

ORIGINAL ARTICLE

Factors Promoting Independent Excretion in Residents of Special Nursing Homes for the Elderly

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ABSTRACT

This study examined the relationships between the levels of independence in excretion and physical/cognitive functions in residents of special nursing homes for the elderly providing functional recovery care. On analyzing the data of 1,230 residents, offered by 17 special nursing homes for the elderly participating in a caregiving skill-building workshop, to clarify such relationships, significant differences were observed in most items related to excretory behavior, eating behavior, mobility, and cognitive functions. Among these factors, the food type showed a particularly strong correlation with the level of independence in excretion. The results suggest that independent excretion is achievable even in those requiring partial assistance for activities of daily living, and that sufficient regular food and energy intakes make discharge to home and the continuation of home life feasible.

< Key-words >

Independence of excretion, Functional Recovery Care,

Older people requiring care, special nursing homes for the elderly

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I. Introduction

Japan with people aged 65 or over numbering 35.89 million and accounting for 28.4% of the total population (aging rate)¹⁾, aging is progressing much more rapidly than in other advanced countries, and supporting older people to maintain their independence is an important challenge. The government is shifting the place of living for older people from facilities to homes, with the aim of establishing a community-based integrated care system that allows these people to continue to live in their communities. Accordingly, inpatient care is markedly changing, emphasizing the necessity of more intensive support to promote discharge directly to homes from healthcare institutions, but this has yet to be realized. As a barrier to discharging older people to home, a decline in activities of daily living (ADL) related to excretion, such as moving to/sitting on the toilet and putting on/taking off lower garments, after bed rest for the treatment of acute diseases has been reported²⁾.

With regard to independent excretion care in healthcare and welfare services, nurses experience dilemmas due to difficulty in achieving independent excretion only with initial care during the acute period after the determination of the shortening of hospital stays, and they note the necessity of continuously providing independent excretion care, including after transfer to other hospitals/facilities³⁾. In welfare, the frequency of creating care plans for older people requiring care to regain independent excretion is significantly higher in health service facilities for the elderly compared with homes and special nursing homes for the elderly⁴⁾. Specifically, in health service facilities for the elderly promoting discharge to home and/or supporting home life, independent excretion care is provided through interdisciplinary collaboration, making the most of each specialty. However, inter-institutional collaboration remains insufficient even in these facilities⁵⁾. In special nursing homes for the elderly providing similar facility services, residents' conditions are becoming severer year by year. In a survey involving these facilities, the free description "Residents' care grades are too high to achieve independent excretion" represented their situation, where they face difficulty in providing care for independent excretion⁴⁾. Compared with most other ADL, excretion may markedly affect one's dignity, and his/her desire to maintain the ability to excrete independently is particularly strong. Takeuchi noted: "Their dignity remains impaired if caring for them is changing their diapers. Caregiving is a theory"⁶⁾. Even when care dependency is marked, optimal measures for independent excretion should be continuously examined. Possibly to address such a situation, the government newly defined additional fees for excretion support to improve the excretory function of older people requiring care and living in long-term care insurance-covered facilities in 2018. With the implementation of this measure, support through interdisciplinary collaboration for facility residents with excretory disorders began to be evaluated. Improving the level of care dependency from "Using diapers" to "Not using diapers" is one of the requirements to calculate the new additional fees. Furthermore, with a revision of care costs in April of 2021, the scope of such fees is going

to further expand, suggesting that care for independent excretion will also be one of the important areas in future care services.

Under these circumstances, we focused on special nursing homes for the elderly, admitting older people requiring higher grades of care. In this study, involving special nursing homes for the elderly, providing functional recovery care for older people requiring care to improve or maintain their levels of independence, we examined the relationships between these residents' levels of independence in excretion and physical/cognitive functions as a basis for discussing care methods for older people requiring higher grades of care to regain independence in excretion. The special nursing homes for the elderly functional recovery care included were participants of a functional recovery care skill-building workshop, consisting of 6 training sessions a year. The workshop is part of the Evidence-based Care Lecture Program provided by a prefectural council of elderly welfare facilities for employees of special nursing homes for the elderly, admitting older people requiring higher grades of care, and providing functional recovery care daily such as nurses, care workers, rehabilitation specialists, dieticians, and care managers.

II. Definition of term

The operational definition of terms used in this study is as follows.

Independent excretion: The ability to excrete using general or portable toilets, not requiring diapers, pull-up pants and incontinence pads for fecal management, as defined in the workshop held by the prefectural council of elderly welfare facilities to improve caregiving skills, with the aim of promoting "diaper-free daily life".

Functional recovery care: A theory of care established and defined as "supporting individuals to achieve and improve/maintain their physical, mental, and social independence through care" by Takeuchi⁷⁾.

III. Subjects and Methods

1. Study design

A quantitative, descriptive study (retrospective study).

2. Study facilities

Seventeen special nursing homes for the elderly, participating in a caregiving skill-building workshop as part of the Evidence-based Care Lecture Program.

3. Subjects

A total of 1,230 older people requiring care and living in the study facilities.

4. Study period

From March 1 to 18, 2021.

5. Methods

1) Data collection

The data files regarding the subjects' mental and physical conditions, submitted by the study facilities during a training session in May 2019.

2) Study items

(1) Dependent variable

The subjects were divided into 2 groups based on their levels of independence in excretion: independent excretion: those using fabric underwear and defecating using general or portable toilets; and assisted excretion: those other than the former.

(2) Independent variables

Basic attributes: The age, sex, care grade, and scores from the Level of ADL Independence of the Elderly with Disabilities Scale (severity of bedridden condition) and Level of ADL Independence of the Elderly with Dementia Scale (severity of dementia).

Related factors: laxative use, the urge to defecate, defecation frequency (days between defecations), urination frequency (times), presence/absence of urinary incontinence, place of urination, type of device for urination, fluid intake (/day), time spent out of bed (/day), frequency of going out (/week), food type, food intake (/day), eating posture, level of independence in eating, presence/absence of aspiration, dental condition, oral care, dressing, bathing, face-washing, mobility and walking ability, type of device for transportation, distance walked (/day), and presence/absence of cognitive dysfunction.

6. Analysis

After simple tabulation for each item, univariate analysis was performed between the level of independence in excretion and each item. As for the relationships with quantitative variables, variables with lower and higher deviations from normal distributions were examined using the t-test and Mann-Whitney U-test, respectively. The relationships with qualitative and ordinal variables were analyzed using the chi-square test.

Subsequently, excretory behavior-related factors were examined by performing multiple logistic regression, with the level of independence in excretion as a dependent variable and the following items as independent variables: the fluid intake (mL/day), food type, food intake (kcal/day), and distance walked (m/day), which are regarded as common parameters in functional recovery care for older people; the dental condition⁸⁾ and presence/absence of cognitive dysfunction⁹⁾, which have been reported to promote the independence of older people requiring care in the literature; and the age and sex (as

adjustment factors). The significance of the relationships with independent and nominal variables was examined using the Wald chi-squared test and likelihood ratio test, respectively. All analyses were performed using the statistical analysis software SPSS Ver. 27, with the significance level set at 0.05.

7. Ethical considerations

We provided the chairman of the prefectural council of elderly welfare facilities, who held the training sessions, with explanation using a document, specifying the study objective, methods, ethical consideration, and contact address of the representative researcher, to obtain his consent. The study facilities and prefectural council of elderly welfare facilities made an agreement on the use of data for research purposes prior to the training sessions. Additionally, the study facilities and subjects made a contract to obtain the latter's consent to the sharing of information among services and its use for research purposes prior to admission. Therefore, we adopted the data of all of the 1,230 subjects, but asked each facility through the prefectural council of elderly welfare facilities to opt - out these data. Furthermore, to ensure opportunities for the subjects and their families to withdraw, we made information regarding the study viewable to them using notice boards within the study facilities and our website. We deleted the data of withdrawing residents or those whose families decided to withdraw, when the former lacked a sufficient decision-making ability. The study was approved by the Ethics Committee of the Faculty of Health Science and Nursing, Juntendo University, where the representative researcher belongs (approval number: 2-03).

IV. Results

Among the 1,230 older people requiring care and living in the 14 consenting special nursing homes for the elderly, 1,000 without missing data regarding the study items were included for analysis (valid response rate: 81.3%). Their basic attributes were as follows: There were 227 males (22.7%) and 773 females (77.3%). The mean age was 85.9±7.8. Overall, the most frequent care grade was <3> (350; 35%), the most frequent severity of bedridden condition was <Completely bedridden> (672; 67.2%), and the most frequent severity of dementia was <III> (514; 51.4%). There were 817 (81.7%) of the independent, and 183 (18.3%) of the assisted excretion group (Table 1).

<Table 1> Basic attributes

Item	Category	n	(%)
Sex	Male	227	(22.7)
	Female	773	(77.3)
Care grade	Applying	6	(0.6)
	Rank I	22	(2.2)
	Rank II	49	(4.9)
	Rank III	350	(35.0)
	Rank IV	335	(33.5)
	Rank V	238	(23.8)
Level of ADL Independence of the Elderly with Disabilities Scale	Independence	19	(1.9)
	Semi bedridden	309	(30.9)
	Completely bedridden	672	(67.2)
	Independence	14	(1.4)
Level of ADL Independence of the Elderly with Dementia Scale	Rank I	40	(4.0)
	Rank II	200	(20.0)
	Rank III	514	(51.4)
	Rank IV	179	(17.9)
	Rank M	53	(5.3)

1) Relationships between the level of independence in excretion and basic attributes (Table 1-1)

On examining the relationships between the level of independence in excretion and basic attributes, significant differences were observed in the care grade, severity of bedridden condition, and severity of dementia, but not in the age.

The most frequent care grade was 3 in the independent (318; 38.9%), and <5> in the assisted (78; 42.6%) excretion group. The most frequent severity of bedridden condition was <Completely bedridden> in both groups (independent: 513; 62.8%; and assisted: 159; 86.9%). The most frequent severity of dementia was <III> in both groups (430; 52.6% and 84; 45.9%, respectively). The mean ages were 85.8±7.7 and 85.7±8.5, respectively.

<Table 1-1> Relationships between the level of independence in excretion and basic attributes

Item	Category	Independence of excretion				p value
		independent		assisted		
		n	(%)	n	(%)	
Sex	Male	183	(22.4)	44	(24.0)	0.631 ^{a)}
	Female	634	(77.8)	139	(76.0)	
Care grade	Applying	4	(0.5)	2	(1.1)	<0.001 ^{**a)}
	Rank I	22	(2.7)	0	(0.0)	
	Rank II	46	(5.6)	3	(1.6)	
	Rank III	318	(38.9)	32	(17.5)	
	Rank IV	267	(32.7)	68	(37.2)	
	Rank V	160	(19.6)	78	(42.6)	
Level of ADL	Independence	19	(2.3)	0	(0.0)	<0.001 ^{**a)}
Independence of the Elderly with Disabilities Scale	Semi Completely bedridden	285	(34.9)	24	(13.1)	
	Completely bedridden	513	(62.8)	159	(86.9)	
Level of ADL	Independence	12	(1.5)	2	(1.1)	<0.001 ^{**a)}
Independence of the Elderly with Dementia Scale	Rank I	36	(4.4)	4	(2.2)	
	Rank II	182	(22.3)	18	(9.8)	
	Rank III	430	(52.6)	84	(45.9)	
	Rank IV	129	(15.8)	50	(27.3)	
	Rank M	28	(3.4)	25	(13.7)	
Age	(Means±SD)	85.8±7.7		85.7±8.5		0.881 ^{b)}

a) χ^2 test, b) t test

*: P<0.05, **: P<0.001, n : Excluding no answer

2) Relationships between the level of independence in excretion and excretory behavior (Table 2)

On examining the relationships between the level of independence in excretion and excretory behavior, significant differences were observed in all items, excluding urinary-incontinence-pad-use during the daytime, urinary-incontinence-pad-use during the night-time, and defecation frequency.

The most frequent answer for laxative-use was <Not using> in both groups (independent: 569; 69.6%; and assisted: 98; 53.6%). The most frequent answer for the urge to defecate was <Having> in the independent (538; 65.9%) and <Not having> in the assisted (134; 73.2%) excretion group. The most frequent answer for the presence/absence of urinary incontinence during the daytime was <Absent> in the independent (569; 70.4%) and <Present> in the assisted (105; 60.0%) excretion group. The most frequent answer for bladder control during the daytime was <Scheduling toilet visits> in both groups (388; 48.0% and 100; 55.9%, respectively). The most frequent answer for failures in bladder control during the daytime was <Never> in both groups (508; 62.9% and 77; 59.5%, respectively). The most frequent answer for the presence/absence of urinary incontinence when going out was <Absent> in both groups (619; 76.6% and 90; 51.4%, respectively). The most frequent answer for the place of urination during the daytime was <General or portable toilets> in the independent (718; 87.9%) and <On the bed/others> in the assisted (114; 62.3%)

excretion group. The most frequent answer for fabric-underwear-use during the daytime was <Using> in the independent (473; 57.9%) and <Not using> in the assisted (113; 61.7%) excretion group. The most frequent answer for rehabilitation-underwear-use during the daytime was <Not using> in both groups (532; 65.1% and 152; 83.1%, respectively). The most frequent answer for urinary-incontinence-pad-use during the daytime was <Using> in both groups (535; 65.5% and 120; 65.6%, respectively). The most frequent answer for diaper-use during the daytime was <Not using> in the independent (674; 82.5%) and <Using> in the assisted (107; 58.5%) excretion group. The most frequent answer for the use of other aids during the daytime was <Not using> in both groups (791; 96.8% and 163; 89.1%, respectively).

The most frequent answer for the presence/absence of urinary incontinence during the night-time was <Present> in both groups (369; 45.7% and 129; 73.7%, respectively). The most frequent answer for bladder control during the night-time was <Not performing> in both groups (383; 47.3% and 95; 53.4%, respectively). The most frequent answer for failures in bladder control during the night-time was <Never> in both groups (537; 66.5% and 86; 49.7%, respectively). The most frequent answer for fabric-underwear-use during the night-time was <Using> in both groups, but the use rate was higher in the independent excretion group (423; 51.8% and 65; 35.5%, respectively). The most frequent answer for rehabilitation-underwear-use during the night-time was <Using>, but the use rate was lower than 50% in both groups (204; 25.0% and 29; 15.9%, respectively). The most frequent answer for urinary-incontinence-pad-use during the night-time was <Using> in both groups (468; 57.3% and 108; 59.0%, respectively). The most frequent answer for diaper-use during the night-time was <Using> in both groups, but the use rate was higher in the assisted excretion group (370; 45.3% and 126; 68.9%, respectively). The most frequent answer for the use of other aids during the night-time was <Using> in both groups (27; 3.3% and 19; 10.4%, respectively). The urination frequency was higher in the independent excretion group during both the day- and night-time.

<Table 2> Relationships between the level of independence in excretion and excretory behavior

Item	Category	Independence of excretion		p value
		independent n (%)	assisted n (%)	
Laxative-use	Not using	569 (69.6)	98 (53.6)	<0.001**
	Using	248 (30.4)	85 (46.4)	
The urge to defecate	Not having	279 (34.1)	134 (73.2)	<0.001**
	Having	538 (65.9)	49 (26.8)	
Urinary incontinence during the daytime	Absent	569 (70.4)	70 (40.0)	<0.001**
	Presen	239 (29.6)	105 (60.0)	
Bladder control during the daytime	Do not	194 (24.0)	57 (31.8)	<0.001**
	Scheduling toilet visits	388 (48.0)	100 (55.9)	
	Appropriately	227 (28.1)	22 (12.3)	
Failures in bladder control during the daytime	Never	508 (62.9)	77 (59.5)	<0.001**
	Half	143 (17.7)	17 (16.3)	
	More than two-thirds	157 (19.4)	81 (24.2)	
Urinary incontinence when going out	Absent	619 (76.6)	90 (51.4)	<0.001**
	Sometimes	78 (9.7)	13 (7.4)	
	Presen	111 (13.7)	72 (41.2)	
The place of urination during the daytime	General or portable toilets	718 (87.9)	69 (37.7)	<0.001**
	On the bed/others	99 (12.1)	114 (62.3)	
Fabric-underwear-use during the daytime	Not using	344 (42.1)	113 (61.7)	<0.001**
	Using	473 (57.9)	70 (38.3)	
Rehabilitation-underwear-use during the daytime	Not using	532 (65.1)	152 (83.1)	<0.001**
	Using	285 (34.9)	31 (16.9)	
urinary-incontinence-pad-use during the daytime	Not using	282 (34.5)	63 (34.4)	0.981
	Using	535 (65.5)	120 (65.6)	
Diaper-use during the daytime	Not using	674 (82.5)	76 (41.5)	<0.001**
	Using	143 (17.5)	107 (58.5)	
Other use during the daytime	Not using	791 (96.8)	163 (89.1)	<0.001**
	Using	26 (3.2)	20 (10.9)	
Urinary incontinence during the night-time	Absent	233 (28.8)	24 (13.7)	<0.001**
	Sometimes	206 (25.5)	22 (12.6)	
	Presen	369 (45.7)	129 (73.7)	
Bladder control during the night-time	Do not	383 (47.3)	95 (53.4)	<0.001**
	Scheduling toilet visits	268 (33.1)	73 (41.0)	
	Appropriately	158 (19.6)	10 (5.6)	
Failures in bladder control during the night-time	Never	537 (66.5)	86 (49.7)	<0.001**
	Half	91 (11.3)	9 (5.2)	
	More than two-thirds	180 (22.3)	78 (45.1)	
Fabric-underwear-use during the night-time	Not using	394 (48.2)	118 (64.5)	<0.001**
	Using	423 (51.8)	65 (35.5)	
Rehabilitation-underwear-use during the night-time	Not using	613 (75.0)	154 (84.1)	0.009**
	Using	204 (25.0)	29 (15.9)	
urinary-incontinence-pad-use during the night-time	Not using	349 (42.7)	75 (41.0)	0.668
	Using	468 (57.3)	108 (59.0)	
Diaper-use during the night-time	Not using	447 (54.7)	57 (31.1)	<0.001**
	Using	370 (45.3)	126 (68.9)	
Other use during the night-time	Not using	790 (96.7)	164 (89.6)	<0.001**
	Using	27 (3.3)	19 (10.4)	
Defecation frequency /day	(Means ± SD)	3.4 ± 1.6	3.1 ± 1.5	0.0034 ^{b)}
Number of urination during the day	(Means ± SD)	4.9 ± 2.1	4.1 ± 1.7	<0.001* ^{a)} ^{b)}
Number of urination at night	(Means ± SD)	2.8 ± 1.4	2.4 ± 1.0	<0.001* ^{a)} ^{b)}

a) χ^2 test, b) t test

*: P<0.05, **: P<0.001, n : Excluding no answer

3) Relationships between the level of independence in excretion and eating behavior (Table 3)

On examining the relationships between independence in excretion and eating behavior, significant differences were observed in the food type, eating posture, level of independence in eating, dental condition, oral care, fluid intake (/day), and energy intake from food (/day).

The most frequent answer for the food type was <Regular foods> in the independent (616; 75.4%) and <Special foods> in the assisted (81; 44.3%) excretion group. The most frequent answer for the eating posture was <Sitting in a chair> in the independent (408; 49.9%) and <Sitting in a wheelchair> in the assisted (128; 69.9%) excretion group. The most frequent answer for the level of independence in eating was <Independent> in the independent (632; 77.4%) and <Requiring assistance> in the assisted (112; 61.2%) excretion group. The most frequent answer for the dental condition was <Favorable using dentures> in the independent (394; 48.2%) and <Natural teeth> in the assisted (73; 39.9%) excretion group. The most frequent answer for oral care was <Requiring assistance> in both groups (461; 56.6% and 149; 81.9%, respectively). Both the daily fluid and energy intakes were higher in the independent excretion group.

<Table 3> Relationships between the level of independence in excretion and eating behavior

Item	Category	Independence of excretion		p value
		independent n (%)	assisted n (%)	
Food type	Regular foods	616 (75.4)	78 (42.6)	<0.001**a)
	Special foods	181 (22.2)	81 (44.3)	
	Tube feeding	20 (2.4)	24 (13.1)	
Eating posture	Sitting in a chair	408 (49.9)	21 (11.5)	<0.001**a)
	Sitting in a wheelchair	394 (48.2)	128 (69.9)	
	On the bed	15 (1.9)	34 (18.6)	
Level of independence in eating	Independent	632 (77.4)	71 (38.8)	<0.001**a)
	Assisted	185 (22.6)	112 (61.2)	
Dental condition	Natural teeth	274 (33.5)	73 (39.9)	<0.001**a)
	Favorable using dentures	394 (48.2)	59 (32.2)	
	Poor conformity	46 (5.6)	9 (4.9)	
	Needed but not used	103 (12.7)	42 (23.0)	
Oral care	Independent	354 (43.4)	33 (18.1)	<0.001**a)
	Assisted	461 (56.6)	149 (81.9)	
Fluid intake /day (ml)	(Means ± SD)	1432.4 ± 363.6	1215.9 ± 408.0	<0.001**b)
Food intake /day (Kcal)	(Means ± SD)	1391.8 ± 248.6	1227.1 ± 328.5	<0.001**b)

a) χ^2 test, b) t test

* : P<0.05, ** : P<0.001, n : Excluding no answer

4) Relationships between the level of independence in excretion and mobility (Table 4)

On examining the relationships between the level of independence in excretion and mobility, significant differences were observed in mobility inside the facility, wheelchair-use inside the facility, walker-use inside the facility, assistance for standing/walking inside the facility, wheelchair-use outside the facility, walker-use outside the facility, the time spent out of bed, distance walked inside the facility (/day), and distance walked (/day).

The most frequent answer for mobility inside the facility was <Requiring assistance> in both groups (independent: 472; 57.8%: and assisted: 157; 85.8%). The most frequent answer for wheelchair-use was <Using> in both groups (573; 70.1% and 171; 93.4%, respectively). The most frequent answer for walker-use inside the facility was <Not using> in both groups (645; 78.9% and 173; 94.5%, respectively). The most frequent answer for assistance for standing/walking inside the facility was <Not required> in both groups (562; 68.8% and 154; 84.2%, respectively). The most frequent answer for wheelchair-use outside the facility was <Using> in both groups (541; 66.2% and 157; 85.8%, respectively). The most frequent answer for walker-use outside the facility was <Not using> in both groups (787; 96.3% and 183; 100%, respectively). All of the time spent out of bed, distance walked inside the facility (/day), and distance walked (/day) were longer in the independent excretion group.

<Table 4> Relationships between the level of independence in excretion and mobility

Item	Category	Independence of excretion				p value
		independent		assisted		
		n	(%)	n	(%)	
Mobility inside the facility	Independent	345	(42.2)	26	(14.2)	<0.001***a)
	Assisted	472	(57.8)	157	(85.8)	
Wheelchair-use inside the facility	Not using	244	(29.9)	12	(6.6)	<0.001***a)
	Using	573	(70.1)	171	(93.4)	
Walker-use inside the facility	Not using	645	(78.9)	173	(94.5)	<0.001***a)
	Using	172	(21.1)	10	(5.5)	
4-point cane-use inside the facility	Not using	810	(99.1)	183	(100.0)	0.242 ^{a)}
	Using	7	(0.9)	0	(0.0)	
T-shaped cane-use inside the facility	Not using	791	(96.8)	180	(98.4)	0.261 ^{a)}
	Using	26	(3.2)	3	(1.6)	
Assistance for standing/walking inside the facility	Not required	562	(68.8)	154	(84.2)	<0.001***a)
	required	255	(31.2)	29	(15.8)	
Mobility outside the facility	Independent	96	(11.8)	12	(6.6)	0.041 ^{a)}
	Assisted	721	(88.2)	171	(93.4)	
Wheelchair-use outside the facility	Not using	276	(33.8)	26	(14.2)	<0.001***a)
	Using	541	(66.2)	157	(85.8)	
Walker-use outside the facility	Not using	787	(96.3)	183	(100.0)	0.008***a)
	Using	30	(3.7)	0	(0.0)	
4-point cane-use outside the facility	Not using	812	(99.4)	183	(100.0)	0.363 ^{a)}
	Using	5	(0.6)	0	(0.0)	
T-shaped cane-use outside the facility	Not using	800	(97.9)	180	(98.4)	0.487 ^{a)}
	Using	17	(2.1)	3	(1.6)	
Going out time (minutes)	(Means ± SD)	14.0 ± 53.0		10.3 ± 48.6		0.422 ^{b)}
Time spent out of bed (minutes)	(Means ± SD)	678.2 ± 196.5		416.8 ± 255.7		<0.001***b)
Distance walked inside the facility /day (m)	(Means ± SD)	139.0 ± 301.9		26.1 ± 118.6		<0.001***b)
Distance walked outside the facility /day (m)	(Means ± SD)	4.5 ± 57.6		0.9 ± 8.6		0.395 ^{b)}
Distance walked /day (m)	(Means ± SD)	143.5 ± 316.5		27.0 ± 121.4		<0.001***b)

a) χ^2 test, b) Mann-Whitney U-test
* : P<0.05, ** : P<0.001, n : Excluding no answer

5) Relationships between the level of independence in excretion and cognitive dysfunction (Table 5)

There were also significant differences on examining the relationships between the level of independence in excretion and presence/absence of cognitive dysfunction.

The most frequent answer for the presence/absence of cognitive dysfunction was <Present> in both groups (independent: 644; 78.8%; and assisted: 167; 91.3%).

<Table 5> Relationships between the level of independence in excretion and cognitive dysfunction

Item	Category	Independence of excretion		p value		
		independent	assisted			
Cognitive dysfunction	absence	173	(21.2)	16	(8.7)	<0.001 **
	present	644	(78.8)	167	(91.3)	

※ χ^2 test, *: P<0.05, **: P<0.001

6) Factors influencing the level of independence in excretion (Table 6)

The fluid intake (mL/day), food intake (kcal/day), and distance walked (m/day) were significantly correlated with the level of independence in excretion correlations, as the rate of independence was higher among older people requiring care with higher fluid and food intakes and longer distances walked. The rate of independence was also higher among older people requiring care without cognitive dysfunction compared to those with it. When focusing on the food type, the rate of independence was higher among those eating regular foods. There were no significant differences related to the dental condition. The odds ratio for independent excretion was 2.79 times higher when eating regular foods compared with other food types.

<Table 6> Factors influencing the level of independence in excretion

Independent variables	Category	n	(%)	Adjusted Odds ratio	95% Confidence interval		P value ^{※1}	P value ^{※2}
					upper limit	lower limit		
Age	Median (25%-75%)	50(81-91)		1.10	0.97	1.24	0.122	
Sex	Male	225	(22.6)	0.60	0.38	0.94	0.026	*
	Female	772	(77.4)	1				
Fluid intake /day (ml)	Median (25%-75%)	1481(1169-1600)		1.19	1.06	1.34	0.004	**
Food intake /day (kcal)	Median (25%-75%)	1415(1222-1555)		1.13	1.00	1.27	0.048	*
Distance walked /day (m)	Median (25%-75%)	2(2-135)		1.30	1.13	1.50	<0.001	**
Cognitive dysfunction	present	808	(81.0)	0.53	0.30	0.95	0.032	*
	absence	189	(19.0)	1				
Eating posture	Regular foods	694	(69.6)	2.79	1.32	5.92	0.007	**
	Special foods	260	(26.1)	1.41	0.69	2.90	0.347	
	Tube feeding	43	(4.3)	1				
Dental condition	Natural teeth	344	(34.5)	1.22	0.74	2.03	0.438	0.329
	Favorable using dentures	453	(45.4)	1.51	0.90	2.53	0.114	
	Poor conformity	55	(5.5)	1.83	0.76	4.36	0.175	
	Needed but not used	145	(14.5)	1				

Multiple logistic regression analysis

Dependent variable : Independence of excretion, n=81.7%

n=997, ※1 Wald χ^2 test, ※2 Likelihood ratio test

Convert from age to odds ratio of daily walking distance to interquartile range

V. Discussion

The addition of a care grade of 3 or higher to the requirements for admission to special nursing homes for the elderly in April of 2015 is resulting in marked care dependency among residents of these facilities. In a survey conducted in 2018, the most frequent care grade among residents of special nursing homes for the elderly was 4, at 36.8%, and then 5, at 32.6%¹⁰; thus, residents requiring advanced care, equivalent to care grades 4-5, accounted for nearly 70%. In the present study, the most frequent care grade was 3, at 35.0%, and then 4, at 33.5%, together accounting for nearly 60%, which is slightly lower than the national average. This may have been resulted from the inclusion of older people requiring care admitted to special nursing homes for the elderly providing functional recovery care. Based on the relationships between the level of independence in excretion and physical/cognitive functions clarified in the study involving these residents, appropriate support for older people requiring higher grades of care to regain independent excretion is discussed below.

On analyzing the above-mentioned relationships, significant differences were observed in most items related to excretory behavior, eating behavior, mobility, and cognitive dysfunction. In the independent- compared with assisted-excretion group, the rates of using general or portable toilets for urination during the daytime and eating regular foods were higher, the daily food and fluid intakes were higher, and the distance walked daily was significantly longer. The rate of those without cognitive dysfunction was also significantly higher in the independent excretion group. According to Takeuchi¹¹, “hydration”, “nutrition”, “exercise”, and “bowel movements” are the basic approaches commonly required in care for older people. The 4 approaches interact, and sufficient effects are achieved only when all of them are simultaneously provided. In a previous study, comprehensive care, combining hydration care, dietary care, excretion care, and exercise, was shown to improve older people’s ADL, promote their early discharge, and help them continue to live at home¹². The results of the present study support these findings by clarifying the influences of hydration, nutrition, and exercise on the level of independence in excretion.

Specifically, in factor analysis, the food type was strongly correlated with the level of independence in excretion. In a national survey conducted in 2015, involving residents of special nursing homes for the elderly, the most common food type was special foods, at 48.7%, and the rate of eating regular foods was limited to 42.4%. The most common range of daily food intake was 1,400 to 1,499 kcal, at 21.3%¹³. In the present study, the rate of eating regular foods was 75.4%, and the daily food intake was 1,391.8±248.6 kcal in the independent excretion group. Fujio et al.¹⁴ compared the nutritional conditions of older people requiring care and living in facilities/homes, and reported that the rate of eating regular foods and daily food intake were 51.8% and 1,327.3±244.4 kcal, respectively, in the facility group, and 76.9% and 1,389.1±317.3 kcal, respectively, in the home group.

Moreover, Furukawa et al.¹⁵⁾ reported that a daily food intake of 1,400 kcal or higher and conditions that allow regular food consumption are promoters of discharge to home. The nutritional conditions of residents of special nursing homes for the elderly in the present study were similar to those of the home group in the previous study, suggesting that sufficient regular food and energy intakes make discharge to home and the continuation of home life feasible even in older people requiring higher grades of care.

The independent excretion rate among the subjects of the present study was higher than the national average, but the rate of requiring assistance for transportation inside the facility was nearly 60%, and wheelchair users accounted for approximately 70% even in the independent excretion group. Thus, all subjects required some assistance for toileting. Furthermore, about 80% had some type/degree of cognitive dysfunction. When considering that the mean age exceeded 85 in both the independent and assisted excretion groups, it may have been difficult for the subjects, who were living while facing aging as a natural phenomenon, to lead a completely independent life. However, the results clarified that independent excretion is achievable even in those requiring partial assistance for ADL. Yata et al.⁹⁾ described that independence in mobility is not an absolute requirement for independent excretion, and what is important is maintaining the functions needed to sit on a toilet seat with or without assistance. In fact, in the present study, the rate of sitting in a chair when eating was significantly high in the independent excretion group, suggesting the effectiveness of helping older people maintain their ability to sit in terms of independent excretion.

As a study limitation, the present study analyzed only the data of residents of special nursing homes for the elderly providing functional recovery care, and, therefore, the results cannot generalize the characteristics of independent excretion in all special nursing homes for the elderly. On the other hand, having clarified the relationships between the level of independence in excretion and physical/cognitive functions in these residents, it confirmed that regaining independence while receiving assistance is an achievable goal, even if they require higher grades of care. In future studies, we will examine the level of independence in excretion among residents of special nursing homes for the elderly not providing functional recovery care for comparison. It may also be necessary to continuously examine the influences of the factors identified in the present study on the level of independence in excretion.

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