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## Original Article

# Long-Term Care Service in Dementia: Experience from a Dementia-Integrated Care Center in Taiwan

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## SUMMARY

**Background:** In Long-term Care (LTC) Plan 2.0, the Taiwanese government built several dementia-integrated care centers (DICC). DICC is a service platform providing case management for dementia people. The present analytical descriptive study aimed to analyze the integrated data of dementia patients in DICC of a tertiary medical center in Northern Taiwan, and to compare the severity and types of dementia according to LTC services subjects receiving.

**Methods:** A total of 635 were collected from the system of dementia case management of the Department of Health, New Taipei City Government. They were diagnosed with having dementia by neurologists in Mackay Memorial Hospital between January 1, 2017, and November 30, 2019. Chi-square test was used to compare the differences in LTC services, dementia type and severity.

**Results:** Alzheimer's disease (AD) was the most common type of dementia the subjects suffered. Nearly 90% of subjects received LTC services. According to the type of LTC service subjects receiving, there was a significant difference ( $p = 0.032$ ) between subjects with clinical dementia rating (CDR)  $\leq 1$  and CDR  $> 1$ . In subjects with non-AD, there was a significantly ( $p = 0.04$ ) higher proportion (71.2%) of subjects with CDR  $\leq 1$  receiving LTC services.

**Conclusion:** Although the receiving rate of LTC services was high in the DICC, there were differences in the type of LTC service subjects receiving according to the severity of dementia. Regardless of the dementia type, subjects with CDR  $\leq 1$  tend to receive more LTC services.

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## 1. Introduction

Dementia is a neurological disease affecting memory, other cognitive domains, and behavior that interferes with a person's ability to maintain their activities and instrumental activities of daily living (ADL and IADL).<sup>1</sup> According to the "World Alzheimer Report 2018," published by the Alzheimer Disease International, 50 million people in the world have dementia in 2017, and the number will rise to about 152 million people by 2050.<sup>2</sup>

The Taiwanese government launched the "10-year Long-Term Care Plan" (LTC 1.0) in 2007,<sup>3</sup> and LTC 2.0 was implemented since January 1, 2017.<sup>4</sup> LTC service refers to the service provided under the LTC plan, and one of the differences between LTC 2.0 and LTC 1.0 is that LTC 2.0 provides dementia care services to people with dementia aged more than 50 years. There are two goals of LTC 2.0. First, set up a dementia community service site (DCSS) by providing multiple support services for dementia people and their caregivers. Second, build a dementia-integrated care center (DICC), and it is a service platform providing case management for dementia people.<sup>5</sup>

Under the 10-year LTC Plan 2.0, 87 DICC and 434 DCSS were

established in 2019. Case management service and shared care platform are two important functions of DICC. The former accompanies dementia patients and their families to face different stages of illness, and provides different care service models. The latter includes the cultivation of dementia care personnel, the establishment of community-based dementia care, and raise public awareness of dementia. Although cholinesterase inhibitor and N-methyl-D-aspartate (NMDA) receptor antagonist could improve cognitive function in Alzheimer's disease (AD) patients,<sup>6</sup> there are no pharmacological treatments that can prevent or reverse the course of dementia so far. In addition, DICC assists in handling support groups and non-pharmacological treatment courses for family members of dementia, paying attention to the needs of caregivers and reducing their care burden, while improving the quality of care services for people with dementia. Non-pharmacological interventions (high-intensity functional exercise programs and occupational therapy) have been proven to improve daily functioning activities and reduce caregiver loads.<sup>7,8</sup>

Although periodic meetings in DICC would oversee and update service progress, data integration and experience sharing could benefit the whole project and complete the goals. The present study aimed to analyze the integrated data of dementia patients in DICC of a tertiary medical center in Northern Taiwan, to show the

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proportion of receiving different types of LTC services, and to compare the severity and types of dementia according to LTC services.

## 2. Material and methods

### 2.1. Study subjects

The analytical descriptive study was approved by the MacKay Memorial Hospital Institutional Review Board (20MMHIS014e) and conducted according to standards set by the World Medical Association's Declaration of Helsinki. A total of 635 were collected from the system of dementia case management of the Department of Health, New Taipei City Government, and they were diagnosed with having dementia by neurologists in Mackay Memorial Hospital between January 1, 2017, and November 30, 2019. Subjects with incomplete dementia survey (image and/or laboratory test) or Clinical Dementia Rating (CDR) of 0.5, and with only memory domain scored 0.5 were excluded. Data about the case source, residence place, education level, idiomatic language, marital status, and caregiver identity and information if they were receiving LTC services and their types, hiring a caregiver, having a disability certification (for financial subsidies to subjects in receiving LTC services), and type and severity of dementia were collected.

### 2.2. Classification of dementia

There are four types of dementia in our study. First, AD, which refers to probable AD that fulfilled the core clinical criteria proposed by the National Institute on Aging/Alzheimer's Association work group.<sup>9</sup> Second, vascular dementia, in which clinical and neuro-imaging criteria are proposed for establishing vascular etiology.<sup>10</sup> Third, Lewy body dementia (LBD), which refers to probable LBD that fulfilled the criteria of core clinical features and indicative or supportive biomarkers.<sup>11</sup> Fourth, others refer to mixed etiologies of dementia or other types of dementia not mentioned above. And vascular dementia, LBD, and others were classified as non-AD in our study.

### 2.3. Rating system of dementia

The severity of dementia was scored by CDR,<sup>12</sup> which is estimated based on the patient's and informant's interview and physician's clinical judgment. The score is calculated based on testing six cognitive and behavioral domains, including memory, orientation, judgment and problem solving, community affairs, home, and hobby performance, and personal care. The score ranged from zero to three as follows: no dementia (CDR = 0), very mild dementia (CDR = 0.5), mild dementia (CDR = 1), moderate dementia (CDR = 2), and severe dementia (CDR = 3). In the present study, we divided the study subjects of dementia into two groups: CDR  $\leq$  1 and CDR > 1.

### 2.4. Types of long-term care service

There were five types of LTC service subjects received in DICC: dementia care service, home care service, adult day care, respite care, and others. Dementia care service is provided by care managers to provide medical care, LTC resource referral and regular follow-up. Home care service is provided by trained care attendants to provide housework, daily life and physical care services. Adult day care provides disabled people who cannot receive care at home during the daytime to the institute to receive care services, and it includes rehabilitation, transportation and meal preparation service. Re-

spite care service provides alternative care services when the caregiver needs to temporarily leave home or rest. Others refer to receiving more than one of the following LTC services: home occupational therapy, comprehensive community care model, and other resource referrals.

### 2.5. Statistical analysis

Statistical analysis was performed through SPSS Statistics 18.0 (IBM Corp., New York, USA). Chi-square test was used to compare the differences in LTC services, dementia type and severity.  $p < 0.05$  was considered statistically significant for all statistical tests.

## 3. Results

Among 563 subjects included in the study, there were 527 subjects (93.6%) aged 65 and above. Men accounted for 39.4% and women 60.6%. With regard to the type of dementia, AD (60.9%) was the most common type of dementia the subjects suffered, followed by vascular dementia (15.8%) and LBD (8.2%). With regard to the severity of dementia, the CDR  $\leq$  1 group composed of 72.1% of subjects. Comparison between younger (< 65 years old) and older subjects were demonstrated in Table 1, and there was only a significant difference ( $p = 0.0055$ ) observed in type of dementia between two groups, of which older group with less proportion of vascular dementia than younger group. The source of the subject was mainly from DICC, accounting for 87.4% of all cases. Those were the people who visited neurology clinic by themselves. Subjects referred from public health centers or other specialists are composed of 12.4% of all cases. Only two cases (0.2%) were referred from the primary clinic.

Men were significantly ( $p = 0.0067$ ) more likely (47.7%) to suffer from non-AD than women (33.4%). Subjects with CDR > 1 had a significantly ( $p = 0.000048$ ) higher proportion of employed caregivers (29.2%) than those with CDR  $\leq$  1 (13.9%). The proportion of people with CDR > 1 who have a disability certificate was significantly ( $p < 0.00001$ ) higher (34.4%) than that of those with CDR  $\leq$  1 (16.7%). Although there was no significant difference in the severity of dementia between subjects with AD and non-AD ( $p = 0.2$ ), the proportion of AD patients with a disability certificate was significantly ( $p = 0.0027$ ) less (17.5%) than that of non-AD patients (28.2%). Nearly 90% of subjects received LTC services, and 33.7% received dementia care services, followed by home care services (24.5%) and adult day care (22.6%).

Comparisons between subjects with CDR  $\leq$  1 and CDR > 1 were made according to LTC services (Table 2). There was a significant difference ( $p = 0.032$ ) between the two groups, and the difference was mainly contributed by home care services. In other words, the CDR > 1 group had a significantly higher proportion (32.6%) in receiving home care services than the CDR  $\leq$  1 group (21.4%; Table 2).

In subjects with AD, there was no significant difference between receiving LTC services and dementia severity. In subjects with non-AD, however, there was a significantly ( $p = 0.041$ ) higher proportion (71.2%) of subjects with CDR  $\leq$  1 receiving LTC services (Table 3). Regardless of the dementia type, subjects with less severe dementia tend to receive more LTC services (62.8% in CDR  $\leq$  1 group versus 27.2% in CDR > 1 group).

## 4. Discussion

As one of the DICC in Taiwan, we analyzed 563 subjects and showed that nearly 90% of subjects received LTC services under our

**Table 1**  
Comparison between younger (< 65 years old) and older subjects.

	Older subjects (n = 527)	Younger subjects (n = 36)	p
Age (mean [standard deviation]; range)	78 [8.7]; 65–101	60 [8.7]; 51–64	
Gender, n (%)			0.1800
Male	204 (38.7)	18 (50)	
Female	323 (61.3)	18 (50)	
Type of dementia, n (%)			0.0055
Alzheimer's disease	326 (61.9)	17 (47.2)	
Vascular dementia	76 (14.4)	13 (36.1)	
Lewy body dementia	45 (8.5)	1 (2.8)	
Others	80 (15.2)	5 (13.9)	
Severity of dementia, n (%)			0.2326
CDR = 0.5	186 (35.3)	11 (30.6)	
CDR = 1	191 (36.2)	18 (50)	
CDR = 2–3	150 (28.5)	7 (19.4)	
LTC services, n (%)			0.4662
Not receive	55 (10.4)	5 (13.9)	
Dementia care services	180 (34.2)	10 (27.8)	
Home care services	127 (24.1)	11 (30.5)	
Adult day care	121 (23.0)	6 (16.7)	
Respite care	20 (3.7)	3 (8.3)	
Others	24 (4.6)	1 (2.8)	

CDR, clinical dementia rating; LTC, long-term care.

**Table 2**  
Comparison of dementia severities according to long-term care services.

LTC services	CDR ≤ 1 (n = 406), n (%)	CDR > 1 (n = 157), n (%)	p
Not receive	40 (9.9)	20 (12.7)	0.032
Dementia care services	142 (35)	48 (30.6)	
Home care services	87 (21.4)	51 (32.6)	
Adult day care	96 (23.6)	31 (19.7)	
Respite care	20 (4.9)	3 (1.9)	
Others	21 (5.2)	4 (2.5)	

CDR, clinical dementia rating; LTC, long-term care.

DICC follow-up. Compared with the report done by the Ministry of Health and Welfare in Taiwan 9 years ago,<sup>13</sup> there were only 45.1% of people with dementia using LTC services. However, only 8% of patients with dementia received LTC services in the study done via a questionnaire at the outpatient dementia department in Southern Taiwan in 2017.<sup>14</sup> Although the difference in the utilization of LTC services between our study and the study done in Southern Taiwan could be caused by different study methods, it also reflected that DICC could increase the accessibility of LTC services. Moreover, most of the dementia cases were from DICC in our study, and the proportion of other sources was low. In the future, DICC should strengthen integrated care advocacy, increase the primary medical institution referral, and provide more convenient care resources.

Healthcare resource use increased with increasing AD severity in a large multi-national, cross-sectional study.<sup>15</sup> However, in the case of no difference in the severity of the AD and non-AD groups, the proportion of patients with a disability certificate in the AD group was significantly lower than the non-AD group in our study. It could be caused by the following possible situations. First, patients or their families are not familiar with a disability certificate, with which it can provide social welfare and resources. Second, physicians do not proactively inform the patients of the eligibility to apply for the disability certificate. To ease the financial and care burden, our DICC should help eligible AD patients and their caregivers improve the quality of life, provide dementia care services, and obtain a disability certificate. In addition, there was a trend that the proportion of patients receiving LTC services in the CDR > 1 group was lower

**Table 3**  
Comparison of dementia severities and receiving long-term care services among subjects with non-Alzheimer's disease dementia.

Dementia severities	Receive LTC services (n = 198), n (%)	Not receive LTC services (n = 22), n (%)	p
CDR ≤ 1	141 (71.2)	11 (50)	0.041
CDR > 1	57 (28.8)	11 (50)	

CDR, clinical dementia rating; LTC, long-term care.

than the CDR ≤ 1 group in our study. Dementia patients with CDR > 1 usually need round-the-clock care, and it is common to hire a caregiver or live in an institution. This may result in lower demand for LTC services.

This is the first study to discuss the preliminary achievements of DICC in Taiwan. The study has several limitations. First, there should be other reasons for whether the subjects accept LTC services, such as an economic condition or care burden. The utilization of LTC services in dementia is not a single factor. Therefore, data of care burden and behavioral and psychological symptoms of dementia should be collected. Second, the data were collected from a single DICC, so it only reflected LTC services implemented in some districts of Taipei and New Taipei City in Taiwan under LTC Plan 2.0. Third, this is a cross-sectional study, and it could not determine and assess the effectiveness under the service of DICC. Longitudinal and cohort methods are necessary to be conducted, and there were plenty of methods to evaluate sufficient care and effective intervention outcomes conducted before.<sup>16,17</sup> Moreover, selecting appropriate indicators or models to reflect the quality of LTC and adjust programs of LTC service is crucial to personalized LTC for dementia patients.

In conclusion, although the receiving rate of LTC services was high in the DICC, there were differences in the type of LTC service subjects receiving according to the severity of dementia. Regardless of the dementia type, subjects with CDR ≤ 1 tend to receive more LTC services.

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### Potential financial and non-financial conflicts of interest

None.

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