of 30,251 senior residents [15,446 males (51.1%) and 14,805 females (48.9%)] staying in 886 LTCFs at the end of 2004 in Taiwan.

The aims of this study were to investigate the rates and utilization patterns of community healthcare services used by senior LTCF residents, and to evaluate the current conditions of reimbursement for community nursing care services among these residents in Taiwan.

2. Methods

2.1. Data sources

The NHI program was initiated in Taiwan in 1995, and provided support for 22,134,270 beneficiaries (about 97.6% coverage) at the end of 2004.[10] The claimed database was released by the Bureau of National Health Insurance for research use to the National Health Research Institutes, which has been affiliated to the project of the National Health Insurance Research Database since 1999. The structure of the claimed database is described in detail on the National Health Research Institutes website and in our previous publications.[11−13]

All of the outpatient service claimed database for beneficiaries aged 65 years and older in 2004 (CD2004.DAT) were obtained. The comprehensive information of all community healthcare services, ambulatory care in primary care clinics, hospital outpatient services and emergency department visits were provided in detail. Variables related to visit dates, medical care facilities, patient gender, date of birth, and the three major diagnoses coded in the 9th International Classification of Disease, Clinical Modification (ICD-9-CM) format were included. The corresponding order files (OO2004.DAT) with the details of management, including medical services, medical procedures, medical materials and supplements, laboratory tests, and prescribed medications presented by a unique coding number in each visits, were also acquired. The complete database of coding numbers for corresponding orders was obtained from the NHI website.[14] Another file, HOSB2004.DAT, was obtained for basic data of the healthcare institutions to identify their accreditation levels: academic tertiary medical centers, metropolitan regional hospitals, local community hospitals, primary care clinics, and home care institutions. All data were kept confidential for the purpose of protecting the privacy of individuals and institutions. This study was a secondary data analysis and was conducted in accordance with the principal of the Declaration of Helsinki.

2.2. Data analysis

Microsoft Structured Query Language (SQL) Server 2008 (Microsoft Corp., Redmond, WA, USA) database software was used for data linkage, processing, and computation. Statistical analyses were performed by using SPSS 17.0 (SPSS Inc.,

Chicago, IL, USA), categorical variables were compared by Chi-square test and continuous variables were compared by *t* test. The significance level was set at 0.05 (2-tailed).

3. Results

3.1. Rate of LTCF senior residents receiving community healthcare services

In 2004, a total of 2,114,142 beneficiaries aged 65 years and over were insured by the NHI program in Taiwan [1,050,882 females (49.7%) and 1,063,260 males (50.3%)]. The mean age of the senior beneficiaries was 79.1 ± 8.0 years for males and 80.1 ± 7.6 years for females. For three age groups of 65−74 years, 75−84 years and ≥ 85years, there were significantly gender differences (all $p < 0.001$). There were 9338 residents aged ≥ 65 years (0.4% of senior beneficiaries; 30.9% of LTCF senior residents) admitted to LTCFs identified, who received a total of 56,534 community healthcare visits. When the target groups are stratified with their age, the highest rate of community healthcare utilization in LTCFs was in the group aged ≥ 85 years (1.7%) and the lowest was in the group of 65−74 years old (0.2%). In LTCFs, females received more community healthcare services than males in the groups of aged 75−84 years and ≥ 85 years (2428 vs. 2153 and 1650 vs. 864, $p < 0.001$, respectively; Table 1).

3.2. Age/sex utilization

While comparing any noted gender differences, females received more community healthcare visits than males in all three age groups (all $p < 0.001$). When exploring the total community healthcare visits in LTCFs, the most common utilization was found in the 75−84 years group (48.9%), followed by the ≥ 85 years group (26.9%) and then the 65−74 years group (24.2%). On average, the groups aged 65−74, 75−84 and ≥ 85 years received 6.1 ± 4.2, 6.0 ± 4.2, and 6.1 ± 4.2 community healthcare visits, respectively (Table 2).

3.3. Major diagnoses

According to the ICD-9-CM coding system, the major diagnoses for LTCF senior residents receiving community healthcare visits were cerebrovascular diseases (ICD-9-CM 430-438, $n = 31{,}048$, 54.9%), dementias (ICD-9-CM 290, $n = 9080$, 16.1%), diabetes mellitus (ICD-9-CM 250, $n = 2817$, 5.0 %), hypertensive diseases (ICD-9-CM 401-405, $n = 2719$, 4.8%), and Parkinson's disease (ICD-9-CM 332, $n = 1440$, 2.5%).

3.4. Distributions among institutions

Among all community healthcare visits to LTCF residents aged 65 years and over in 2004, community home nursing care institutions were responsible for providing the majority of visits ($n = 6{,}191$, 66.3%), followed by local community hospital-affiliated home care institutions ($n = 1{,}637$, 17.5%), metropolitan hospital-affiliated home care institutions ($n = 1{,}020$, 10.9%) and academic medical center-affiliated home care institutions ($n = 490$, 5.2%).

3.5. Patterns of physician and nursing visits

The results show that the total number of physician visits in 2004 was 22,488 when the healthcare professional visits of LTCF residents stratified by healthcare institutions were analyzed. The most frequent visits were provided by the physicians who contracted with community home nursing care institutions ($n = 14{,}113$, 62.8%), followed by with local community hospital-affiliated home care institutions ($n = 4598$, 20.4%), metropolitan hospital-affiliated home care institutions ($n = 2192$, 9.7%) and academic medical center-affiliated home care institutions ($n = 1585$, 7.1%). The community healthcare nursing visits by RUG, and the total number of nursing visits for LTCF residents in 2004 was 60,972 (Table 3). The RUG-2 contributed the most frequent of those visits ($n = 34{,}217$, 56.1%), while the RUG-4 contributed the fewest ($n = 3342$, 5.5%). The most frequent nursing visits were provided by community home nursing care institutions ($n = 39{,}864$, 65.4%), followed by local community hospital-affiliated home care institutions ($n = 10{,}153$, 16.7%), metropolitan hospital-affiliated home care institutions ($n = 6445$, 10.6%), and academic medical center-affiliated home care institutions ($n = 4510$, 7.4%; Table 3).

3.6. Patterns of skilled nursing services

The skilled nursing services provided by different healthcare facilities are described in Table 4. Of a total 74,365 services provided, tube replacement, including changing of

Table 1
Rate of LTCF senior residents receiving community healthcare services under the NHI in Taiwan in 2004, stratified by age and gender.

Age	No. of NHI beneficiaries, *n* (% of beneficiaries)			No. of LTCF residents who received community healthcare services, *n* (% of beneficiaries by different age groups)		
	Male	Female	*p*	Male	Female	*p*
65−74	612,262 (29.1)	636,227 (30.2)	<0.001	1175 (0.2)	1068 (0.2)	<0.001
75−84	381,653 (18.1)	327,858 (15.6)	<0.001	2153 (0.6)	2428 (0.7)	<0.001
≥85	66,881 (3.2)	80,097 (3.8)	<0.001	864 (1.3)	1650 (2.1)	<0.001

LTCF = long-term care facilities, including 886 elderly long-term nursing organizations, nursing organizations or caring organizations; NHI = National Health Insurance.

Table 2
Utilization of 56,534 community healthcare visits for LTCF senior residents under the NHI in Taiwan in 2004, stratified by age and gender.

Age	No. of community healthcare visits, *n* (%)			Home healthcare visits per residents, mean ± SD		
	Male	Female	*p*	Male	Female	*p*
65−74	6841 (49.9)	6861 (50.1)	<0.001	5.8 ± 4.1	6.4 ± 4.2	<0.001
75−84	11,952 (43.3)	15,665 (56.7)	<0.001	5.5 ± 4.1	6.4 ± 4.3	<0.001
≥85	4751 (31.2)	10,464 (68.8)	<0.001	5.5 ± 4.1	6.4 ± 4.2	<0.001

LTCF = long-term care facilities, including 886 elderly long-term nursing organizations, nursing organizations or caring organizations; NHI = National Health Insurance.

nasogastric tubes, urinary catheters, and tracheostomy tubes accounted for 98.8% ($n = 73,464$). The second most frequent service provided was wound care ($n = 803$, 1.1%), followed by less frequent services including ostomy care ($n = 74$) and intravenous fluid administration ($n = 24$). The most significant number of services provided were by community home nursing care institutions ($n = 52,462$, 70.5%), followed by local community hospital-affiliated home care institutions ($n = 13,279$, 17.9%), metropolitan hospital-affiliated home care institutions ($n = 7153$, 9.6%), and academic medical center-affiliated home care institutions ($n = 1471$, 2.0%). By the end of 2004, a total of 40,664 nasogastric tube replacements were provided to 7039 (75.2%) residents with an average of 5.8 changes per person (Table 5). Urinary catheter replacements delivered to 5272 residents (56.3%) totaled 28,187, with an average of 5.3 changes per person.

4. Discussion

Population aging is a worldwide issue.[1,3,5] The growing number of elderly disabled people who require long-term healthcare at home or in LTCFs in the community has been reported for the Taiwanese population.[2,15] Results showed that 1.4% of the senior NHI beneficiaries resided in LTCF in 2004 in the present survey. About one-third of them received community healthcare services, which implied that more frail patients with multiple chronic conditions are being cared for in LTCFs.[16−20] Furthermore, most of the senior residents in the RUG-2 received community healthcare services, indicating that they needed an additional skilled nursing service, such as nasogastric tubes or urinary catheters replacement (Table 5). The major diagnoses of LTCF residents receiving community healthcare services were cerebrovascular diseases, dementia, and diabetes mellitus, which were similar to those in western countries.[16,19]

The fact that female senior residents used more community home healthcare services and were subject to more visits than males was revealed in this study, confirming previous reports that showed women had more family physician visits and diagnosis services, and received more medication.[21−25] This result indicates that females may be more concerned about their health status,[23,24] and elderly women may have more chronic conditions.[26,27]

Tube replacement, including nasogastric, urinary, and tracheostomy tubes change, was the most common skilled nursing service conducted in LTCF in Taiwan. There were 7039 (75.2%) of the total 9353 LTCF senior residents who accepted community healthcare services received nasogastric tube placement, with an average of 5.8 tube changes per patient in 2004. The prevalence of tube-feeding in LTCF was reported to be 29.2% in Taiwan, much higher than that in Western countries (range, 6.4−9.7%).[16,17] Major medical indications or diagnoses related to tube-feeding for elderly patients include dysphagia caused by neurological diseases, strokes, dementia, Parkinson's disease, esophageal diseases, or circumstances where patients refuse to eat.[16,28] The distribution of indications varies in different healthcare systems and different cultures.[16,26] A cross-national study comparing tube-fed institutionalized senior individuals living in Ontario, Canada, and the USA showed that the tube-fed patients in the

Table 3
Community healthcare professional visits for LTCF senior residents under the NHI categorized by contracted category of healthcare institutions in Taiwan in 2004.

Accreditation level	Physician visits *n* (%)	Nursing visits, *n* (%)				Total
		RUG-1	RUG-2	RUG-3	RUG-4	
Academic medical center affiliated home care institutions	1585 (7.1)	108 (0.2)	2663 (4.4)	1552 (2.5)	187 (0.3)	4510 (7.4)
Metropolitan hospital affiliated home care institutions	2192 (9.7)	106 (0.2)	3760 (6.2)	2194 (3.6)	385 (0.6)	6445 (10.6)
Local community hospital affiliated home care institutions	4598 (20.4)	28 (0)	5672 (9.3)	3781 (6.2)	672 (1.1)	10,153 (16.7)
Community home nursing care institutions	14,113 (62.8)	311 (0.5)	22,122 (36.2)	15,333 (25.1)	2098 (3.4)	39,864 (65.4)
Total	22,488 (100)	553 (0.9)	34,217 (56.1)	22,860 (37.5)	3342 (5.5)	60,972 (100)

LTCF = long-term care facilities, including 886 elderly long-term nursing organizations or caring organizations; NHI = National Health Insurance; RUG = resource utilization group, please refer to text for details; RUG-1 = patients who need common nursing care; RUG-2 = patients who need one additional kind of the skilled nursing care; RUG-3 = patients who need two additional kinds of skilled nursing care; RUG-4 = patients who need three or more additional kinds of skilled nursing care.

Table 4
Community skilled nursing services for the LTCF senior residents under the NHI in 2004 stratified by contracted category of healthcare facilities.

Accreditation level	Tube replacement *n* (%)	Wound care *n* (%)	Ostomy care *n* (%)	IV fluid injection *n* (%)	Total *n* (%)
Academic medical center affiliated home care institutions	1362 (1.9)	107 (0.1)	2 (0)	0 (0)	1471 (2.0)
Metropolitan hospital affiliated home care institutions	7016 (9.4)	129 (0.2)	8 (0)	0 (0)	7153 (9.6)
Local community hospital affiliated home care institutions	13,082 (17.6)	166 (0.2)	8 (0)	23 (0)	13,279 (17.9)
Community home nursing care institutions	52,004 (69.9)	401 (0.5)	56 (0.1)	1 (0)	52,462 (70.5)
Total	73,464 (98.8)	803 (1.1)	74 (0.1)	24 (0)	74,365 (100)

LTCF = long-term care facilities, including 886 elderly long-term nursing organizations, nursing organizations or caring organizations; NHI = National Health Insurance.

USA cohort more frequently involved those with dementia or advanced cognitive disability, and less frequently in patients with stroke.[16]

Nasogastric tube feeding is well-known to be associated with a variety of potential complications, including pain, epistaxis, tube dislodgement, trachea-bronchial misplacement, nasal alar necrosis, esophagitis, electrolytes alteration, vomiting, diarrhea, and lung aspiration. Since people generally believe in the traditional Chinese culture adage of "to eat or to be fed is to live", even for terminal patients, nasogastric tube feeding has been commonly provided in long-term care systems in Taiwan.[17,28,29] In previous findings from a study of 1221 senior residents in LTCF in the Taipei area, 29.2% of all patients were fed through tubes, with a reported 98.4% of those patients using nasogastric tubes.[17] Nasogastric tube feeding is generally recommended for a short period, while feeding through a gastrostomy tube or jejunostomy tube is recommended for long-term enteral feeding.[17,28] However, only a small percentage of LTCF senior residents received ostomy care in this study. Lin et al also found that some patients who were diagnosed with irreversible swallowing disorders in need of long-term tube feeding still received nasogastric tube feeding.[17] One reason to use long-term nasogastric tube feeding instead of gastrostomy or jejunostomy for feeding might be associated with the concept of traditional filial piety in Chinese culture, which suggests that our body was given to us from our parents and should not be damaged. The other reason might be related to the NHI reimbursement regulations, which could prompt patients or their families to decide to keep the nasogastric tube in order to retain healthcare services. However, other factors impacting on long-term nasogastric tube feeding in Taiwan need to be further investigated.

Our data show that 37.9% of skilled nursing services involved replacement of urinary catheters. A previous study revealed that the prevalence of urinary catheter indwelling among LTCF residents in Taiwan was about 24.6%,[30] much higher than in the USA (7.5%)[31] and in European countries (5.4%).[19] However, the inappropriate urinary catheter placement rate was high (60%),[30] and long-term placement of urinary catheters could cause considerable discomfort to patients and increase urinary tract infections.[30] Consequently, more attention needs to be devoted to the problems which can result from overuse of urinary catheter placements in Taiwan.

About one-third of senior residents admitted to LTCFs in Taiwan received community healthcare services in 2004. As the population continues to age, more elderly people will need healthcare services. However, the shortage of healthcare workers is now becoming a notable problem in Taiwan's healthcare delivery system. Task shifting has been implemented in several countries, used to strengthen and expand the health workforce to rapidly increase access to health services.[32] This option has been discussed by the World Health Organization, and could be considered by policymakers for use in Taiwan.

The study was completed by using a nationwide claims database with the following limitations. First, sufficient information about trends of community healthcare services could not be obtained by the 1-year cross-sectional survey. Second, the claims database did not necessarily provide sufficient demographic or socioeconomic data, and comprehensive medical backgrounds of the beneficiaries in detail. Therefore, analyses of possible contributing factors, such as education level, economic background, caregiver status, family composition, polypharmacy, and inappropriate prescriptions for those LTCF senior residents were not likely to have been recorded.

Table 5
Distributions of skilled nursing care services for the LTCF senior residents under the NHI in 2004 stratified by contracted category of healthcare facilities and procedures.

Accreditation level	Change NG tube *n* (%)	Change Foley *n* (%)	Change tracheostomy tube *n* (%)	Pressure sore change dressing *n* (%)	Ileostomy change dressing *n* (%)
Academic medical center	736 (1.0)	468 (6.3)	158 (0.2)	107 (0.1)	2 (0)
Metropolitan hospitals	3961 (5.3)	2560 (3.4)	495 (0.7)	129 (0.2)	8 (0)
Local community hospitals	7387 (1.0)	5138 (6.9)	557 (0.7)	166 (0.2)	8 (0)
Home nursing care institutions	28,580 (38.4)	20,021 (26.9)	3403 (4.6)	401 (0.6)	56 (0.1)
Total	40,664 (54.7)	28,187 (37.9)	4613 (6.2)	803 (1.1)	74 (0.1)

LTCF = long-term care facilities, including 886 elderly long-term nursing organizations, nursing organizations or caring organizations; NHI = National Health Insurance.

In conclusion, Taiwanese NHI is a universal health program that offers accessible community healthcare services to LTCF senior residents. Among those senior beneficiaries who resided in LTCFs, a greater number of elderly female residents utilized community healthcare services than males. Additionally, the rate of healthcare visits was also higher in females than in males. Our findings indicate that the most commonly provided skilled nursing services were replacement of nasogastric tubes and urinary catheters. To provide the necessary information to make the most effective long-term care decisions and accurately evaluate cost efficiency, the gender differences of community healthcare services utilization and the appropriateness of replacing nasogastric tube and urinary catheters in LTCF senior residents in Taiwan require further investigation. Furthermore, as the population continues to age, with increasing healthcare needs of the elderly, policymakers should examine ways to deal efficaciously with the shortage of professional healthcare workers to meet the burgeoning needs of the elderly in Taiwan.

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