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ORIGINAL ARTICLE

The Influence of Living Environment on Independence Level of Special Nursing Home Residents

Yukie ENOMOTO [1)] Megumi KODAIRA [2)]

1) Kyorin University Department of Physical Therapy School of Health Sciences, Japan
2) International University of Health and Welfare Graduate School, Japan

ABSTRACT

In this study, we examined the changes in independence levels of old residents after the shift living environment from conventional care and shared rooms toward unit care and private rooms. The study involved 38 (male: 7; female: 31; mean age: 86.2) residents of a special nursing home, which was changed from a conventional to unit-type facility as a shift toward unit care. Their care levels based on the Long-term Care Insurance System were 4 or higher in 70% of all cases. Their levels of ADL independence were measured using the FIM before (pre-) and after (post-shift period) the shift, and the following mean scores were obtained from each FIM sub-scale during the pre- and post-shift periods: <bladder management>: 2.47 and 2.32; <transfers - toilet>: 3.16 and 2.81; and <memory>: 3.3 and 3.05, respectively, revealing a significant decrease in the independence level after the shift. This indicates the necessity of providing care for individuals using such facilities, particularly elderly residents, in consideration of their adaptability to environmental changes and those in care service systems.

＜Key-words＞
activities of daily living, special nursing home, living environments, unit care, functional independence measure

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y-enomoto@ks.kyorin-u.ac.jp (Yukie ENOMOTO; Japan)

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Asian Journal of Human Services, VOL.12 30-45

I. Introduction

Special nursing homes are facilities for the elderly with difficulty in receiving nursing care in their homes despite their need for assistance at all times due to marked mental and/or physical impairment (Annual Health, Labour and Welfare Report, 2007). Such facilities provide: bathing, eating, and toileting (care workers and nurses); rehabilitation counseling (occupational/physical therapists and care managers); cleaning and laundry (care workers); and shopping, recreation, and other services to support residents' daily lives. They mainly consist of: resident rooms, equipment to be shared, such as bathrooms and toilets, and dining/living rooms as common living spaces. Based on the resident room design and care service system, special nursing homes are classified into 2 types of facility: conventional: each resident room comprises multiple beds, and the living unit ('unit') is not set at 10 persons; and unit-type: a private room is allocated to each resident, and a common living space is created based on the unit, adopting the unit care system. These facilities had aimed to help residents lead their daily lives with a sense of security by monitoring and caring for them in accordance with their levels of need. However, the Ministry of Health, Labour, and Welfare noted the following points in its report in 2004: the fact that the conventional care service system had forced care-dependent elderly individuals to lead a group life in conventional facilities, in order to provide care needed for them; marked differences between such a living environment (covering group care, shared rooms, and large dining rooms) and residents' previous lives, and the inappropriateness of the former to support the elderly's independence; and an increasing demand for care, attaching importance to individual residents' personalities and life rhythms (individualized care) (Ministry of Health, Labour and Welfare, 2004). Oomori observed that conventional facilities are generally based on a hospital model, which is characterized by resident rooms with 4 to 8 beds consecutively distributed alongside or middle corridors, and it is inappropriate to use the flow process focusing on work efficiency even in settings for support, mainly care (Omori W et al, 2002). Similarly, Ogasawara proposed reviewing methods to provide care, including ensuring privacy and appropriate living conditions, in special nursing homes as a living environment (Ogasawara, 1999).

In 2001, the Ministry of Health, Labour, and Welfare presented a new type of special nursing home, in which all rooms are private based on the unit care system (unit-type facilities) to provide care while attaching importance to residents' dignity (Ministry of Health, Labour and Welfare, 2001). These facilities aim to enable residents to continue their 'normal home lives' in accordance with their life rhythms by maintaining privacy and creating living environments with a home atmosphere (Muraoka, Kitajima & Honna, 2003; Akagi, 2009). It has been reported that the provision of care while respecting individuals' own paces and intentions led to changes in care workers' attitudes, such as refusing to provide care less frequently (Yokojima, 2004). In addition to this, Toyama

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Asian Journal of Human Services, VOL.12 30-45

noted the following changes related to a shift toward private rooms and unit care: the lengths of residents' stays in their rooms and common living spaces decreased and increased, respectively, consequently promoting their activities out of bed and communication among them; their frequencies of eating in bed and the dining room decreased and increased, respectively, consequently enhancing their dietary intakes; and the numbers of portable toilets distributed and shared toilets used decreased and increased, respectively (Toyama, 2002).

Sanmiya explained that the majority of conventional facilities were founded after the establishment of the Ten-Year Strategy to Promote Health Care and Welfare for the Aged (Gold Plan), and, therefore, they are still too new to be rebuilt, indicating the necessity of improving facility environments to adopt the unit care system as a challenge (Sanmiya & Kataoka, 2004). In line with this, living environments for facility users have been considered in terms of privacy, and one of these measures is a shift of resident rooms from conventional shared to private rooms, supported by subsidies allocated by administrative bodies. Under these circumstances, the number of special nursing homes adopting the unit care system is increasing (Kishida & Ono, 2009). In a survey conducted by the Ministry of Health, Labour, and Welfare in FY 2015, unit care was being provided in 35.9% of all special nursing homes, 34.9 and 1.0% of which were unit- and partially unit-type facilities, respectively. It was also shown that 34.2 and 33% of all residents of special nursing homes were classified into care levels 4 and 5, respectively, based on the Long-term Care Insurance System (Ministry of Health, Labour and Welfare, 2015).

A large number of previous studies on the adoption of the unit care system involved facility care workers. They revealed various problems related to organizational operations, which occur after a complete shift toward private rooms and unit care, including: difficulty in allocating sufficient personnel, resulting in fragmented work shifts; a reduced quality of care for facility users due to an increased psychological burden loaded on care workers; and the necessity of reviewing work procedures (Suzuki, 2005). Jang reported that workers tended to show signs of cumulative fatigue more frequently in facilities providing care for small groups, compared with conventional facilities (Jang & Kuroda, 2008). The adoption of the unit care system has also been reported to promote negative attitudes toward care (burnout) among care workers (Tanabe, Adachi & Ohgubo, 2005; Chozo & Kuroda, 2007), highlighting the importance of appropriate education for them, particularly unexperienced workers who are vulnerable to burnout (Sanmiya & Kataoka, 2004; Suzuki, 2007).

The complete shift toward private rooms and unit care should aim to not only benefit facility staff, but also protect residents' privacy, and provide appropriate, individualized care. However, its influences on residents have rarely been examined, except for a limited number of studies on awareness of life (Mibu, 2010, 2011)

By providing such care, it may be possible to maintain or improve residents' activities of daily living (ADL).

DOI: http://dx.doi.org/10.14391/ajhs.12.30
Asian Journal of Human Services, VOL.12 30-45

In this study, we examined the changes in independence levels of old residents after the shift living environment from conventional care and shared rooms toward unit care and private rooms.

II. Subjects and Methods

Residents of a special nursing home, in which buildings were newly organized, and conventional shared resident rooms were changed to unit-type private rooms to adopt the unit care system, were studied to compare their levels of ADL independence before and after such a shift toward unit care ('shift').

1. Facilities

In the study facility, the quota was set at 50 before and 90 after the shift. The number of care workers was also increased with this. Table 1 shows the characteristics of the facility before and after the shift, covering the quota (number of beds), number of staff members, and their qualifications. Concerning facility environments, the facility had previously comprised 17 rooms with 2-4 beds, in addition to dining rooms and bathrooms on each floor. After the shift, it consisted of 70 private rooms, 15 two-bed rooms, and dining rooms and common spaces distributed for every 10 residents as 1 unit. Figures 1 and 2 outline facility environments before and after the shift.

<Table1 > Facilities

		before	after
		Conventional Facility	Unit-type Facility
Capacity (n)		50	90
Facilities form		60 rooms with multiple beds	40 rooms with multiple beds
			60 private rooms
		(10 beds for short stay included)	(10 beds for short stay included)
The number of staff (full-time)	Care workers	36.69	54.86
	Nurses	4	5
	PT/OT[1)]	1	1
	Consultants	1	2
	Care managers	1	1
	Registered dieticians	1	1
	Others	5.64	4.52
Staff's qualifications	Care workers	13	19
		(4 Graduated from the Training Institutions)	(8 Graduated from the Training Institutions)
	Helpers	24	37
	Social workers	1	1
	Nurses	4	5
	PT/OT[1)]	1	1
	Care managers	4	5
	Registered dieticians	1	1
	[1)]PT: physical therapists OT:occupational therapists		

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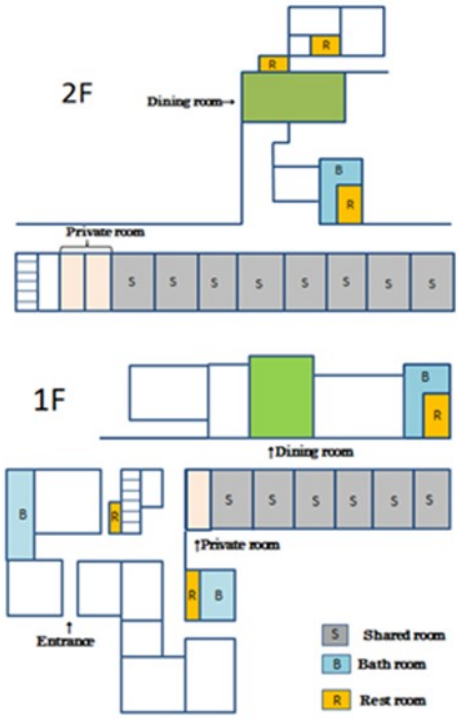
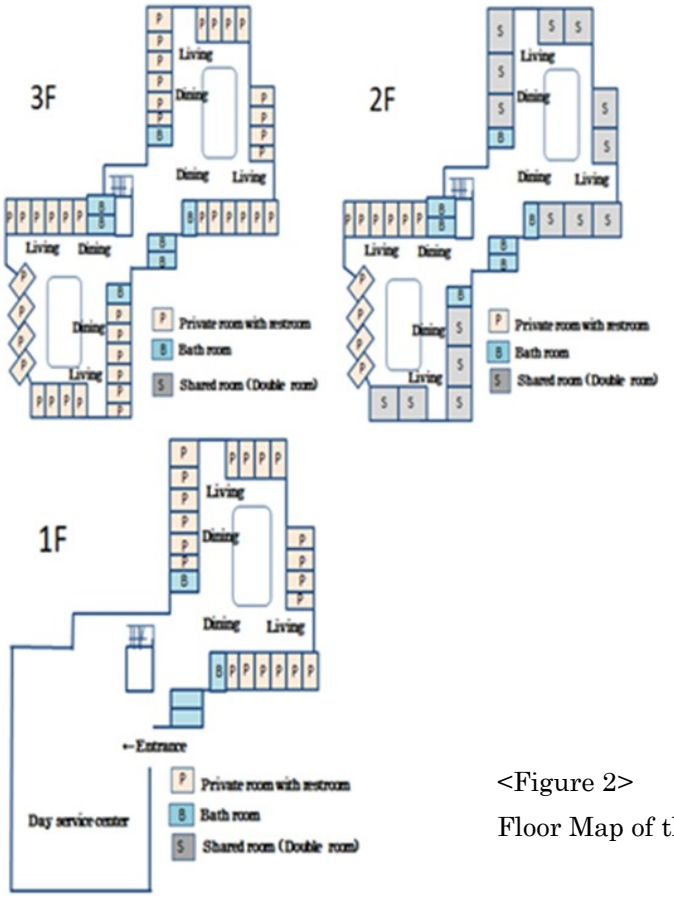
Asian Journal of Human Services, VOL.12 30-45



<Figure 1>
Floor Map of the Conventional Facility



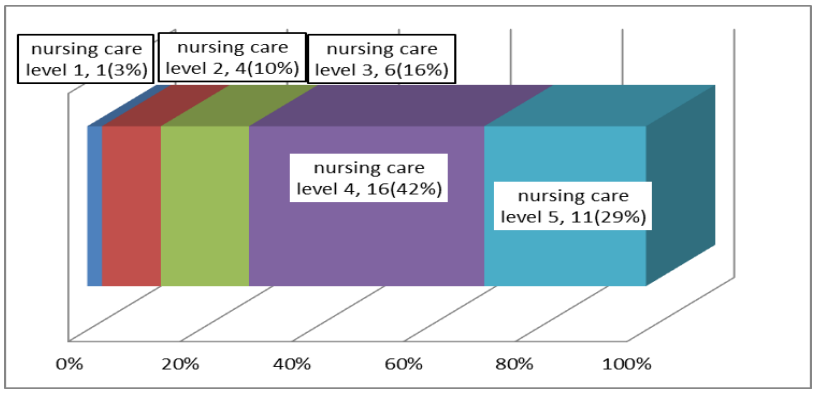
<Figure 2>
Floor Map of the Unit-type Facility.

DOI: http://dx.doi.org/10.14391/ajhs.12.30
Asian Journal of Human Services, VOL.12 30-45

2. Subjects

Among the 50 residents, who had previously lived in conventional shared rooms, 38 (7 males and 31 females) aged 86.2±10.6 (range: 49-104), who began to live in private rooms and receive unit care after the shift, were studied. Their care levels were as follows: 1: 1; 2: 4; 3: 6; 4: 16; and 5: 11, revealing that 70% of these residents were classified into care level 4 or higher (Figure 3). Residents whose physical conditions worsened due to recurrence or other causes and those admitted to hospitals during the study period were excluded.

As ethical considerations, the residents were previously provided with explanations of personal information use, and such information was strictly managed. Furthermore, data analysis was performed after adopting measures to prevent the identification of facilities and individuals.



<Figure 3> Nursing care levels (based on assessment of care requirements) (%)

*The Long-term Care Insurance System, a societal system of mutual assistance for elderly care, was founded in Japan in 2000. In this system, based on the decision by the Long-term Care Approval Board, the applicant will be judged either unqualified (self-reliant), or either Support Required (1 and 2) or Long-term Care Required (nursing care levels 1-5). With need of nursing care level 1, assistance shows a necessary state for a walk or bathing. Need of nursing care level 5 shows the state that it is the severest, and assistance is necessary for overall everyday lives.

3. Outcome measures

To compare the residents' levels of ADL independence, assessment was conducted twice: 1-4 months before ('pre-shift period') and 1-4 months after the shift, by 1 physical therapist working in the study facility, using the Functional Independence Measure (FIM). *FIM is an ADL assessment scale with sufficient reliability and validity. It measures the ability to actually perform each activity. The level of independence in performing each activity is scored on a 7-point basis from 1 to 7, based on the total score and those from the 18 subscales listed below: 1: the patient expends less than 25% of the effort; 2: the patient expends between 25 and 49% of the effort; 3: the patient expends between 50 and 74% of the effort; 4: the patient expends 75% or more of the effort; 5: the patient requires setup, verbal instructions, or supervision; 6: the patient needs considerable time or assistive devices to perform the activity; and 7: the patient performs the activity independently. The full score is 126.

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Asian Journal of Human Services, VOL.12 30-45

4. Analysis

The total FIM and sub-scale scores during the pre- and post-shift periods were compared (Wilcoxon signed rank test). For analysis, the statistical software SPSS 18 (IBM) was used, with the significance level set at <5%.

III. Results

The total FIM and sub-scale scores during the pre- and post-shift periods were as follows:

1. Scores from each FIM sub-scale during the pre- (conventional) and post-(unit-type) shift periods.

The care level was 4 or higher in 70% of all cases, indicating that a large number of the residents required high-level assistance with movements for ADL, excluding eating and grooming. Table 2 shows their scores from each FIM sub-scale during the pre- and post-shift periods.

Eating

During the pre- and post-shift periods, 16 (42.1%) showed a score of 5, indicating that a large number of the residents required setup, verbal instructions, or supervision for eating during both periods.

Grooming

During the pre- and post-shift periods, 15 (39.5%) and 11 (28.9%), respectively, showed a score of 5, indicating that a large number of the residents required setup, verbal instructions, or supervision for grooming during both periods.

Bathing

During the pre- and post-shift periods, 14 (36.8%) and 16 (42.1%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Dressing - upper body

During the pre-shift period, 11 (28.9%) and 10 (26.3%) showed scores of 1 and 2, respectively. These numbers were 11 (28.9%) and 14 (36.8%), respectively, during the post-shift period, indicating that a large number of the residents expended less than 50% of their efforts during both periods.

Dressing - lower body

During the pre- and post-shift periods, 21 (55.3%) and 23 (60.5%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

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Asian Journal of Human Services, VOL.12 30-45

Toileting

During the pre- and post-shift periods, 17 (44.7%) and 19 (50%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Bladder management

During the pre- and post-shift periods, 15 (39.5%) and 17 (44.7%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Bowel management

During the pre- and post-shift periods, 16 (42.1%) and 18 (47.4%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Transfers - bed/chair

During the pre- and post-shift periods, 8 (21.1%) and 10 (26.3%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Transfers - toilet

During the pre- and post-shift periods, 12 (31.6%) and 17 (44.7%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Transfers - tub/shower

During the pre- and post-shift periods, 17 (44.7%) and 18 (47.4%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Locomotion - walk

During the pre- and post-shift periods, 29 (76.3%) and 26 (68.4%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

Locomotion - wheelchair

During the pre- and post-shift periods, 13 (34.2%) and 15 (39.5%), respectively, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods. The numbers of non-wheelchair users were 9 and 8, respectively.

Locomotion - stairs

During the pre- and post-shift periods, all residents, excluding 1 whose score was 2, showed a score of 1, indicating that a large number of the residents expended less than 25% of their efforts during both periods.

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Asian Journal of Human Services, VOL.12 30-45

Communication - comprehension

During the pre- and post-shift periods, 14 (36.8%) and 13 (34.2%), respectively, showed a score of 4, indicating that a large number of the residents expended 75% or more of their efforts during both periods.

Communication - expression

During the pre-shift period, 10 (26.3%) and 11 (28.9%) showed scores of 3 and 4, respectively. These numbers were 13 (34.2%) and 8 (21.1%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 50% of their effort during both periods.

Social cognition - social interactions

During the pre-shift period, 8 (21.1%) and 9 (23.7%) showed scores of 3 and 4, respectively. These numbers were 10 (26.3%) and 10 (26.3%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 50% of their effort during both periods.

Social cognition - problem-solving

During the pre-shift period, 14 (36.8%) and 13 (34.2%) showed scores of 2 and 3, respectively. These numbers were 15 (39.5%) and 12 (31.6%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 25% of their effort during both periods.

Social cognition - memory

During the pre-shift period, 11 (28.9%) and 11 (28.9%) showed scores of 2 and 3, respectively. These numbers were 14 (36.8%) and 8 (21.1%), respectively, during the post-shift period, indicating that a large number of the residents expended more than 25% of their effort during both periods.

2. Comparison of scores from each FIM sub-scale during the pre- (conventional) and post- (unit-type) shift periods

Table 3 compares the total FIM and sub-scale scores during the pre- and post-shift periods. During both periods, <stairs>, <walk>, and <dressing - lower body>-related scores were low, indicating low independence levels. The mean total FIM scores were 52.57 and 51.16, respectively; the value was higher in the former, but the difference was non-significant. Those from the other sub-scales were as follows: <bladder management>: 2.47 and 2.32; <transfers - toilet>: 3.16 and 2.81; and <memory>: 3.3 and 3.05, respectively, revealing a marked decrease during the post-shift period. There were no significant differences between the periods in the score related to: <eating>, <grooming>, <bathing>, <dressing - upper body>, <dressing - lower body>, <toileting>, <bowel management>, <transfers - bed/chair>, <transfers - tub/shower>, <walk>, <wheelchair>, <stairs>, <comprehension>, <expression>, <social interactions>, or <problem-solving> (Wilcoxon signed rank test, $p<0.05$).

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Asian Journal of Human Services, VOL.12 30-45

<Table 2> Results: Functional Independence Measure

The motor subscale includes:		FIM1	FIM2	FIM3	FIM4	FIM5	FIM6	FIM7	total
Eating	before (n)	5	1	2	2	16	11	1	38
	(%)	13.2	2.6	5.3	5.3	42.1	28.9	2.6	100.0
	after (n)	6	1	1	4	16	7	3	38
	(%)	15.8	2.6	2.6	10.5	42.1	18.4	7.9	100
Grooming	before (n)	5	7	3	15	5	3	0	38
	(%)	13.2	18.4	7.9	39.5	13.2	7.9	0	100.0
	after (n)	7	5	7	11	4	4	0	38
	(%)	18.4	13.2	18.4	28.9	10.5	10.5	0	100.0
Bathing	before (n)	14	12	5	7	0	0	0	38
	(%)	36.8	31.6	13.2	18.4	0	0	0	100.0
	after (n)	16	10	6	6	0	0	0	38
	(%)	42.1	26.3	15.8	15.8	0	0	0	100.0
Dressing, upper body	before (n)	11	10	4	7	5	1	0	38
	(%)	28.9	26.3	10.5	18.4	13.2	2.6	0	100.0
	after (n)	11	14	2	5	5	1	0	38
	(%)	28.9	36.8	5.3	13.2	13.2	2.6	0	100.0
Dressing, lower body	before (n)	21	8	3	2	3	1	0	38
	(%)	55.3	21.1	7.9	5.3	7.9	2.6	0	100.0
	after (n)	23	6	2	3	3	1	0	38
	(%)	60.5	15.8	5.3	7.9	7.9	2.6	0	100.0
Toileting	before (n)	17	10	2	2	3	4	0	38
	(%)	44.7	26.3	5.3	5.3	7.9	10.5	0	100.0
	after (n)	19	9	1	3	3	3	0	38
	(%)	50.0	23.7	2.6	7.9	7.9	7.9	0	100.0
Bladder management	before (n)	15	9	5	3	3	2	1	38
	(%)	39.5	23.7	13.2	7.9	7.9	5.3	2.6	100.0
	after (n)	17	9	4	3	2	2	1	38
	(%)	44.7	23.7	10.5	7.9	5.3	5.3	2.6	100.0
Bowel management	before (n)	16	6	6	10	0	0	0	38
	(%)	42.1	15.8	15.8	26.3	.0	0	0	100.0
	after (n)	18	6	7	5	2	0	0	38
	(%)	47.4	15.8	18.4	13.2	5.3	0	0	100.0
Transfers	before (n)	8	7	5	5	5	7	0	37
bed/chair/wheelchair	(%)	21.1	18.4	13.2	13.2	13.2	18.4	0	97.4
	after (n)	10	7	7	5	4	5	0	38
	(%)	26.3	18.4	18.4	13.2	10.5	13.2	0	100.0
Transfers	before (n)	12	3	6	6	3	7	0	37
toilet	(%)	31.6	7.9	15.8	15.8	7.9	18.4	0	97.4
	after (n)	17	1	7	3	5	5	0	38
	(%)	44.7	2.6	18.4	7.9	13.2	13.2	0	100.0

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Asian Journal of Human Services, VOL.12 30-45

The cognition subscale includes:		FIM1	FIM2	FIM3	FIM4	FIM5	FIM6	FIM7	total
Transfers	before (n)	17	9	4	3	4	0	0	37
bath/shower	(%)	44.7	23.7	10.5	7.9	10.5	0	0	97.4
	after (n)	18	9	5	2	4	0	0	38
	(%)	47.4	23.7	13.2	5.3	10.5	0	0	100.0
Walk	before (n)	29	2	0	1	2	3	0	37
	(%)	76.3	5.3	.0	2.6	5.3	7.9	0	97.4
	after (n)	26	3	1	5	0	3	0	38
	(%)	68.4	7.9	2.6	13.2	.0	7.9	0	100.0
Wheelchair	before (n)	2	7	13	2	3	6	5	38
	(%)	5.3	18.4	34.2	5.3	7.9	15.8	13.2	100.0
	after (n)	1	7	15	5	0	4	6	38
	(%)	2.6	18.4	39.5	13.2	.0	10.5	15.8	100.0
Stairs	before (n)	36	1	0	0	0	0	0	37
	(%)	94.7	2.6	0	0	0	0	0	97.4
	after (n)	37	1	0	0	0	0	0	38
	(%)	97.4	2.6	0	0	0	0	0	100.0
Comprehension	before (n)	1	7	8	14	2	2	3	37
	(%)	2.6	18.4	21.1	36.8	5.3	5.3	7.9	97.4
	after (n)	0	9	9	13	3	1	3	38
	(%)	0	23.7	23.7	34.2	7.9	2.6	7.9	100.0
Expression	before (n)	1	5	10	11	4	3	3	37
	(%)	2.6	13.2	26.3	28.9	10.5	7.9	7.9	97.4
	after (n)	0	7	13	8	4	3	3	38
	(%)	0	18.4	34.2	21.1	10.5	7.9	7.9	100.0
Social interaction	before (n)	2	6	8	9	7	4	1	37
	(%)	5.3	15.8	21.1	23.7	18.4	10.5	2.6	97.4
	after (n)	3	6	10	10	5	2	2	38
	(%)	7.9	15.8	26.3	26.3	13.2	5.3	5.3	100.0
Problem solving	before (n)	1	14	13	4	5	0	0	37
	(%)	2.6	36.8	34.2	10.5	13.2	0	0	97.4
	after (n)	2	15	12	3	6	0	0	38
	(%)	5.3	39.5	31.6	7.9	15.8	0	0	100.0
Memory	before (n)	3	11	11	4	3	2	3	37
	(%)	7.9	28.9	28.9	10.5	7.9	5.3	7.9	97.4
	after (n)	6	14	8	2	3	2	3	38
	(%)	15.8	36.8	21.1	5.3	7.9	5.3	7.9	100.0

Subsequently, the residents with significant decreases in their <bladder management>, <transfers - toilet>, and <memory>-related scores during the post-shift period were examined. The 5 residents with decreases in their <bladder management>-related scores were characterized by an older age, with a mean age of 94 (range: 85-100), and their mean score in this domain decreased from 3 (5-2) to 1.8 (3-1). Similarly, the mean age of the 5 residents, whose <transfers - toilet>-related scores decreased during the post-shift period, was 91 (83-100), and their mean score in this domain decreased from 22 (6-2) to 2.44 (5-1). The 8 residents with decreases in their <memory>-related scores were also older, with a mean age of 93 (85-104), and their mean score in this domain decreased from 3.25 (2-5) to 2 (1-3).

DOI: http://dx.doi.org/10.14391/ajhs.12.30
Asian Journal of Human Services, VOL.12 30-45

IV. Discussion

This study suggested that the independence levels of old residents decreased after changes in living environment. However, our study design cannot reveal whether residents' independence levels were influenced by the changes in care service systems and the style of rooms, or by the merely adaptation to living environment. Therefore, further research is needed to investigate the relation between independence levels of residents, care service systems and the style of rooms.

Unit care attaches importance to individual facility users' personalities and life rhythms to help them lead a daily life while establishing favorable relationships with others in a living environment similar to their homes. A complete shift toward private rooms and unit care makes the following approaches feasible: 1) creating more home-like living environments for elderly residents; 2) protecting their privacy and dignity by allocating a private room to each of them; and 3) providing individualized care, attaching importance to their dignity and personalities. At these points, the adoption of the unit care system has been promoted to increase residents' quality of life and levels of satisfaction, as well as to maintain and improve their levels of ADL independence.

In this study, significant decreases in residents' levels of independence in < bladder management >, <transfers - toilet>, and <memory>, representing ADL, were observed after such a shift. The subjects' care levels tended to be high, indicating low levels of independence, and facility staff's direct assistance was needed in most cases.

Unlike those in locomotion-related activities, such as <walk> and <stairs>, the residents' levels of independence in <bladder management> and <transfers - toilet> were also high during the pre-shift period. On the other hand, as excretion requires frequent daily care, the influence of changes in care environments and service systems on the level of independence in related activities, such as < bladder management > and <transfers - toilet>, may have been more marked. The adaptability of elderly facility users aged 75 or over to environmental changes is likely to be reduced, and their increased vulnerability to stress and damage may be an important risk factor (Sasaki, Hanyu & Nagashima, 2004; Tahara, Horiuchi & Yasuda, 2013).

As the present study also examined such users, with a mean age of 86, periods shorter than 4 months were regarded as insufficient to observe their adaptability to environmental changes and those in care service systems. Their scores related to <memory> confirmed their insufficient adaptation to new environments and changes in living conditions. In fact, the residents whose scores in this domain markedly decreased during the post-shift period were older, supporting the results of the above-mentioned studies.

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Asian Journal of Human Services, VOL.12 30-45

<Table 3> Results: Comparison of Functional Independence Measure

		Mean	N	SD	Z	Asymptotic significance levels (two-sided)
Eating	before	4.58	38	1.70	-1.41	.157
	after	4.47	38	1.81		
Grooming	before	3.45	38	1.48	-1.67	.096
	after	3.32	38	1.58		
Bathing	before	2.13	38	1.12	-1.00	.317
	after	2.05	38	1.11		
Dressing, upper body	before	2.68	38	1.53	-1.61	.107
	after	2.53	38	1.50		
Dressing, lower body	before	1.97	38	1.42	-.71	.480
	after	1.95	38	1.47		
Toileting	before	2.37	38	1.75	-.91	.361
	after	2.24	38	1.68		
Bladder management	before	2.47	38	1.70	-2.12	.034*
	after	2.32	38	1.68		
Bowel management	before	2.26	38	1.27	-1.51	.132
	after	2.13	38	1.30		
Transfers	before	3.35	37	1.84	-1.85	.064
bed/chair/wheelchair	after	3.03	37	1.77		
Transfers	before	3.16	37	1.91	-2.00	.046*
toilet	after	2.81	37	1.94		
Transfers	before	2.14	37	1.38	-.63	.527
bath/shower	after	2.08	37	1.36		
Walk	before	1.76	37	1.64	-.74	.458
	after	1.86	37	1.58		
Wheelchair	before	2.56	27	1.61	-.88	.380
	after	2.37	27	1.64		
Stairs	before	1.03	37	.16	.00	1.000
	after	1.03	37	.16		
Comprehension	before	3.73	37	1.48	-.26	.792
	after	3.70	37	1.41		
Expression	before	3.89	37	1.51	-1.00	.317
	after	3.81	37	1.51		
Social interaction	before	3.78	37	1.49	-1.13	.260
	after	3.65	37	1.48		
Problem solving	before	2.95	37	1.08	-.45	.655
	after	2.92	37	1.16		
Memory	before	3.30	37	1.68	-2.31	.021*
	after	3.05	37	1.78		
Total	before	52.57	37	19.24	-1.74	.083
	after	51.16	37	20.00		

In previous studies examining the influences of a shift toward private rooms and unit care on care workers, such a shift was shown to increase their psychological burden, resulting in a reduced quality of care for residents (Suzuki, 2005; Jang & Kuroda, 2008). In short, similar to the case of residents, care providers' adaptation to environmental

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Asian Journal of Human Services, VOL.12 30-45

changes and those in care service systems was also insufficient, and this may have influenced the status of excretion care, leading to a decrease in the residents' levels of independence in this activity that requires frequent daily care. The incidence of burnout among care workers increases immediately after a shift toward unit care, but it may decrease with time. In this respect, the promotion of stable and smooth operations within a short period has been reported to be effective for such workers to develop positive attitudes toward care and a sense of belonging, consequently improving the quality of care provided by them and resident-staff relationships (Jang & Kuroda, 2008; Yamaguchi, 2006). Longitudinal studies may be necessary to time-dependently examine residents' and facility staff's adaptability to environmental changes and those in care service systems, with a view to clarifying whether or not the influence of such changes on the former's excretion and memory is temporary.

V. Conclusion

In this study, we examined the changes in independence levels of old residents after the shift living environment from conventional care and shared rooms toward unit care and private rooms. On examining their FIM scores, representing their levels of ADL independence, decreases in <bladder management>, <transfers-toilet>, and <memory>-related scores were observed during the post-shift period, while there were no significant differences in the other domains. The decreased levels of independence in < bladder management >, <transfers - toilet>, and <memory> after the shift toward unit care may have reflected insufficient adaptation to changes in environments and care service systems, such as the distribution of toilets and toileting methods.

Longitudinal studies may be necessary to time-dependently examine residents' and facility staff's adaptability to environmental changes and those in care service systems, with a view to clarifying whether or not the influence of such changes on the former's excretion and memory is temporary.

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Asian Journal of Human Services, VOL.12 30-45

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Asian Journal of Human Services, VOL.12 30-45

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VOL.12 April 2017

CONTENTS

ORIGINAL ARTICLES

Associations among the Nutrional Status and Mental/Physical Functions of Care-dependent Individuals Living in Residential Homes for the Elderly

Yuko FUJIO, et al. 1

A Survey on International Nursing Education of National Universies in Japan

Akina ISHIBASHI, et al. 8

Academic Qualification and Job Market Placement: A Bangladesh Study

Rajib Ahmed FAISAL, 17

The Influence of Living Environment on Independence level of Special Nursing Home

Yukie ENOMOTO, et al. 30

Encouraging Exercise Participation amongst UK South Asians:
The Case of a Community Gym

Nigel KING, et al. 46

Promoting Wellbeing:
Amylase as an Indication of Changes in Stress level in People with Intellectual Disabilities

Nigel A. MARSHALL, et al. 60

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