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The word ‘Human Services’ is used when someone faces social challenges for ‘help’ or ‘support’ people.

‘Human Services’ is expanding rapidly its area such as field of social welfare, medical, nursing, clinical psychology related mental care, health promotion for aging society, assist family for infant and child care, special supporting education corresponding to vocational education, education support sector corresponding to era of lifelong learning and fluidization of employment corresponding to the area of career development.

Human Services area, if its research methods are scientific, is internationally accepted and greater development is expected by collaborative research which is performed by multinational and multi-profession.

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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		n	n	p value
		independent	assisted			
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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ORIGINAL ARTICLE

Imagined Intergroup Contact Reduces Prejudice Against Suicide Loss Survivors; An Empirical Study with Japanese Undergraduates

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ABSTRACT

Background: This study examined whether imagined intergroup contact reduced prejudice against suicide loss survivors in Japanese undergraduates.

Methods: Participants were randomly divided into the following two groups: imagined contact and control. The imagined contact group included 53 participants, and the control group included 48 participants. Participants assigned to the imagined contact group were asked to imagine meeting and comfortably talking with a suicide loss survivor for two minutes. Participants assigned to the control group were asked to think about suicide loss survivors for two minutes. Then, all participants responded to 5 questions assessing social distance and 11 questions about their impressions of suicide loss survivors. The five items for social distance were measured on a 6-point scale. The eleven items for their impressions of suicide loss survivors were measured on 7-point semantic differential rating.

Results: For social distance, participants assigned to the imagined contact group considered survivors were significantly less psychologically disturbed and less to blame for the death. Then, an exploratory factor analysis of the 11 items of the scale for impressions of suicide loss survivors was conducted, and the following two factors were derived: "Anticipated Survivor Affect" and "Negative Affect." Results indicated that participants assigned to the imagined contact group considered survivors had significantly less "Negative Affect" toward survivors.

Conclusion: It was showed that imagined contact with a suicide loss survivor had a certain influence on reducing prejudice against suicide loss survivors.

< Key-words >

Suicide loss survivors, suicide, prejudice, imagined intergroup contact hypothesis, grief

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I. Introduction

Individuals who have lost someone close to them due to death by suicide may feel guilty or blame themselves, which complicates the process of grieving from the loss¹⁾. Others may have blamed them or viewed them negatively for complicity with the suicide; this is a common social prejudice²⁾. Thus, suicide loss survivors might have difficulty gaining understanding and support because of prejudice directed at them³⁾. This would complicate their grief process⁴⁾. Therefore, it is desirable to learn whether there are ways to reduce this prejudice.

Brown defined prejudice as “any attitude, emotion or behavior towards members of a group, which directly or indirectly implies some negativity or antipathy towards that group”⁵⁾. Similarly, Ikegami said that prejudice was made up of negative attitudes, beliefs, affect, and behavioral intentions about a group. Based on these definitions, we define the prejudice against suicide loss survivors as involving any attitudes, beliefs, affect, behavior, and behavioral intentions which directly or indirectly imply some negativity or antipathy toward suicide loss survivors⁶⁾.

What prejudices about suicide loss survivors are prevalent? Calhoun, Selby and Faulstich presented four fictional obituary notices describing the death of either a 10-year-old boy or girl from suicide by hanging or from viral illness⁷⁾. Participants read the newspaper accounts and responded using twelve rating scales about the surviving parents. The results showed that participants tended to consider the suicide-loss surviving parents as being less likeable and more to blame for the child’s death. Moreover, similar studies found that participants tended to consider the suicide-loss surviving parents as being more psychologically disturbed, sadder and depressed longer, more ashamed, and being in increased need of specialist support⁸⁾. Similar results were found regarding other suicide-loss surviving relatives, such as spouses⁹⁾. Doka said that the public might have a taboo involving not only the person dying by suicide, but also the survivors¹⁰⁾. Suicide has been taboo through the ages, and even in modern times the taboo persists¹¹⁾.

As psychological support for suicide loss survivors, many researchers suggest intervention strategies such as grief counseling and group work¹²⁻¹⁵⁾. A few researchers also suggest an educational program aimed at reducing public prejudice against suicide loss survivors. In this study, we focus on empirical research which can contribute to the development of an effective education program.

The contact hypothesis of Allport is one of the dominant theories to explain the process and factors for reducing prejudice toward a particular group¹⁶⁾. This hypothesis proposes that contact between members of opposing groups, under conditions of common goals and equal status, can reduce negative intergroup attitudes¹⁷⁾. Although much empirical research supports this hypothesis, direct contact with an outgroup has a risk of causing members to experience more intergroup anxiety or tension⁶⁾. Therefore, setting up actual opportunities for direct contact with an outgroup might be difficult.

The imagined intergroup contact hypothesis has been suggested as an alternative to riskier direct contact¹⁷⁾. This hypothesis proposes that imagining positive social interactions with a member or members of an outgroup at certain times leads to more positive intergroup attitudes. Thus, even if there is no opportunity for direct contact with members of the outgroup, imagining positive interactions can reduce prejudicial attitudes toward the outgroup. The imagined intergroup contact technique has substantial advantages over direct or extended contact techniques. The imagined intergroup contact technique is more practical, more inexpensive, and does not casually stir up participants' anxiety associated with direct contact¹⁸⁾. Based on this imagined intergroup contact hypothesis, Turner, Crisp and Lambert conducted a set of experiments regarding several types of outgroups¹⁹⁾. For example, in an experiment regarding attitudes toward homosexual males, heterosexual male participants assigned to the imagined intergroup contact group were asked to imagine for five minutes that they were talking to a gay man who sat next to them on the train. They spent about thirty minutes talking until they left the train, and learned some interesting and unexpected things about the gay man during the conversation. Participants assigned to the control group were asked to spend the same five minutes imagining a three-day hiking trip. The results showed that the imagined intergroup contact participants developed more positive attitudes toward homosexual males than the control participants. One of the models to explain the imagined intergroup contact effect is the mental simulation model¹⁷⁾. According to this model, practicing mental simulation, i.e., imagining positive interactions with members of an outgroup, can activate some concepts consistent with the image and then produce thoughts and feelings related to good interactions with members of that outgroup¹⁸⁾. There is little imagined intergroup contact research that focuses on suicide loss survivors as one of the outgroups. It is important that we examine the imagined intergroup contact effect for prejudice against suicide loss survivors, because it is likely that the content of prejudices differ according to the targeted outgroup. This study examines whether imagining positive interactions with a suicide loss survivor reduces the prejudice against suicide loss survivors, based on the imagined intergroup contact hypothesis.

II. Methods

1. Participants

The participants were students enrolled in an Introductory Psychology course at a private university in Sapporo, Japan. The sample for the two groups included 103 Japanese undergraduates (60 men and 43 women). Participants were randomly divided into the following two groups: imagined contact and control. The imagined contact group included 55 participants (33 men and 22 women) ranging in age from 18 to 24 years ($M=19.00$, $SD=1.13$). The control group included 48 participants (27 men and 21 women)

ranging in age from 18 to 21 years ($M=18.80$, $SD=0.74$). Data from 2 participants were excluded from analysis because of incomplete answers on the questionnaire. Consequently, the imagined contact group included 53 participants (31 men and 22 women).

We informed participants that participation in this study was not related to their course and was voluntary. We asked them to participate without compensation.

2. Materials and Procedure

Prior to the start of the experiment, we randomly handed out two types of booklets, corresponding to the imagined contact and control groups, which described the instructions and included a questionnaire about the impressions of the participants. The instructions were modified from Turner, Crisp and Lambert Experiment 3 for an imagined contact group for the manipulation of mental imagery¹⁹. Earlier studies have employed some ingenious control groups, such as imagining contact with a non-outgroup member, imagining a neutral scene, thinking about the outgroup, and so on. Miles and Crisp conducted a meta-analytic test of studies of the imagined contact hypothesis and demonstrated that the type of control group had no significant impact²⁰. So, in this study, we employed the simple 'think about the outgroup' method for the control group.

Participants assigned to the imagined contact group were asked to read to themselves the following scenario in the booklet: "One day, you took a train and got a seat. A person who incidentally sat down next to you addresses you. In the first half of the conversation, you heard a story that the person lost a family member from suicide. You kept talking with the person until you got off the train, about 30 minutes later. The conversation with the person was very delightful and fulfilling for you, and you feel very good." After reading that scenario, they were asked to imagine that situation as concretely as possible for two minutes. After the imagining task, they were asked to describe their imagined content and to complete measurement scales about their attitudes and impressions of suicide loss survivors.

Participants assigned to the control group were asked to read to themselves the following sentence in the booklet: "What characteristics do you imagine that suicide loss survivors in general have?" Then, they were asked to think about the things which come to mind for two minutes. After the imagining task, as was done with the imagined control group, they were asked to describe their imagined content and to complete the measurement scales about their attitudes and impressions of suicide loss survivors. Miles and Crisp pointed out that the effectiveness of imagined contact was equivalent whether the time spent imagining was longer than two minutes or not²⁰. So, we decided to use the two-minute time to reduce the burden on the participants.

1) Scale for social distance with suicide loss survivors

All participants completed the following self-report scale about general attitudes toward suicide loss survivors. We used the 5 items Yamanaka²¹⁾ had chosen from the 7 items used by Reynolds and Cimboric²²⁾. The five items for social distance, measured on a 6-point scale (from 1 = “not at all” to 6 = “very much”), were as follows: “How psychologically disturbed are suicide loss survivors?”, “How much do you like suicide loss survivors?”, “How much blame do you attribute to suicide loss survivors?”, “How tense would you be during a visit with a suicide loss survivor?”, and “How much do you empathize with suicide loss survivors?”

2) Scale for impressions of suicide loss survivors

To further consider the affective component of attitudes toward suicide loss survivors, we employed the following 7-point semantic differential rating items. We used 11 items from Yamanaka²¹⁾ for measuring the image of suicide loss survivors: “*powerful- weak*”, “*bright- dark*”, “*familiar - strange*”, “*unfeared - feared*”, “*pleasing - annoying*”, “*pleasant - unpleasant*”, “*shallow - deep*”, “*relaxed - tense*”, “*good - bad*”, “*happy - sad*”, and “*cheerful - sorrowful*”. Seven of these items (“*powerful - weak*”, “*familiar - strange*”, “*pleasing - annoying*”, “*pleasant - unpleasant*”, “*deep - shallow*”, “*relaxed - tense*”, and “*good - bad*”) were contained in the sub-scale of the Aftermath of Suicide Scale developed by Calhoun, Selby, Tedeschi and Davis²³⁾.

III. Results

1. Data Analysis

Statistical analyses were computed using IBM SPSS Statistics software (Version 21.0). For statistical analyses, we employed p -values $<.05$ as statistically significant.

2. Group Differences on the Five Social Distance Items

Table 1 shows descriptive information for each social distance item for each of the two groups. For each item, we compared the between-group score using t -tests. We adjusted the degrees of freedom in cases where unequal variances were detected by Leven’s test.

For the item “How psychologically disturbed is the suicide loss survivor?”, we found that the mean score of the imagined contact group was significantly lower than that of the control group ($t(95.62) = -2.70, p < 0.1, d = .53$). For the item “How much blame do you attribute to suicide loss survivors?”, we found that the mean score of the imagined contact group was significantly lower than that of the control group ($t(97) = -2.14, p < 0.5, d = .53$). For other 3 items, we did not find significant differences between the mean score of the imagined contact group and that of the control group.

3. Exploratory Factor Analysis of the Scale for Impressions of Suicide Survivors

We conducted a factor analysis of the 11 items of the scale for impressions of suicide loss survivors. The factor analysis was performed using the maximum likelihood method with Oblimin rotation. The number of factors was determined by the standard that the eigenvalue was more than 1. One factor included only one item “*powerful-weak*”, so this item was excluded from subsequent factor analysis. Subsequent factor analysis was also performed using the maximum likelihood method with Oblimin rotation.

<Table 1> Means (*SD*) of the five attitude items for each condition

Items	Imagined contact	Control	<i>t</i> (97)	<i>p</i>
Psychological Disturbance	4.30 (1.59)	5.07 (1.22)	-2.70	.008
Like	3.47 (0.82)	3.20 (0.72)	1.77	.08
Responsibility	3.72 (1.15)	4.17 (0.95)	-2.14	.03
Tense	3.94 (1.38)	3.85 (1.41)	0.34	.74
Empathy	3.17 (1.24)	2.91 (1.30)	1.01	.32

As shown in Table 2, 10 items were finally retained, and two factors were derived. Factor 1 included three items, such as “*happy - sad*”, “*cheerful - sorrowful*”, and “*deep - shallow*.” This factor was named “Anticipated Survivor Affect.” Factor 2 included seven items, such as “*agreeable - annoying*”, “*pleasant - unpleasant*”, “*familiar - strange*”, “*good - bad*”, “*unfeared - feared*”, “*bright - dark*”, and “*relaxed - tense*.” This factor was named “Negative Affect.”

<Table 2> Factor loadings in the exploratory factor analysis of 11 impression items

	Item	Factor loading
Factor 1: Anticipated survivor emotions		
11	Cheerful-sorrowful	.91
10	Happy-sad	.88
7	Deep-shallow	.36
Factor 2: Negative affect		
5	Agreeable-annoying	.85
6	Pleasant-unpleasant	.82
3	Familiar-strange	.70
9	Good-bad	.70
4	Unfeared-feared	.55
2	Bright-dark	.41
8	Relaxed-tense	.37
Factor correlations		1 2
Factor 1		.45
Factor 2		.45

Internal consistency and reliability were good, with a Cronbach's alpha coefficient of .72 for the "Anticipated Survivor Emotions" subscale, and .85 for the "Negative Affect" subscale.

3. Group Differences on the Scale for Impressions of Suicide Loss Survivors

Table 3 shows descriptive information for each impression factor subscale for each of the two groups. For each factor subscale, we compared the between-group scores using *t* tests. We similarly adjusted the degrees of freedom in cases where unequal variances were detected by Leven's test.

<Table 3> Means (*SD*) of sub-scales scores of impressions

Factors	Imagined contact	Control	<i>t</i> (97)	<i>p</i>
Anticipated survivor emotions	5.04 (0.91)	5.29 (0.91)	-1.37	.17
Negative affect	3.81 (0.99)	4.28 (0.82)	-2.53	.01

For the factor subscale "Negative Affect", we found that the mean score of the imagined contact group was significantly lower than that of the control group ($t(97) = -2.53, p < 0.1, d = .51$). However, for the factor subscale "Anticipated Survivor Emotions", we did not find a significant difference between the mean score of the imagined contact group and that of the control group.

IV. Discussion

Focusing on the imagined intergroup contact hypothesis, this study examined whether imagining a social interaction with a suicide loss survivor contributed to reducing the prejudice against them. The results suggested that participants assigned to imagine an experience of contact with a suicide loss survivor viewed suicide loss survivors as less psychologically disturbed, less to blame for the suicide, and showed less negative affect than did the participants assigned to the control group.

Viewing suicide loss survivors as psychologically disturbed can lead to considering them as people with needs for support. Accordingly, the public could try to offer wide-ranging assistance to suicide loss survivors. Considering this framework, it might not be necessary to consider such attitudes as prejudice. However, Rudestam pointed out that viewing people as being more psychologically disturbed was not a seemingly negative attitude, but this attitude could lead to avoiding close contact with survivors⁴. Thus, it might be

possible that suicide loss survivors see this public attitude as negative, such as “feeling themselves left out.” The present result that imagined intergroup contact led to rating the seriousness of psychological disturbance as lower is meaningful in terms of preventing the isolation of survivors.

Suicide loss survivors could tend to feel guilty and blame themselves, which complicates grieving the loss¹⁾. Hanschmidt, Lehnig, Riedel-Heller, and Kersting suggested that suicide loss survivors’ internalization of negative public attitudes, including public blaming survivors for the suicide, could exacerbate their feelings of shame, self-blame and guilt²⁴⁾. Therefore, reducing public blaming for suicide could assuage unnecessary self-blame and guilt that survivors might feel and result in survivors experiencing a normal grief processes. This study indicated that imagined intergroup contact leads to less blaming of suicide loss survivors for the suicide. Therefore, the imagined intergroup contact technique could contribute to increasing suicide loss survivors’ support for suicide survivors.

Moreover, the present study also showed that imagined intergroup contact lowered negative affect toward suicide loss survivors. It was already pointed out that imagined intergroup contact also has effects on emotional content²⁰⁾. Lowering negative affect could soften the resistance to interaction with survivors, which then might lead to actively supporting survivors.

Therefore, the imagined intergroup contact can have an effect as one method for reducing prejudice against suicide loss survivors.

This study was conducted using a procedure similar to Turner, Crisp, and Lambert¹⁹⁾, similar to most previous studies that have targeted the direct victims of stigma, including outgroups, people with mental illnesses, specific ethnic groups, and older adults, among others. However, the outgroup in this study were family members rather than the person that committed suicide, which would be the direct target of stigmatization. It is clear that the imagined contact method has a specific effect on reducing prejudice against family members of the direct target of stigma; the suicide victim. However, changes in ‘Like’, ‘Tense’, and ‘Empathy,’ scores among others used in this study were unclear. It has been suggested that factors in forming prejudices directed at family members are more complex than those directed against the directly responsible people²⁰⁾. Such differences in the formation of prejudices could have influenced the study’s results.

Furthermore, most previous studies on the imagined contact hypothesis have been conducted with university students in Europe and the United States, whereas Asian cultures such as Japan have been less often investigated. The differences in participants’ culture might have influenced the results of this study.

There are some limitations to this preliminary study, which should be overcome in future research. For example, this study only assessed attitudes only immediately after manipulating the imagination and did not examine how long the positive effect of imagining would continue. Miles and Crisp also pointed out the absence of an empirical

examination of the duration of the imagined intergroup contact effect²⁰). Future research should examine the extent of this duration, to develop and conduct more effective educational programs.

Although we examined social distance and impressions of suicide loss survivors, and found positive change in these, we did not examine whether imagined intergroup contact could positively change actual behavior toward suicide loss survivors. Miles and Crisp in a meta-analytical study, reported that imagined intergroup contact could produce a positive change in not only affect, attitudes, and intentions but also in actual behavior towards the outgroup²⁰). Future research should replicate imagined intergroup contact effects using actual behavior toward suicide loss survivors.

This study demonstrated an imagined intergroup contact effect on specific attitudes, but there was no positive effect on other attitudes such as liking suicide loss survivors, tension when visiting survivors, and empathy for survivors. Therefore, we should recognize that the imagined intergroup contact procedure, when used as an educational program, does not change all attitudes positively. Therefore, further research is needed to examine the content of images and the method of imagining and identify more effective procedures.

Attitudes toward suicide loss survivors might be related to people's experiences of suicidal behaviors, including a history of suicidal behaviors among significant others and suicidal behaviors of the self. However, we did not examine such individual differences in this study. The association between attitudes toward suicide loss survivors and personal experiences should be examined in the future.

Finally, the participants in this study were only Japanese undergraduates, so the generalizability of these findings may be limited. Suicide loss survivors have contact not only with undergraduates but also with people of diverse ages, statuses, races, or communities. Future research should investigate imagined intergroup contact effects in diverse populations. Such research could lead to more effective educational programs for reducing prejudices against suicide loss survivors, and increasing the inclusiveness of suicide prevention programs.

Declaration of Conflicting Interests

The author(s) declared that there is no conflict of interest.

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ORIGINAL ARTICLE

Preschool and Kindergarten Teachers' Assessments of Children with Special Needs and Influences on Their Assessments

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ABSTRACT

Early assessment of children with special needs is important as a basis for subsequent support in preschool, kindergarten, and beyond. In this study, we examined the accuracy of preschool and kindergarten teachers' assessments of children's problematic behaviors incorporating the effects of five factors that influence the accuracy of such assessments: age, years of work experience, self-learning time, training time, and face-to-face communication time with parents.

In our analysis results, we identified that the assessment scores in the high self-learning time and high training time groups were significantly higher than those of the low self-learning time and training time groups, suggesting that those assessments were more accurate. The results also indicated more accurate assessments among the group with more face-to-face communication time with parents. In contrast, age and years of work did not affect the assessment scores for attachment and developmental disorders, although more broadly, we found significant positive correlations between face-to-face communication time with parents and both age and years of work experience. We do note that it might be valuable to measure experience in specific terms, such as years of experience working with children with developmental or other disabilities.

These results suggest that training is essential for improving the accuracy of caregivers' assessments of children with challenging behaviors and that increasing face-to-face interaction with parents can lead to more accurate assessments of their children. It is necessary to further examine the causes of these results to increase the accuracy of assessments of children whose behaviors pose challenges.

< Key-words >

Preschool and Kindergarten Teachers, Children with special needs, Assessment

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I. Introduction

Caregivers have designated many children in preschools and kindergartens as having special needs^{1,2)}, frequently because of problematic behaviors³⁻⁶⁾.

However, there is no standardized definition of “children with special needs” in this context⁷⁾. For example, Kuboyama et al. defined a child with special needs as one who “may have a disability but has not yet been diagnosed, or whose behavior makes it difficult to know whether it is due to the disability or the environment”⁸⁾. Hongo et al. defined a “child with special needs” as “a child who has no delay in intellectual development, but who is characterized by restlessness, frequent trouble with other children, and inability to control his or her emotions”⁹⁾. Hidaka et al. defined children with special needs as “children, including children with developmental disabilities, who are of concern to caregivers in childcare settings”¹⁰⁾. In other words, the term “children with special needs” is not a technical term with a fixed conceptual and operational definition¹¹⁾. Therefore, in this study, we define children with special needs as children who have not received a clear diagnosis but have some background issues and whose caregivers are having difficulties caring for them.

In recent years, developmental disabilities have often been considered a background cause of problematic behaviors in children with so-called special needs¹²⁻¹⁴⁾. For instance, one case study was a functional assessment of a 5-year-old child with intellectual disability¹⁵⁾. Another case assessed a 4-year-old child diagnosed with mild intellectual disability, marked hyperactivity, and attention-deficit/hyperactivity disorder (ADHD)¹⁶⁾. In addition, researchers have studied assistance and guidance for children with high-functioning autism^{17,18)} and integrating autistic children into child care activities¹⁹⁾. In other words, as Shiromoto et al. observed, the number of children with developmental disabilities is increasing in the child care and education fields²⁰⁾, there are many children display worrisome behaviors, possibly because of a developmental disability such as ADHD, autism spectrum disorder (ASD), or intellectual disability, such as aggression or defiance, tantrums or panic, or simply difficulty fitting in with a group at preschool or kindergarten. However, Okada states that developmental disabilities are largely attributable to genetic factors. It is unlikely that such functional disorders of the nervous system would rapidly increase in a short time. Instead, genetic factors and acquired nurturing and environmental factors should be considered when tracing the roots of children’s “difficult” behaviors^{21,22)}.

Nurturing and a child’s environment, for instance, the cultural and regional characteristics of a country^{23,24)} or inappropriate nurturing attitudes of caregivers at home^{25,26)}, are key drivers of children’s early behaviors. For instance, Ikeda et al. found one cause of children’s problematic behaviors in preschool and kindergarten was poor attachment formation during infancy^{27,28)}. Inappropriate nurturing such as neglect, over-intervention, and abuse under the guise of discipline can negatively affect attachment

formation between mother and child and the child's normal development. In other words, attachment formation is considered an important background to children's problematic behavior.

In addition, previous researchers have found individual differences in the behaviors of newborn infants, suggesting that children display innate dispositional characteristics from infancy onward that even influence mothers' nurturing attitudes and the formation of mother-child attachments²⁹⁻³²). Furthermore, parents' mental disorders can contribute to their inappropriate child-rearing and, in turn, negatively affect children's development³³).

As indicated so far, children with problematic behaviors can have any number of internal diagnoses that contribute to their challenging behaviors, such as those related to ADHD, ASD, and intellectual disabilities. Also, unhealthy conditions at home, such as parents' inappropriate nurturing and even children's characteristics, can motivate troubling behaviors.

Overall, although any child labeled as having special needs likely displays distinct characteristics, the outward-facing behaviors of designated children do share similarities. For example, Ikeda et al. identified that some of the characteristics of "children with special needs" as reported by their caregivers, such as inability to listen, hyperactivity, restlessness, and difficulties with group activities, are similar to characteristics of children with mild developmental disabilities³).

Additionally, poor attachment is one reason for problematic behaviors. Children who fail to form key attachments in their early years can exhibit problematic behaviors, such as lack of self-control, defiant attitudes and actions, and high aggression. Many of these symptoms are similar to those caused by developmental disabilities³⁴). In addition, Sugiyama identified that it is not uncommon for strong emotional disturbances caused by inappropriate child-rearing, such as abuse, to manifest themselves in the form of hyperactive behavior disorder³⁵). In other words, it is difficult to attempt to categorize children as having special needs based solely on their surface behaviors.

However, it is highly ineffective to provide the same support to all "children with special needs" simply because it is difficult to identify the causes of their problematic behaviors accurately. For instance, as Yonezawa reported, even within the same category, developmental disorders, ADHD entails support with behaviors because of the significant problems with executive functions. In contrast, ASD requires more support for cognition, and attachment problems require support for emotions³⁶). In other words, providing effective support for coping with children's problematic behaviors requires comprehensive considerations of children's backgrounds for more accurate assessments.

In addition, Ishikura et al. stated that "delays in support due to difficulties in determining the causes of stumbling and responding to secondary problems after they have occurred can result in a great deal of energy being expended by both the individual and those around them"³⁷). And the Commentary on the Daycare Guidelines for Nursery

Schools also stated that “daycare centers need to accurately grasp the actual situation of each child, including children with disabilities, and provide childcare with a perspective that allows all children to fully demonstrate themselves”³⁸). Therefore, it is important to assess and respond to children’s stumbling blocks and issues at an early stage³⁹).

In light of the above, we believe that appropriate child care assessments should consider children’s problematic behaviors from multiple perspectives and consider multiple possible backgrounds and solutions. However, given the multidimensional nature of the origins of children’s so-called problematic behaviors, what factors can help caregivers give accurate assessments of the children in their care?

The first factor is often the age of the caregiver. Older child care providers are generally more specialized, have more social skills, and are better able to deal with problems than are younger providers^{41,42}).

The second factor is years of experience, which can relate to age. Caregivers with more experience working with different types of children are overall better able to interact with them^{41,42}).

The third factor is training. Kitano cited enhanced in-service training as essential to improving the quality of child care providers⁴³). And Ogawa identified that in caring for children with disabilities, it is important for child care providers to improve their knowledge and skills through daily training and study to respond to diverse demands⁴⁴). Common training methods include lectures by experienced teachers and experts, workshops, observation of public child care, and case studies^{45,46}).

A fourth factor we can mention is self-learning time. Ogawa found that some caregivers emphasized personal learning by reading specialized books and articles in addition to participating in exhaustive in-service training⁴⁴).

Finally, the fifth factor we see as critical is face-to-face communication time with parents. In caring for children with disabilities or developmental issues, caregivers are expected to work closely with parents and families, communicating with parents about children’s home and school lives and deepening their understanding of the children in their care^{39,47,48}). In addition, some daytime caregivers use contact notes to communicate with parents indirectly^{49,50}). But these notes tend to focus more on transmitting information from the school than on communicating what happens in the home. Indeed, Zhang et al.^{49,51}) found that misunderstandings related to note-writing style and note content made direct face-to-face interaction during pick-up and drop-off times more effective for communicating.

The research findings suggested that high levels of these five factors would enable more accurate assessments of children with problematic behaviors. Verifying our hypothesis requires first understanding the actual assessment status among caregivers, including examining the impacts of the aforementioned factors on assessment. Previous researchers examined the impacts of factors, such as years of service, training to improve teacher quality, understanding children, and kindergarten teachers’ and child care providers’

responses to parents ^{41,52,53}). However, as far as we know, there is no research on how the multiple influences on children's behaviors affect the accuracy of assessments of those behaviors.

Based on the above literature findings, for this study, we conducted a questionnaire survey and interviews with preschool and kindergarten caregivers to examine the actual status of the assessment and the factors that might affect its accuracy. We aimed to test whether older age, longer worker experience, and more self-learning time, training time, and face-to-face communication time with parents would increase the accuracy of caregivers' assessments of children's difficult behaviors.

II. Methods

1. Survey collaborators and survey methods

We conducted the surveys for this study with a questionnaire and with telephone interviews. The questionnaire survey was anonymous, and we ultimately administered it to a total of 72 people (33 kindergarten teachers and 39 preschool teachers working in 6 kindergartens and 5 preschools) who cooperated in the survey. Our response rate was 100%, but we had to exclude four incomplete questionnaires, leaving 68 completed surveys for the analysis. We also conducted telephone interviews with 11 preschool and kindergarten representatives familiar with the actual conditions of the schools where they worked.

We distributed the questionnaires by mail and collected responses by mail from mid-November to mid-December 2017 or from late November to the end of December 2018. We conducted the telephone interviews later but asked the participants to recall the time when they responded to the original questionnaire. We explained the study's purpose and method to all participants in advance, and their intentions were respected even if they did not wish to cooperate with the study.

2. Survey details

1) Questionnaire

For the demographic portion of the questionnaire, we asked the participants to enter their gender, age, class, and years of work and to choose from the following five options for the total time they had spent participating in group training in the past one year: ① 0 hours, ② approximately 1 to less than 10 hours, ③ 10 to less than 20 hours, ④ 20 to less than 30 hours, ⑤ more than 30 hours. We also asked the respondents to choose from the following five options for the amount of time they spent studying individually during the week: ① approximately 0 hours, ② less than 1 hour, ③ 1 to 2 hours, ④ 2 to 3 hours, ⑤ more than 3 hours.

For the case study portion of the questionnaire, we developed four case studies of

problematic behaviors commonly seen in 5-year-old “children with special needs.” We created the cases using the American Psychiatric Association and World Health Organization’s definitions of attachment disorder, ADHD, ASD, and pervasive developmental disorder (PDD)^{54,55} using examples of support for attachment disorder, socialization disorder, and developmental disorder⁵⁶.

For each case study, we identified six possible causes of children’s problematic behaviors: For factors related to attachment formation, we offered excessive discipline by caregivers in the home and caregivers’ indifference to the child; for factors related to developmental disorders, we selected ADHD, ASD, and delayed intellectual development; and for factors related to the child’s temperament, we selected the child’s personality.

In all the cases, any of the six factors could have been a cause of the problematic behavior. However, the question in Case 1 was formulated so it would be appropriate to choose “highly likely” for ADHD and the caregiver’s indifference to the child. We set the other cases similarly so that it would be appropriate to select “highly likely” for ADHD and excessive caregiver discipline in Case 2, ASD and excessive caregiver discipline in Case 3, and delayed intellectual development and caregiver indifference to the child in Case 4. To confirm the objectivity and validity of the case studies, we asked three university professors in psychology, development, and special needs and five psychology graduate students to review and revise the studies for accuracy.

The instructional text read as follows: “The following are examples of problematic behaviors of five-year-old children. Please circle the number to the extent that you think it applies as a possible cause of such behavior: 1 = unlikely, 2 = somewhat unlikely, 3 = undecided, 4 = somewhat likely, 5 = highly likely.”

2) Telephone Interview

For the telephone interviews, we asked the respondents about their average daily face-to-face communication time between caregivers and each parent at their respective schools and other means of interaction in the absence of direct interaction with parents.

III. Results

1. Assessment points

For each case, we summed the respondents’ ratings from 1 to 5 for each factor. We used the two factors with the most responses in each case as the assessment points. The assessment points for each case ranged from 1 to 10 points, and if the assessment was appropriate for all four cases, the full assessment score for all four cases was 40 points. Table 1 presents the mean assessment scores, standard deviations, and F values for each case. On multiple comparisons, there were no significant differences in the mean assessment scores for each case. Therefore, we summed the assessment scores for each case to obtain the total assessment points ($M = 29.12$, $SD = 3.92$).

<Table 1> The Mean Assessment Scores, Standard Deviations, and F Values for Each Case

	Case1 (N=68)		Case2 (N=68)		Case3 (N=68)		Case4 (N=68)		F(df)
	M	SD	M	SD	M	SD	M	SD	
Assessment Points	7.63	1.56	7.31	1.59	7.28	1.54	7.28	1.41	.86 (3.268)

2. Group classification

In the analysis, we divided the participants into groups based on their age, years of work experience, self-learning time, training time, and face-to-face communication time; we took the means for learning time, training time, and face-to-face communication time and divided each factor into two groups, low and high: self-learning time, low: -1.79 hours, $N = 33$ and self-learning time, high: 1.79 hours or more, $N = 35$; training time, low: -10.4 hours, $N = 40$ and training time, high: 10.4 hours or more, $N = 28$; and face-to-face communication time, low: 3 minutes or less, 6 preschools, $N = 39$ and face-to-face communication time, high: 3 minutes or more, 5 preschools, $N = 29$. We divided the respondents by age into low (20–25 years old, $N = 35$) versus high (26–65 years old, $N = 33$), and we divided years of service into low (1–4 years old, $N = 38$) versus high (5–45 years old, $N = 30$) as well.

3. Correlations between variables

Table 2 presents the correlations between each of the five independent variables. We found significant positive correlations between age and years of work, years of work and face-to-face communication time, self-learning time and training time, and face-to-face communication time. Regarding correlations between each independent variable and the dependent variable, the age and years of work did not correlate with the assessment points, in contrast with self-learning time, training time, and face-to-face communication time.

<Table 2> Correlations Between each Variable

	1	2	3	4	5	6
1 Age	-	.71 ^{***}	.04	-.17	.12	.05
2 Years of Work		-	.07	.03	.28 [*]	.22
3 Self-Learning Time			-	.54 ^{***}	.13	.33 ^{**}
4 Training Time				-	.26 [*]	.56 ^{***}
5 Face-to-Face communication time					-	.63 [*]
6 Assessment Points						-

* $p < .05$ ** $p < .01$ *** $p < .001$

4. Hypothesis testing

Table 3 presents the results of a one-way analysis of variance with age, years of work, self-learning time, training time, and face-to-face communication time as independent variables and the mean of the assessment points as the dependent variable. The analysis results showed no significant differences in assessment points between the high and low age groups and between the high and low years of workgroups. In contrast, the high self-learning time group had significantly higher assessment points than those of the low group. The high training time group had significantly higher assessment scores than the low group. In addition, the high face-to-face communication time group had higher scores than the low group.

<Table 3> Mean Assessment Scores for Each Factor by Group

	group	N	M	SD	F(df)
Age	Low-group	35	29.00	3.84	.06(1.66)
	High-group	33	29.24	4.06	
Years of Work	Low-group	38	29.05	3.99	.02(1.66)
	High-group	30	29.20	3.90	
Self-Learning Time	Low-group	33	28.00	3.76	5.57*(1.66)
	High-group	35	30.17	3.82	
Training Time	Low-group	40	27.76	3.62	16.11**(1.66)
	High-group	28	31.31	3.40	
Face-to-Face communication time	Low-group	39	28.22	.87	3.55†(1.66)
	High-group	29	30.76	1.05	

† $p < .10$ * $p < .05$ ** $p < .001$

IV. Discussion and Conclusion

In the analysis results from this study, first, caregiver age and years of work did not significantly affect the accuracy of the assessments of children considered to have special needs. However, previous researchers have shown that caregivers with long experience have more skills and expertise than those with less experience⁵⁷⁾. Therefore, it is necessary to compare and examine the assessment abilities of caregivers in each age group in more detail in the future.

We also found that the assessment points from the high self-learning time and high training time groups were higher than those from the low self-learning and low training time groups. This finding suggests that, although experience might be important for accurate assessment, even young child care providers working for short periods might

make more accurate assessments if they can secure time for self-learning and training.

Notably, the assessment scores of the high face-to-face communication time group were higher than those of the low group, and in the low face-to-face communication time group, 50% of the preschools mainly used contact notes. This suggests that indirect interactions such as contact notes are insufficient for proper assessment and that increasing face-to-face communication time with parents might improve the accuracy of assessments of children. In the above results, caregivers' self-learning time, training time, and face-to-face communication time affect assessment accuracy, partially supporting our hypothesis.

However, because the survey did not ask about the training method, it will be important in the future to consider not only the quantity but also the quality of training, such as what training formats and content can improve caregivers' assessment abilities. Future researchers should collect and analyze individual caregivers' face-to-face communication time with their children's parents rather than averages.

We also note that we measured caregiver experience by age and year of work experience, but relevant experience could include specifically caring for children with disabilities. For example, Tomita described that experience in caring for children with disabilities leads to better understanding and responses⁵³). Therefore, in the future, it will be necessary to examine these causes further and aim to improve caregivers' assessment skills and qualifications further.

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ORIGINAL ARTICLE

The Verification of the Reliability and Construct Validity of the Disability Awareness Program (DAP) scale:

Analysis of Cross-sectional Data and Longitudinal data

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ABSTRACT

This study aimed to verify the reliability and construct validity of Disability Awareness Program (DAP) scale in a multicenter setting for students wishing to become teachers in the future. Cross-sectional data and longitudinal data were collected at University in Yamaguchi and Miyazaki, Okinawa, Miyagi prefecture between January 2020 to May 2020. The reliability of DAP scale was verified via the internal consistency method; the coefficient of Cronbach's α were over 0.7 (0.829 for all items).

The validity of DAP scale was also verified via one-way repeated-measures ANOVA and the latent growth curve model. The total scores of DAP scale obtained from one-way repeated-measures ANOVA were the same as the predicted scores. DAP scale is valid based on its goodness-of-fit values obtained using the latent growth curve model, the values of comparative fit index and root mean square error of approximation were within the goodness-of-fit range (CFI=0.998, RMSEA=0.017). These results indicate that DAP scale has high reliability and construct validity.

< Key-words >

scale development, disability awareness program, Disability Awareness Program (DAP) scale, reliability, construct validity

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I. Introduction

In present, the number of students with disability advancing to higher education institutions is on the rise. According to statistics, in 2019, the number of disabled students was 37,647 (33,812 in the previous fiscal year), which is 1.17% (1.05% in the previous fiscal year) of the total 3,214,814 students.¹⁾ In addition, due to advances in medicine, the number of people with disabilities participating in society is increasing.

Disability awareness program is defined a program that increases awareness of disability in healthy individuals, including children and adults, and promotes changes in awareness and attitudes towards persons with disabilities.²⁾ Disability awareness program is carried out in the higher educational institution, Junior high school, and elementary school. In the higher educational institution, disability awareness program implements mainly for student that hope to become professionals like medical students or nursing students. Moreover, DAP for medical schools enforce programs focused on specific diseases. Specialized content is included in the program, and evaluation items are also specialized content.

Bu et al. conducted disability awareness program for total of 488 third-year medical students. in this study, divided into Intervention Group (n = 237; 109 females, 115 males) and Control Group (n = 237; 122 females, 97 males) and using evaluation scale that the Disability Attitudes in Health Care scale.³⁾ It consists of addresses general attitudes, cost effectiveness, therapeutic potential, and educational preparation of healthcare professionals caring for person with disabilities. This session was given every 6 weeks. Prior to the session, the students were asked to watch Ten Commandments of Communicating with disability person, a 26-minute video teaching disability etiquette. McConville et al. conducted disability awareness program for total of 145 nursing student University of Wolverhampton (age range 18-45 years) using evaluation scale that A six-item self-efficacy toward nursing scale⁴⁾.

All the aforementioned disability awareness program studies targeted Medical and nursing students, whereas studies investigating the effectiveness of disability awareness program specifically in college students are scarce. In particular, it is necessary to develop a disability awareness program for students majoring in education. Because when Students major in education become teacher after graduation from university, they often meet child with disabilities as their student.⁵⁾

However, disability awareness program was mainly practiced in the medical field are aimed at communicating with patients and are difficult to practice like students in other disciplines. Moreover, disability awareness program practiced at the School of Medicine consisted of specialized content and evaluation scale focused on specific disability types. It is difficult to implement it for university students other than the medical school, and there is no evaluation method for the content of the implementation. Thus, it is necessary to revise the specialized content and develop a new evaluation scale for disability

awareness program from a sociological point of view.

In addition, college students other than medical students also need a program that takes into consideration the involvement of people with disabilities. OTA et al. developed a disability awareness program scale (DAP scale) that comprehensive evaluating disability awareness program for university students wishing to become teachers in the future.⁶⁾ Although the content validity of the DAP scale has been verified, content validity is a subjective opinion, scientific validation of reliability and construct validity is required. Moreover, it is necessary to collect data in multiple facilities, because one facility is insufficient. Therefore, the aim of this study was to verify the reliability and construct validity of DAP scale in a multicenter setting for students wishing to become teachers in the future.

II. Methods

1. Study Design

Cross-sectional data is used to calculate reliability factors in typical scaling steps, and longitudinal data is used to validate construct validity.⁷⁾ In this study, the term DAP scale is used as the scale developed by the author. The DAP scale data is collected in a cross-sectional and longitudinal. A package containing manuals was sent to researchers who explained the objectives and methods of the survey and obtained consent to participate. DAP scale packages were sent to university of teacher training course in Miyagi, Yamaguchi, Miyazaki, and Okinawa prefectures was conducted.

2. Questionnaire

Questionnaire is used DAP scale developed by OTA et al.⁶⁾ DAP scale administered has three areas (basic human rights awareness, disability awareness, and diversity awareness) to measure changes in students' awareness of Disability Awareness Program.

DAP scale is evaluated on the five grades, 1= "Strongly disagree", 2= "Disagree", 3= "Neither agree nor disagree", 4= "Agree a little" and 5= "Strongly agree".

3. Process

Research collaborators from all four universities are informed of their research objectives and implementation procedures, and after a research collaboration agreement was obtained. After obtaining consent, the study summary briefing material, DAP scale, and student study collaboration consent form were filed and sent to the research collaborators. The research collaborators explained to the students who were the subjects of the data collection before the lesson based on the research summary explanatory material. The explanation contents are freedom of the research participation, withdrawal of the consent, consultation counter, outline and purpose of the research, research method

and period, selection method of the subject, handling of the personal information, and publication of the result. After completing all the explanations, only the students who obtained the consent were implement DAP scale. Classes were held based on an implementation manual from November 2019 to March 2020, collected by mail from January 2020 to May 2020.

1) Cross-sectional data

Cross-sectional data without intervention are collected at University in Yamaguchi and Miyazaki prefecture. Data obtained at the first time at University in Miyagi and Okinawa prefecture were also treated as cross-sectional data and used to calculate a reliability.

2) Longitudinal data

Longitudinal data by intervention are collected at University in Miyagi and Okinawa prefecture. University in Miyagi and Okinawa prefecture, which cooperated in collecting longitudinal data, were sent implementation manuals and lesson materials on the content of the intervention.

4. Intervention

The intervention was performed to collect longitudinal data. The content of classes about longitudinal data interventions was plan based on scaled areas. DAP scale implemented before class intervention as a baseline, and after classes intervention three times. Lesson materials include content related to “basic human rights”, “ICF”, and “diversity”, which are areas of DAP scale, and consisted of a total of three classes. In the execution manual, the explanation was described on questions based on the lesson material and discussion method, and the answer when the question was asked from the student.

5. Statistical analysis

1) Reliability of DAP scale

The internal consistency method was utilized, and Cross-sectional data were employed to verify the reliability of DAP scale. Cronbach’s α value was used for the internal consistency of DAP scale. Cronbach’s α is a factor that measures the reliability and internal consistency of the most used measures. A minimum Cronbach’s α co-efficient of 0.7 was considered satisfactory for group-level comparisons.⁸⁾

2) Validity of DAP scale

For this study, the latent growth curve model, which is one of an experimental intervention method, and structural equation modeling (SEM), among the methods of construct validity, were utilized, and longitudinal data were employed to verify the validity of DAP scale. Constructs can become bases of validity when they succeed in

predicting the changes after experimental interventions, and a tool for measuring constructs reflects the changes that occurred, if any.⁹⁾ That is, the total score of DAP scale is expected to increase when the educational outcome is longitudinally measured because DAP scale is a tool for evaluating disability awareness program outcomes. To analyze the obtained data, one-way repeated-measures ANOVA were used. SPSS ver.23.0 was used for statistical analysis.

The latent growth curve model can be used to analyze the repeated-measures data, which is different from general path analysis.¹⁰⁾ In the latent growth curve model, unlike in general path analysis, path coefficients are not the subjects of the data analysis because all the path coefficients from the observed to the latent variables are fixed parameters.¹¹⁾ The goodness of fit of the model was evaluated with the following goodness-of-fit indicators: Comparative Fit Index(CFI) and Root Mean Square Error of Approximation(RMSEA). When conducting analysis via SEM, the researchers themselves are to choose the fit index that they would use, based on their judgment. A model is considered acceptable, when two or more fit indices are met including RMSEA.¹²⁾ The model goodness-of-fit criterion for RMSEA is $RMSEA < 0.1$, $RMSEA < 0.05$ is in a very good range.¹³⁾ The model goodness-of-fit criterion for CFI is $CFI > 0.90$, and $CFI > 0.95$ is in a very good range.¹³⁾¹⁴⁾ The maximum likelihood method was used for the estimation of the parameters. Amos ver. 23.0 was used for statistical analysis.

6. Ethics

Based on the Declaration of Helsinki, this study was carried out by preparing a protocol describing appropriate academic and ethical considerations and obtaining the approval of the Ethical Review Board of the academic conference (No.2019-1-928).

III. Results

1. Subject characteristics

118 longitudinal data and 165 cross-sectional data were collected in this study. Among the 165 cross-sectional data, the first data of 118 longitudinal data is included. All data were collected in Miyagi, Yamaguchi, Miyazaki, and Okinawa prefectures.

The average age of longitudinal data was 19.38 ± 1.15 and the gender rate was 37 males (31.4%), 81 females (68.6%). Regarding whether with disabilities, 5 students (4.2%) answered "yes" and 112 students (94.9%) answered "no". Regarding opportunities to interact with people with disabilities, 49 students (41.5%) answered "Not at all", 27 students (22.9%) answered "1-3 times a year", 22 students (18.6%) answered "1-3 times a month", 9 students (7.6%) answered "1-3 times a week", and 11 students (9.3%) answered "almost every day" (Table 1).

The average age of cross-sectional data was 19.61 ± 1.37 and the gender rate was 52 males (31.5%), 109 females (66.1%), and 4 non-responders (2.4%). Regarding whether with disabilities, 8 students (4.8%) answered “yes” and 151 students (91.5%) answered “no”, and 6 non-responders. Regarding opportunities to interact with people with disabilities, 58 students (35.2%) answered “Not at all”, 34 students (20.6%) answered “1-3 times a year”, 30 students (18.2%) answered “1-3 times a month”, 26 students (15.8%) answered “1-3 times a week”, and 13 students (7.9%) answered “almost every day”, 4 non-responders (2.4%) (Table 1).

<Table 1> Characteristics of the participants that has used DAP scale

		longitudinal data	cross-sectional data
All		118	165
Age \pm SD		19.38 \pm 1.15	19.61 \pm 1.37
Gender, n(%)	Male	37(31.4)	52(31.5)
	Female	81(68.6)	109(66.1)
	Non-response	0(0.0)	4(2.4)
Whether with disabilities, n(%)	Yes	5(4.2)	8(4.8)
	No	112(94.9)	151(91.5)
	Non-response	1(0.8)	6(3.6)
Opportunities to interact with people with disabilities, n (%)	Not at all	49(41.5)	58(35.2)
	1-3 times a year	27(22.9)	34(20.6)
	1-3 times a month	22(18.6)	30(18.2)
	1-3 times a week	9(7.6)	26(15.8)
	Almost every day	11(9.3)	13(7.9)
	Non-response	0(0.0)	4(2.4)

2. Reliability of DAP scale

165 cross-sectional data were collected to verify reliability. The Cronbach’s α value, which is the reliability coefficient of internal consistency, was 0.831 for the “basic human rights awareness” area, 0.856 for the “disability awareness”, and 0.945 for the “diversity awareness” in each area. In addition, it was 0.829 for all items (Table 2). The reliability of DAP scale was verified via the internal consistency method.

< Table 2 > DAP scale scores and reliability score

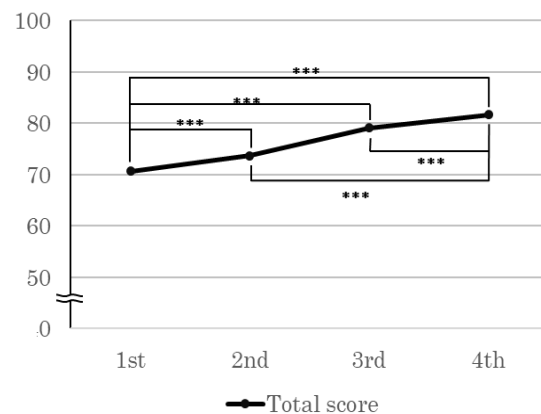
Constructs	Mean	SD	Cronbach's alpha if item deleted	Cronbach's α
Basic human rights awareness				0.831
Q1	3.63	1.154	0.801	
Q2	4.32	0.903	0.816	
Q3	3.61	1.140	0.798	
Q4	4.05	0.980	0.772	
Q5	3.88	1.130	0.797	
Disability awareness				0.856
Q6	3.95	1.083	0.828	
Q7	4.22	1.008	0.847	
Q8	3.36	1.371	0.857	
Q9	3.75	1.074	0.823	
Q10	3.69	1.161	0.814	
Q11	3.50	1.252	0.819	
Diversity awareness				0.945
Q12	4.53	0.914	0.935	
Q13	4.45	0.984	0.930	
Q14	4.38	1.002	0.917	
Q15	4.48	0.979	0.932	
All item				0.829

3. Validity of DAP scale

1) Validity determined via the experimental intervention method

The experimental intervention method was set as the first one before the lesson, the second one after the “lesson on human rights”, the third one after the “lesson on disability”, and the fourth one after the “lesson on diversity”.

118 longitudinal data were collected to verify construct validity. In the results of the experimental intervention, the total scores average of DAP scale significantly increased (Fig. 1). The total scores average changed from 70.66 (SD=0.94) before the lesson, to 73.66 (SD=1.01) after first lesson, 79.08 (SD=1.22) after second lesson, and 81.66 (SD=1.13) after third lesson. In the results of the analysis through one-way repeated-measures ANOVA, there were significant differences between the first and second ($p < .001$), the first and third ($p < .001$), the first and fourth ($p < .001$), the second and third ($p < .001$), the second and fourth ($p < .001$), the third and fourth ($p < .001$). Based on the above results, the prediction of total score of DAP scale was confirmed, and the construct validity by the experimental intervention method, which is one of the verification methods of construct validity, was verified.

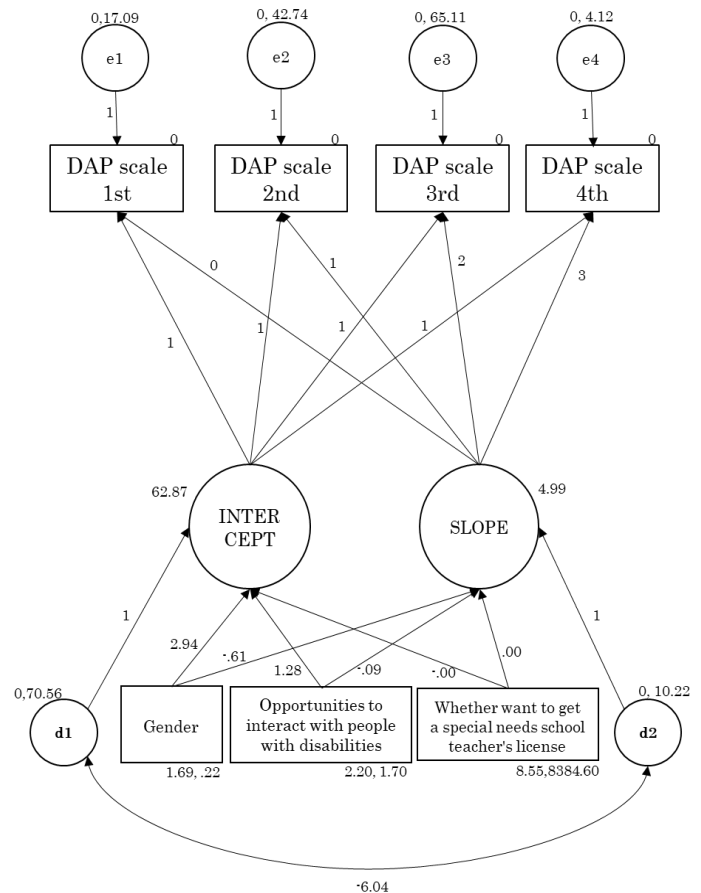


< Figure 1 > Changes of the total score of DAP scale, one-way repeated measures ANOVA was used, *** $p < .001$, n = 118

2) Validity determined via the latent growth curve model

The latent growth curve model was verified using “gender”, “age”, “whether with disabilities”, “opportunities to interact with people with disabilities”, and “whether want to get a special needs school teacher’s license” as explanatory variables.

As for the Validity analysis via the latent growth curve model, DAP scale showed a high level of fitness: $\chi^2 = 14.447$; degree of freedom (DF) = 14; CFI = 0.998; and RMSEA = 0.017. The validity was verified because the values of CFI and RMSEA were within the goodness-of-fit range.



<Figure 2> Latent curve analysis of DAP scale
DF, degree of freedom; CFI, comparative fit index; RMSEA, root mean square error of approximation. n = 118, $\chi^2 = 14.447$, DF = 14, CFI = 0.998, RMSEA = 0.017.

As for the factors affecting DAP scale scores, three factors were clearly identified: “gender”, “opportunities to interact with people with disabilities”, and “whether want to get a special needs school teacher’s license”. This means that the three explanatory variables affect the outcome of disability awareness program (Fig. 2).

IV. Discussion

Due to advances in medicine, the number of people with disabilities participating in society is increasing. Disability awareness program is aimed to increases awareness of disability in healthy individuals, including children and adults, and promotes changes in awareness and attitudes towards persons with disabilities.²⁾ In particular, it is necessary to develop a disability awareness program for students majoring in education.⁵⁾ In the higher educational institution, Disability awareness program implements mainly for student that hope to become professionals like medical students or nursing students.³⁾⁴⁾

However, it is difficult to practice like students in other disciplines, as these disability awareness program were specialized content is included in the program, and evaluation items are also specialized content. In addition, college students other than medical students also need a program that takes into consideration the involvement of people with disabilities.

In this context, DAP scale, a tool that comprehensive evaluating disability awareness program for university students wishing to become teachers in the future, was developed, and its reliability and validity were verified in this study. The present study was the first attempt to develop a tool for evaluating the disability awareness program combined with ICF, diversity. It is also the first study to be conducted to collect data in multiple facilities, and identify the factors affecting the disability awareness program using the latent growth curve model.

The reliability of DAP scale was verified via the internal consistency method; all areas and all items, the coefficient of Cronbach's α were over 0.7 (0.829 for all items). As for the verification of construct validity, the high level of construct validity of DAP scale was confirmed using the experimental intervention method and the latent growth curve model. One-way repeated-measures ANOVA were used to observe the changes in the educational outcomes using the experimental intervention method. In the results, the total DAP scale score significant differences between all class ($p < .001$). The fitness level of the model was found to be high in the results of its analysis using the latent growth curve model (CFI = 0.998, RMSEA = 0.017). As for the factors affecting the scores, three factors were clearly identified: gender, opportunities to interact with people with disabilities, and whether want to get a special needs school teacher's license.

A study for students majoring in another specializations needs to be conducted, because in this study, target for students majoring in education. Moreover, it is necessary to implement an intervention other than in this study and identify an effective disability awareness program. This study also had a regional limitation because the data for the study were collected only within four Prefecture in Japan. And an evaluation model for the disability awareness program needs to be established via nationwide data collection in Japan, and the evaluation scale to be used for such model needs to be standardized.

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SHORT PAPER

Characteristics of Case Records and Staff Awareness in Institutions for Persons with Intellectual Disabilities

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ABSTRACT

This study aims to grasp the characteristics and trends of case records and staff awareness in institutions for persons with intellectual disabilities. The study analyzed the descriptive content of the case records of users with many problematic behaviors as well as those with fewer problematic behaviors in a certain residential facility. To this end, the study conducted a questionnaire survey on the staff regarding the case records. The results confirmed that the case records contained accounts of health status and daily routines, regardless of the user. However, users who reported serious problematic behaviors were significantly more likely to have accounts of individual episodes and problematic behavior. Furthermore, a considerable number of the staff felt burdened by the case records. Based on these findings, the study discusses the future directions for case records.

< Key-words >

Institution for Persons with Intellectual Disabilities, Case Records, Questionnaire Survey

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I. Introduction

According to a survey by the Japanese Association on Intellectual Disability in 2019, 95% of people with intellectual disabilities — who were admitted to and used a facility — were categorized under disability support classification ≥ 4 . Additionally, there were many users who exhibited strong tendencies towards harming themselves or others.¹⁾ To address such problematic behaviors, efforts that emphasize raising staff qualifications to the level of skilled professionals have been carried out in the facilities. Specifically, it was pointed out that the problematic behavior of patients lessened when the staff applied support methods proposed by experts at third-party institutions.²⁾

However, the continuation of high quality support inside facilities has become an issue.³⁾ Many facilities operate in two shifts: a day shift and a night one. Thus, it is difficult to provide opportunities that create a shared understanding among the staff.⁴⁾ In other words, it is possible to enhance the common understanding among the staff and provide ongoing services by sharing information about the facility's users. However, this may result in transitory improvements, regardless of the positive measures adopted, unless proper attention is given to the information provided to the staff, their workload, and so on. Considering this, records about the daily users (hereinafter, case records) may be the most effective tool for creating a common understanding among the staff. In addition, case records can also serve as valuable information about users and changes in their condition over time. However, at present, the contents of the case record forms are entrusted to each facility, and to date, a detailed examination of these contents has not been done. In facilities shared by users with disorders of varying degrees, it is essential to consider the future support methods by the staff, the information shared on the case records, and the awareness of the staff about these records.

Therefore, the present study aims to analyze the descriptions in case records and its contents. The study's subject is a facility admitting persons with intellectual disabilities. In addition, this study aims to create an awareness survey for the staff and clarify the characteristics of the case records and staff awareness.

II. Subjects and Methods

1. Target Facilities

The authors received study cooperation from Facility C operated by corporation B in prefecture A. Facility C is a large-scale utility that provides assisted living services and engages in daily and local activities, short-term admissions, after-school day services, consultation and support, as well as group living assistance. The facility also offers assistance in entering the facility. Facility C comprises four dormitory buildings, two each for men and women, with support staff of the same gender as the users of each dormitory.

The daily routine is somewhat like this. After waking up, the users get dressed and eat breakfast in the dining room. Next, after brushing their teeth, they participate in a morning meeting (a health check-up) and engage in radio calisthenics, after which they participate in group activities. In the afternoon, they bathe or clean their rooms after lunch. After the evening meeting (health check-up) is finished, they have dinner and enjoy some leisure time before going to bed. Toilet assistance is provided for the users who need it during the breaks between activities. On weekends and holidays, group activities and bathing are considered leisure activities, while for the remainder of the day, the weekday schedule is followed. Events like birthdays and Christmas parties are also held.

In this study, we focused on one men's dormitory (25 users, 13 staff) and one women's dormitory (20 users, 12 staff). The average age of users in the men's dormitory was 33.3 years (the youngest and oldest users were 23 and 47 years old, respectively). Of these users, 25 suffered from intellectual disabilities (five among them had overlapping physical disabilities) with an average disability support classification of 5.5. The average age of users in the women's dormitory was 41.2 years (the youngest and the oldest users were 23 and 59 years old, respectively). Twenty women had intellectual disabilities (five among them also had overlapping physical disabilities) with an average disability support classification of 5.5.

2. Case records of users

The two-shift work system in Facility C consisted of a day shift (of 6 staff members) and a night shift (1 staff member). The staff members maintained the cords of the entire building, including the case records for each user, until their duty hours were over. As the description method of the case records, they added a title to the header and noted the circumstances at the site under the title. To avoid bias in the targets, we made the staff members select four users – one male and one female user, each with serious problematic behaviors in communicative and intellectual ability, and another pair of male and female users with relatively minor problematic behavior. In this study, self-harm and aggression were defined as problematic behaviors, and users with a high frequency of such behaviors were designated as “users with serious problematic behavior” and users with a low frequency were designated as “users with minor problematic behavior.” The case records of the four users (over a 12-month period, from April 2018 to March 2019) were used.

Case records were classified based on the KJ method.⁵⁾ The KJ method is a method of qualitative data analysis. It is a way of interpreting data by recording them on cards and grouping them based on what can be read from them. The case records were classified into six items, namely ① health status (vital signs, status of hospital visits, condition of injuries, allowance, drug compliance), ② daily routine (intake of meals, participation in group activities, participation in events, bathing, defecation), ③ problematic behavior (annoying behavior like making strange noises, destructive behavior like damaging utensils, acts of self-harm like repeatedly banging one's head against a wall, acts of

harming others like biting, etc., trouble with other users), ④ individual episodes (interactions with the staff and other users), ⑤ contact from the family (return home, supply of clothing and food), and ⑥ matters for handover (change of clothes and mail). Next, their numbers were counted. For the reliability assessment of the classification, we requested a classification of the four case records from a third party and calculated the kappa coefficient. Consequently, it exhibited good consistency at $\kappa = 0.82$. If no consistency was observed, those cases records were reclassified based on consultations.

3. Staff awareness

An awareness survey about the case records was undertaken for the staff working in the two dormitories. In June 2019, a questionnaire sheet was distributed to 20 staff members (10 each in the men's and women's dormitories) who had been working continuously in the two buildings in the preceding business year, and their anonymous responses were solicited. Responses were received from 14 staff members (6 male and 8 female; a response rate of 70%), and these were used for our analysis (there were no missing entries).

On the questionnaire sheets, the respondent staff members were first asked about the time required for completing the case reports and the feeling of burden created by these. The respondents had to enter the amount of time required, and they had to choose one of four responses to answer if they felt burdened (I feel it; I feel it somewhat; I do not feel it much; I do not feel it at all). In addition, they had to freely describe general matters requiring attention in the case records and matters requiring attention while describing users with severe and minor problematic behaviors, respectively. Finally, the respondents were also asked to describe the items requested for the case records.

The response descriptions were categorized using the KJ method, and the tendencies of these contents were organized. ⁵⁾

4. Ethical concerns

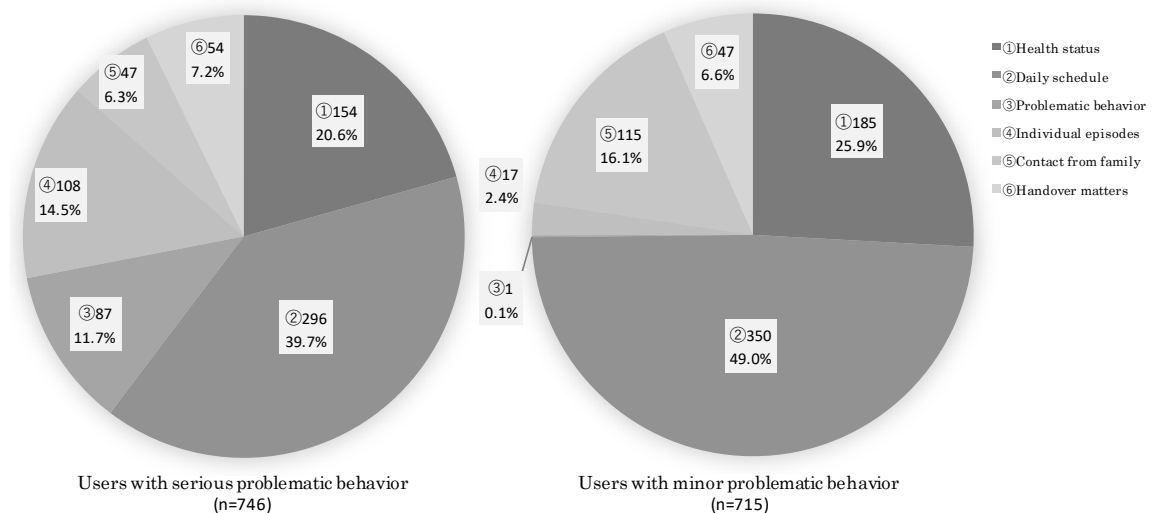
The purpose of the study and the survey method was explained to corporation B as well as the facility's users and their families. In addition, it was explained that the facility and the individuals would not be identified, data would be strictly controlled, and the study's results would only be used for scholarly purposes. Finally, consent from these parties was obtained in writing.

III. Results

1. The men's dormitory case records (Figure 1)

A total of 77,862 characters were devoted to users with serious problematic behaviors. There were 746 entries for the contents described, which were categorized as follows: ① health status 154 (20.6%), ② daily schedule 296 (39.7%), ③ problematic behavior 108 (14.5%), ④ individual episodes 87 (11.7%), ⑤ contact from family 47 (6.3%), and ⑥ handover matters 54 (7.2%).

A total of 57,257 characters were devoted to users with minor problematic behaviors. There were 715 entries for the contents described, which were categorized as follows: ① health status 185 (25.9%), ② daily schedule 350 (49.0%), ③ problematic behavior 17 (2.4%), ④ individual episodes 1 (0.1%), ⑤ contact from family 115 (16.1%), and ⑥ handover matters 47 (6.6%).

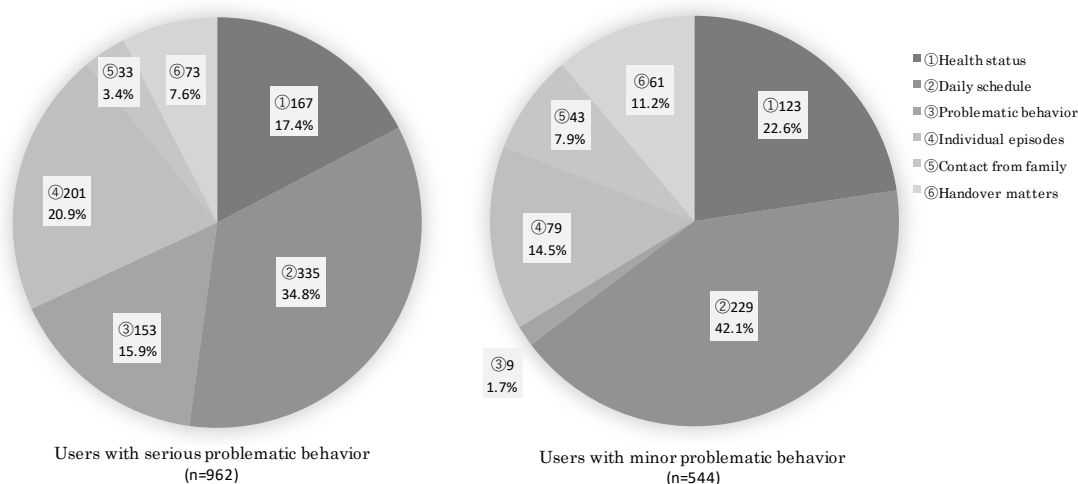


<Figure 1> Summary of the case records of the men's dormitory

2. The women's dormitory case records (Figure 2)

A total of 146,058 characters were devoted to users with serious problematic behavior. There was a total of 962 entries, with a breakdown by category as follows: ① health status 167 (17.4%), ② daily schedule 335 (34.8%), ③ problematic behavior 153 (15.9%), ④ individual episodes 201 (20.9%), ⑤ contact from family 33 (3.4%), and ⑥ handover matters 73 (7.6%).

A total of 57,244 characters were devoted to users with minor problematic behavior. There were 544 entries, categorized as: ① health status 123 (22.6%), ② daily schedule 229 (42.1%), ③ problematic behavior 9 (1.7%), ④ individual episodes 79 (14.5%), ⑤ contact from family 43 (7.9%), and ⑥ handover matters 61 (11.2%).



<Figure 2> Summary of the case records of the women's dormitory

2. Staff awareness about case records

An average of 2.6 hours was required to complete case records (minimum 1 hour, maximum 4 hours). Regarding the responses to the feeling of burden, 4 staff members said they felt it, 7 felt it somewhat, 3 did not feel it much, and no one reported not feeling burdened at all.

For general matters requiring attention (n = 20), the responses were summarized under the following four categories: support contents in line with the individual support plan (n = 7), language use (n = 6), accurate description of the users' appearance (n = 6), and finding time to attend to the case records (n = 1). Not speaking colloquially as cited under language use.

Regarding matters requiring attention (n = 18) for users with serious problematic behavior, the responses were summarized under the following categories: describing the users' appearance other than problematic behavior (n = 9), detailed description of the problematic behavior (n = 7), and awareness of the staff (n = 2). In addition, the necessity of describing the user's ordinary appearance (since there is a tendency to describe only problematic behavior) was noted, while describing their appearance other than the problematic behavior.

The responses for the matters requiring attention (n = 16) for users with minor problematic behavior were summarized under the following categories: considering the need to consciously observe (n = 9), detailed description (n = 4), and avoiding repetition when describing the contents (n = 3).

The information required from the case records were summarized under the following five categories: a user's detailed appearance (n = 10), physical condition (n = 7), the user's new aspects (n = 4), staff awareness (n = 4), and handover matters (n = 1). Regarding staff awareness, it was opined that a staff member should also share the appearance of a user,

about whom the staff member was personally concerned.

Table 1 shows the matters requiring attention in the case records.

< Table 1> Matters Requiring Attention in Case Records

Item	Records in general (n = 20)	Users with serious problematic behavior (n = 18)	Users with minor problematic behavior (n = 16)	Things required from the case records (n = 26)
Contents	Support contents in line with the individual support plan (7)	Description of appearance other than problematic behavior (9)	Considering the need to consciously observe (9)	Detailed appearance of the user (10)
	Language use (6)	Detailed description of problematic behavior (7)	Avoiding repetition while recording contents (3)	Physical condition (7)
	Accurate description of appearance (6)	Staff Awareness (2)	Detailed description (4)	New aspects of a user (4)
	Finding the time to attend to the case records (1)			Staff awareness (4)
				Handover matters (1)

IV. Discussion

The study aimed to understand the characteristics of the case records in institutions for persons with intellectual disabilities. We now focus on a discussion based on the results.

The users' health status accounted for about 20% and the daily schedule for about 40% of the contents of the case records for both dormitories. Physical condition ranked number one among the matters required from the case records by the staff. Given the above, we can conclude that the case records are being applied as a tool by the staff to grasp the users' health status and their daily routine. In addition, language use is cited as a matter requiring attention in the general case records. Notably, none of the staff members responded with "did not feel at all," regarding the feeling of burden related to the case records. Although the case records are being prepared based on the individual support plan at Facility C, no strict rules have been established, and the matter to be described has been left to the discretion of each staff member. Thus, staff members may feel a great sense of burden about what and how they should describe the matters.

In both dormitories, the number of characters used in the case records to describe users with serious problematic behavior was greater than that used to describe those with minor problematic behavior. In addition, problematic behaviors and individual episodes were appropriately described. Considering this, although the case records serve as a tool for the staff to understand problematic behavior and share information, they may feel burdened about writing the records of users who show a high level of problematic behavior. However, the matters requiring attention in the case records included the need to describe appearance other than problematic behavior, for users with serious problematic behavior, as well as to consciously observe users with minor problematic behavior. Thus, the feeling of burden among the staff may have increased because they needed to write the case records by understanding the users from multiple viewpoints.

Awareness of the staff and new aspects of a user were mentioned as the information that the staff required from the case records. What the staff members notice or feel while

engaging with the users is ultimately based on subjectivity, and we may not be able to conclude that this is suitable for case records describing only the facts. However, if we assume that problematic behavior occurs in a context wherein individual and environmental factors are intertwined, the incongruity or the expectations felt by staff members can serve as important clues for undertaking or revising support, and they should be shared among the staff. Creating a situation where the staff members can easily describe the users' appearance by providing them with entry examples may be possible. However, a variation may arise in the way in which the staff copes with this, if a framework is established.⁶⁾ It may be important to conduct a study about the strategy to stay updated about what the staff notice or feel.

This study revealed two points: ① although case recording has been an important tool to understand the condition of the users, many staff members feel burdened by case records; ② case records are indispensable for sharing information among staff members, and we need to consider what should be recorded and how to reduce the burden on the staff in the future. In a survey about the actual state of work in a special nursing home for the aged, it has been suggested that the nature of work differs between the day and night shifts. In addition, there is a difference in the time required for dealing with the same tasks.⁷⁾ In the current study, we have not focused on the effect of the difference between day and night shifts on case records or the staff's feeling of burden, and further study about this issue is likely needed. Moreover, in this study we limited our examination to a single facility. Furthermore, the format of the records and the time required to complete these as well as the staff's feeling of being burdened may vary depending on the facility. Owing to this, the present authors plan to conduct a large-scale study in the future to verify the validity of the study's findings.

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REVIEW ARTICLE

Effects of Physical Exercise on Mental Health of Frail Older Adults: A Literature Review

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ABSTRACT

Frailty is a geriatric and physiological syndrome, which is highly prevalent in community-dwelling older adults. In particular, prevention of mental health is a key objective for successful ageing in older adults who are becoming frailty state. Therefore, the purpose of this review is to determine the effect of physical exercise on Quality of Life (QOL) and mental health of the frail older adults. A literature review of research was conducted using the PubMed, SCOPUS, Google Scholar and Web of Science electronic databases for papers published between 2016 and 2021. Randomized controlled studies were included that were aimed at the QOL and Mental health of frailty older adults. The inclusion criteria were: frailty; QOL and Health Related Quality of Life (HRQOL), Mental health (MH); physical exercise; intervention; controlled trial study and published in English. After screening, 7 research were included in this literature review (n=1038, age range: 68.9±3.9 to 85.2±7.4 years). There was a significant, positive impact on QOL and MH outcomes in 3 out of the 7 studies included in the literature review. Furthermore, there was proof that using a clinically validated measures of frailty affected the results of QOL.

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I. Background

Across the world, the older adult population is growing rapidly. It is expected that the older adult population will reach 2 billion adults in 2050 which raises serious concerns for the planning of physical and mental systems^{1,2}. One of the most challenging aspects of older adults is the Clinical frailty¹.

Frailty is a geriatric syndrome and clinical state which primarily affects older adults, places the individual at a high risk of falls, disability, hospitalization, and mortality^{3,4}. The pathophysiology of frailty is multifactorial factors and not due to normal aging, but instead causes by age and aging-related disease and lifestyle, psychological, educational, and environmental risk factors⁵. In the Japan, approximately 7.4% of community-dwelling older adults are frail, and the prevalence of frailty was 5.7%, 30.4%, and 35.1% for those aged 65-74, 75-84, and 85 years, respectively⁶. In particular, one of the most challenging issue for older adults aged over 75 years is the clinical state of frailty^{1,6,7}. Although the prevalence of frailty varies widely depending on the instruments and defined criteria used, but there are two widely defined diagnosis for frailty; holistic assessment such as frailty index (FI) and phenotypic approach. The most commonly cited one of frailty is phenotypic and diagnostic criteria of Cardiovascular Health Study (CHS), as the presence of minimum three or five criteria; 1) unintentional weight loss, 2) low level physical activity, 3) self-reported exhaustion, 4) weakness, and 5) slow walking speed⁸. Furthermore, it is important to recognize that frailty exists on a spectrum ranging from pre-frail to failure in older adults aged over 65 years⁹.

Previous studies reported that frail older adults may health-related beneficial effects from physical exercise and interventions that targeted executive functional deficits. Moreover, supervised physical exercise is recommended as a possible intervention to reverse frailty and is safe intervention in frail older adults⁹. A previous review, conducted by Campbell et al and Kojima et al., demonstrated an inverse association between Quality of Life (QOL) and frailty among community-dwelling older people^{10,11}. Also, exercise interventions are reduced frailty and positive impact on QOL or activities of Daily life (ADL)^{10,11}. Therefore, QOL have an important effect on the performance of frail older adult.

However, the literature search of previous studies was undertaken in 2018, and not reflect the most recent literature. Therefore, the present study aims to review recently published the literature investigating the effect of physical exercise and interventions on QOL and Mental health (MH) in Frail older adults.

II. Methods

1. Data sources and search strategy

A literature search was undertaken in September 2021 using following data bases; PubMed (Medline), Cochrane, SCOPUS, Google Scholar, Web of Science for papers published between January 2016 and September 2021. The selected keywords were “Frail”, “older adults”, “Frail elderly”, “quality of life”, “QOL”, “HRQOL”, “Exercise” and “intervention”. This search strategy was adapted for all databases.

2. Study selection

Researcher independently screened all studies by reading the title and abstract; non-randomised clinical trials or randomised controlled trials (RCT) in frail older adults. In particular, frail defined clinically using Fried phenotypic diagnostic and published in English were considered for eligibility criteria.

3. Eligibility criteria

The inclusion criteria for this study were: designed as a controlled clinical trial, non-randomised clinical trial or randomized controlled trial; age of samples > 65 years, participant of frail older adults; effect of the exercise and intervention on Quality of Life (QOL); was written in English.

Type of participants: Frail older adults.

Type of physical exercise and intervention: All types of physical exercise; e.g., aerobic, strength, balance, resistance, stretching, and combination of these exercise. These physical exercise and intervention were compared with control group or other exercise.

Type of outcomes measurement: Mental health (MH), Quality of Life (QOL).

The exclusion criteria were: non-human studies, participants younger than 65 years, pharmaceutical interventions; exercise and intervention without control group or usual group, QOL was not the outcome of the study.

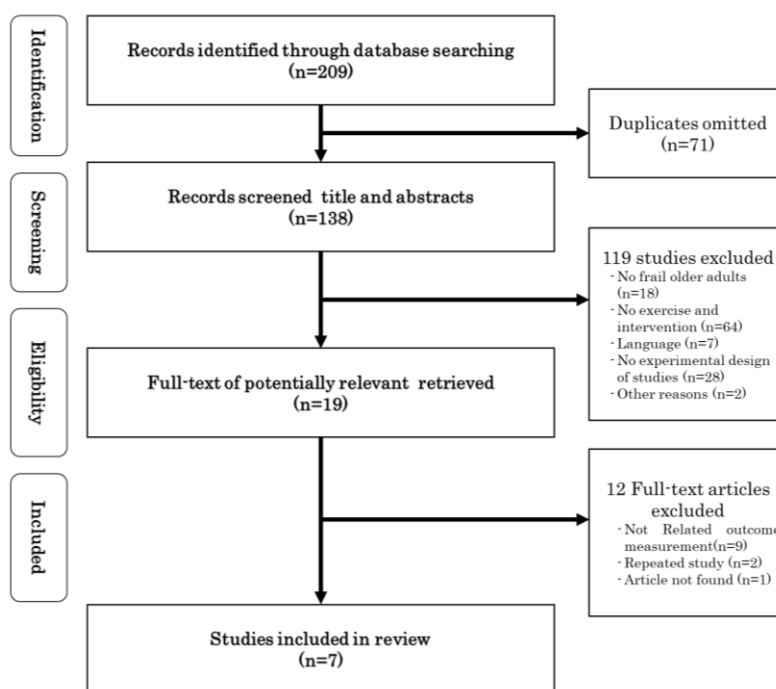
4. Data extraction

The data were extracted from the included studies: author names, publication year, study, number of participations, characteristics of participations (age, gender, Frailty states), type of physical exercise and intervention, measured outcome, finding of primary outcome; QOL, MH, and secondary outcomes; physical function. If provided, the average(mean) and standard deviation (SD) or standard error (SE) for QOL in the groups were extracted.

III. Research Overview

1. Literature search results

From the search, 209 records were obtained. After the omission of 71 duplicates, 138 titles and abstracts were screened (Fig. 1). 138 records were read for further information, and further 119 were excluded. Most of the studies excluded at this stage did not physical exercise and intervention (n=64), the study design was not experiment (n=28) and study population was not frail older adults (n=18). After screening full-text, 19 potentially eligible recorders were identified, further 12 were excluded. The excluded full-text articles reported a study that did not measure quality of life (n=8), did not found article (n=4). Thus, a total of 7 trials were included in literature review.



<Figure 1> Flow diagram of search process

2. Study characteristics

An overview of the characteristic and outcomes of studies is Table 1. All 7 studies included were RCT, no eligible controlled clinical trial and non-randomised clinical trial were identified. Total number of participations in the review was 1038, and age ranged from 68.9 ± 3.9 to 85.2 ± 7.4 years (mean \pm standard deviation; SD)¹²⁻¹⁸. Sample size range from 64¹⁷ to 377¹⁴. These studies used 4 different criteria for frailty; Primary care of the survey of health, ageing and retirement in Europe (SHARE-FI)¹⁵, Fried criteria from CHS^{13,16-18}, Edmonton Frailty Scale¹⁸ and a 25-item self-reported screening questionnaire:

Kihon checklist¹⁴⁾.

<Table 1> Overview of the included studies, characteristics and Frailty

Study Author, year	Study Design	Participations Age (SD)		Frailty measure
		Intervention	Control	
Chittrakul et al. ¹²⁾ (2020)	RCT, single-blind, assessor-blind, ITT	n=36 69.1(3.6)	n=36 68.9(3.9)	Pre-frail.
		65-69, n=24 70-74, n=8 ≥75, n=4	65-69, n=23 70-74, n=9 ≥75, n=3	
Hsieh et al. ¹³⁾ (2019)	RCT, single-blind, four-arm, ITT	n=245	n=80	Frailty five indicators by Fried criteria from CHS; 1) weightless≥3kg(or 5%), 2) exhaustion, 3) poor muscle strength, 4) slowness, 5) low physical activity.
		Exercise, n=79 72.0(6.0)	72.5(5.5)	
		Nutrition, n=83 70.4(5.3)		
		Combination, n=83, 71.6(6.0)		
Huang et al. ¹⁴⁾ (2020)	RCT, single-blind,	n=284	n=93	Three items out of a 25-item self-reported screening questionnaire: Kihon checklist. Frailty index (FI)
		AE, n=98, 72.3(4.6)	72.1(4.6)	
		RE, n=90, 72.3 (4.8) AE+RE, n=96, 72.6(4.5)		
Kapan et al. ¹⁵⁾ (2017)	RCT	n=39 83.0(8.0)	n=41 82.5(8.0)	Pre-frail, Primary care of the survey of health, ageing and retirement in Europe (SHARE-FI). Able to walk with or without walking aid.
		65-79, n=13 80-89, n=15 ≥90, n=11	65-79, n=13 80-89, n=19 ≥90, n=9	
Mollinedo Cardalda et al. ¹⁶⁾ (2019)	RCT	n=48	n=29 85.2(7.4)	Frailty five indicators by Fried criteria from CHS
		TE, n=25 85.5(8.1)		
		ME, n=23 83.8 (8.3)		
Sadjapong et al. ¹⁷⁾ (2020)	RCT	n=32 76.7(1.4)	n=32 78.9(1.3)	Frailty five indicators by Fried Five criteria: 1) weight loss ≥ 4.5kg in the previous years 2) slow gait, 3) weakness, 4) exhaustion, 5) low physical activity.
Tarazona-Santabalbin a et al. ¹⁸⁾ (2016)	RCT	n=51 79.7(3.6)	n=49 80.3(3.7)	Fried frailty criteria from CHS, Edmonton Frailty Scale.

The data are expressed as mean (SD or SE) or n, RCT: randomised clinical trials, SD: standard deviation, SE: standard error, ITT: intension to treat, AE: aerobic exercise, RE: resistance exercise, TE: TheraBand's exercise. ME: multi-calisthenics exercise.

3. Type of physical exercise and Measurement of Quality of Life/Mental health

Five studies included an intervention that was solely physical exercise^{12,14,16-18)}, two studies had a multi-modal intervention which included a physical exercise^{13,15)}. Other intervention in multi-modal included Nutrition intervention¹³⁾ and social support or cognitive intervention¹⁵⁾. The lowest frequency of exercise was twice a week^{14,15)} and highest five a week¹⁸⁾. All studies included worm-up and cool-down, Five included strength

exercise^{12,13,15,16,18}), Three included aerobic exercise^{14,17,18}), Two included balance exercises^{12,17}) and two included resistance exercise^{14,17}) (Table2).

The different instruments used to determine quality of life were; Short Form 36 health survey questionnaire (SF-36)^{12,17}) or Short Form 12 health survey questionnaire, (SF-12)^{13,16}), World Health Organization Quality of Life Instrument-physical, psychological, social and environmental aspects (WHOQOL-BREF)¹⁵), World Health Organization Quality of Life Instrument-Older Adults Module (WHOQOL-OLD)¹⁵), Euro Quality of life 5 Dimension (EQ-5D)¹⁸), and the life satisfaction index¹⁴). Moreover, the different outcomes used to determine mental health; Geriatric Depression Scale (GDS)¹²⁻¹⁴), Generalized Anxiety Disorder (GAD)¹⁴), Mini-Mental State Examination (MMSE)^{13-16,18}), International Physical Activity Questionnaire (IPAQ)¹⁴), Wechsler Memory Scale-Revised Logical Memory I & II (WMS-R)¹⁴), Mini Nutritional Assessment-Longform (MNA-LF)¹⁵), Barthel Index(BI)¹⁸).

4. Effects of physical exercise on various outcomes

Table 2 is overview of the effects of physical exercise on QOL and MH. From these seven studies¹²⁻¹⁸), between group improvements in the exercise group, or deterioration in the control group, and with maintenance of the exercise group in QOL or MH measures, were reported in Three studies^{12,14,16}). Moreover, six studies were with in-group improvements in the exercise group^{12,13,15-18}).

In the seven studies from the exercise intervention on QOL and MH measures, six studies used a clinically validated measure of frailty criteria from CHS^{13,16-18}), FI and Kihon Check list¹⁴), SHARE-FI¹⁵) and one study did not measure of frailty¹²). In the three studies which did observe an improvement^{12,14,16}), two employed a clinically recognized frailty measure^{14,16}). These results were to suggests that using a clinically validated measure of frailty criteria impacted on the beneficial effect of exercise. In addition, all three studies which observed effect of exercise on QOL and MH (GDS, GAD) also observed an improvement in physical function^{12,14,16}). Of the three studies that did observe a significant, positive effect of exercise on QOL and MH measures^{12,14,16}), all studies reported an improvement in physical outcomes. As a result of the literature review, it would appear that significantly improved physical function do not necessarily result in improved of QOL or MH, but when physical function is increased, QOL and MH are al so increased.

<Table 2> Overview of the effects of physical exercise on Mental health

Study Author, year	Length of trial/ Follow-up	Type of physical exercise	QOL/MH measure	Main findings
Chittrakul et al. ¹²⁾ (2020)	12weeks /24weeks	60min/1set, 3days/week, for total of 36 session. <Details> Multi-system physical exercise (MPE). 10min of warm-up, 45min of exercise, 5min of cool-down. Beginner: weeks 1to 4, proprioception, muscle strengthening, reaction time, balance Intermediate: weeks 5 to 8, proprioception, muscle strengthening, reaction time, balance Advanced: weeks 9 to 12, proprioception, muscle strengthening, reaction time, balance	QOL: SF-36 MH: GDS	BG: ↑SF-36, GDS WG : ↑SF-36, GDS Physical function; ↑Knee extension strength, hand reaction time, sway path.
Hsieh et al. ¹³⁾ (2019)	1month /3month /6month	5-60 min/1set, 3-7days/week, per session or rep tailored to participants capabilities. <Details> Exercise: Combination of strength, flexibility, balance and endurance training. Nutrition: To maintain a desirable body weight; caloric intake achieved through designated number of servings of food. Combination: Exercise plus Nutrition.	QOL: SF-12 MH: GDS, MMSE, IPAQ.	BG: Exercise, Combination; →SF-12 MCS, GDS WG: Combination; ↑SF-12 MCS Exercise, Combination; ↑physical function Handgrip strength 10-mgait speed lower body flexibility ↑Frailty score.
Huang et al. ¹⁴⁾ (2020)	26weeks /52weeks	60min/1set, 2days/week, for total of 52 session. <Details> 60min/1sets: Stretch 10min, Each exercise 40min, cool-down 10min. AE: 40min, 10-to15min step-in place exercise, 10-15min walking and rest intervals sets. RE: resistance band workout (Curls, chest presses, side raises, leg presses, hip abduction, etc.) and bodyweight exercises (squats, knee-ups, calf raises and trunk curls). AE+RE: AE and RE 20min for each.	QOL: the life satisfaction index. MH: GDS, GAD, MMSE, WMS-R	BG: AE, RE; →QOL AE+RE; ↑QOL, AE; ↑GDS, GAD. WG: AE; → GDS, GAD, RE, AE+RE All exercise group; ↑FI index

Kapan et al. ¹⁵⁾ (2017)	12 weeks / No	<p>1h/1set, 2days/week, for total of 24 session.</p> <p><Details> Physical training and nutritional intervention (PTN): 5min warm-up and six strength exercise (mini squats, hip extension, chest press, shoulder press), two sets(12-15repetitions),</p> <p>Social support (SOSU): Social contact, ideas for cognitive exercises (memory card, card games)</p>	<p>QOL: WHOQOL-BREF, WHOQOL-OLD</p> <p>MH: MMSE, MNA-LF</p>	<p>WG: ↑WHOQOL-BREF; Overall QOL, Social relationship</p> <p>↑WHOQOL-OLD; Past, present and future activities, social participation, ↑MNA-LF</p> <p>Physical function: ↑SPPB, ↑handgrip strength, ↑PSAE</p>
Mollinedo Cardalda et al. ¹⁶⁾ (2019)	12 weeks / No	<p>60min/1set, for total of 24session</p> <p><Details> 10 min of warm up (Mobility of ankle, nee, hip joints)</p> <p>45 min of strength exercise for the lower limbs (flexors and knee extensor -s, abductors, hip rotators)</p> <p>5min of cool-down with stretching of the muscles.</p> <p>1-2weeks:2 exercises were undertaken in main part, 2sets of 10 repetitions.</p> <p>4-6weeks:3 exercises were under taken, 15 repetitions.</p> <p>10-12weeks:4 exercises were performed with the same repetitions.</p>	<p>QOL: SF-12,</p> <p>MH: MMSE,</p>	<p>Time × Group: SF-12 PCS↑, SF-12 MCS↑.</p> <p>WG: TE; ↑SF-12 PCS, PS, GH, ↑SF12-MCS, SF, ES, EW.</p> <p>ME: ↑ PS, ↑SF12-MCS, ES, EW.</p> <p>Physical Function: ↑BI, ↑Mini-mental test, ↑FTSTS</p>
Sadjapong et al. ¹⁷⁾ (2020)	12weeks /24weeks	<p>Multicomponent exercise Program (MCEP).</p> <p>60min/1set, 3days/week, for total of 36 session.</p> <p><Details> 5-10min of warm up.</p> <p>10-20min of Chair Aerobic exercise. 1month: 10min 2month: 15min 3month: 20min</p> <p>25-30min of resistance exercise with TheraBand. 1month: Reps8×2 set (Intensity: 65% of 1RM) 2month: Reps10×3 set (Intensity: 75% of 1RM) 3month: Reps12×3 set (Intensity: 85% of 1RM)</p> <p>10min of balance exercise. 1month: two hands 2month: one hand 3month:no support.</p>	<p>QOL: SF-36</p>	<p>WG: ↑SF-36 PCS, →SF-36 MCS.</p> <p>Physical Function: ↑Frailty Score, ↑Strength(handgrip), ↑Burg balance score, ↑TUG</p>

Tarazona-Santabalbina et al. ¹⁸⁾ (2016)	24weeks /No	Multi-component exercise. 65-70min/1set, 5days/week, for 70session. <Details> 10min of warm up 10-15min of proprioception and balance exercise. 10-15min of aerobic exercise. (Intensity: 40% of HRmax increasing progressively to 65%) 40min of strength exercise with TheraBand. 1month: Reps30×1-3 set (Intensity: 25% of 1RM) 2month: Reps30×3 set (Intensity: 25% of 1RM) 3month: Reps15-8×1-3 set (Intensity: 50% of 1RM) 4month: Reps8×3 set (Intensity: 50% of 1RM) 5month: Reps15-8×1-3 set (Intensity: 75% of 1RM) 6month: Reps8×3 set (Intensity: 75% of 1RM) 5min of stretching with band, ball.	QOL: EQ-5D MH: BI, MMSE	BG: →EQ-5D, ↑BI WG: ↑EQ-5D, BI, MMSE Physical function; ↑SPPB total score, ↑PPT ↑PAEE
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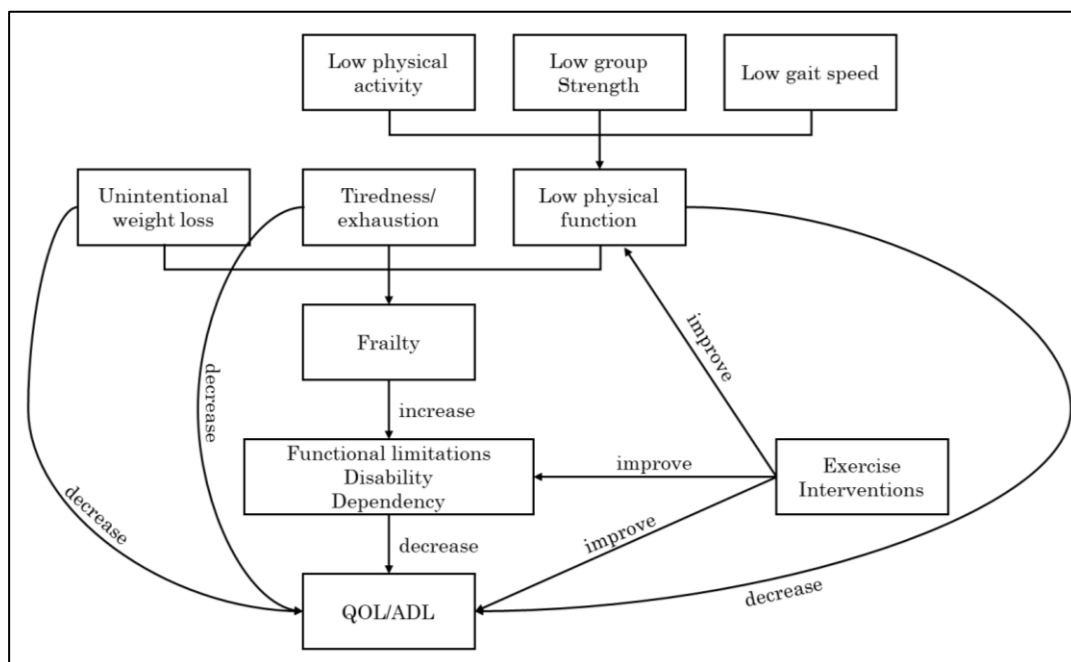
NOTE: ADL: activities of daily living, AE: aerobic exercise, BG: differences between groups, BI: Barthel index, EQ-5D: Euro Quality of life 5 Dimension, ES: emotional state, EW: emotional wellbeing, FTSTS: Five times sit to stand test, GAD: Generalized Anxiety Disorder, GDS: geriatric depression scale, IPAQ: international physical activity questionnaire, MCS: mental component summary, ME: multi-calisthenics exercise, MMSE mini-mental state examination, MNA-LF: mini nutritional assessment-longform, PAEE: physical activity energetic expenditure, PASE: physical activity scale for the elderly, PCS: physical component summary, PPT: physical performance test, PS: physical state, GH: general health, QOL: health related quality of life, MH: mental health, RE: resistance exercise, SF: social function, SF-12: short form 12 health survey questionnaire, SF-36: short form 36 health survey questionnaire, TE: TheraBand's exercise, TUG: Timed up and go test, WG: difference with in groups, WHOQOL-BREF: World Health Organization Quality of Life Instrument-physical, psychological, social and environmental aspects, WHOQOL-OLD: World Health Organization Quality of Life Instrument-Older Adults Module, WMS-R: Wechsler Memory Scale-Revised Logical Memory I & II.

IV. Discussion and Conclusion

The literature review performed provided improvement of the effects of exercise on the QOL and MH of the frail older adults. This review identified 7 studies that examined the effect of physical exercise and intervention on QOL or MH (Depression, Anxiety, etc.,) in frail older adults. In summary, there was a significant effect on QOL and MH in 3 out of the 7 studies included in the literature review, there was proof that using a clinically validated measures of frailty affected the results of QOL or MH. However, the produced inconsistent finding on whether prescribed intervention and physical exercise led to a significant, positive impact on QOL and MH; therefore, it is unclear whether exercise had an effect on QOL and MH in frail older adults. These findings are broadly in line the systematic reviews of Campbell E et al., which concluded that there was no noticeable effect of exercise on QOL¹⁰⁾. Moreover, according to these author, the systematic and meta-

analysis, concluded that it was not possible from the previous studies to examine the effect of QOL^{10,19}).

In this review, six studies reported an improvement in physical function outcomes. Furthermore, it was provided that there was a positive impact on QOL or MH in all papers that reported an improvement in a physical function outcome, none of the papers that did not. These results were evidence that improvements of QOL or MH (depression, anxiety) may be linked to improvement in physical function. Similarly, in the present studies results, a hypothetical pathway of interaction of exercise intervention on frailty, QOL and physical function can be seen from the figure 2, by Campbell E et al¹⁰.



(Adapted from Campbell E et al, Exp Gerontol. 2021)

<Figure 2> Pathway of interaction of Exercise interventions

In conclusion, this literature reviews which found that physical exercise and intervention seemed to have a significant, positive effect on QOL/MH in frail older adults. However, the optimum intervention and the type of physical exercise remained unclear. Future studies should focus on determining the effective of physical exercise and intervention methodology in frail older adults. Finally, more literature and systematic review study is needed to improve the underlying mechanism responsible of significant influence of physical exercise on QOL and MH outcomes in frail older adults.

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REVIEW ARTICLE

Conceptual Analysis of Menstrual Disorders in Young Women

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ABSTRACT

To define the concept of menstrual disorders in young women.

Articles were searched from PubMed (2010-2020) using the keywords "Young Women," "Dysmenorrhea" and "Premenstrual Syndrome." Eight articles were extracted from 32 articles. Regarding articles in Japan, Japan Medical Abstracts Society website and CiNii Articles were searched, using the keywords "Young Women" and "menstrual disorders." 23 articles were extracted from 165 articles. A total of 31 articles (23 articles in Japan, 8 articles from overseas) were targeted.

Six attributes: Actual condition of menstrual disorders, risk of menstrual disorder, endometriosis and treatment, use of analgesics, use of oral contraceptives (hereinafter OC), and Quality of Life (hereinafter QOL) in menstrual period. Five preconditions: Young women and motivation, women's lifestyle and change in life habits, menstrual mechanism and normal values, classification and symptoms / treatment of menstrual disorder, view of menstruation and menstrual education. Four consequences: Awareness of menstruation, education surrounding menstruation, research on menstruation, and issues related menstruation were extracted.

This concept was defined as "in actual conditions of menstrual disorders, there is great variation, such as dysmenorrhea, PMS, and irregular menstruation, and accordingly, related risks have been observed, and the existence of endometriosis is also partially indicated. Analgesics and OC are not appropriately utilized, and QOL of young women during menstrual period decreases."

< Key-words >

Young women, menstrual disorders, conceptual analysis

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I. Introduction

Regarding the study background, when a self-care scale for young women with menstrual pain was prepared, it was indicated that young women with strong menstrual pain do not properly care for themselves, their symptoms are not improved by self-care. Consequently, they need to visit a gynecologist¹⁾.

A survey by the Japan Association for The Advancement of Working Women (2004) pointed out that 27.1% of women 25 years old and younger visit a gynecologist for irregular menstruation. However, in contrast, 55.9% did nothing. Regarding degree of menstrual pain, 43.1% of women 25 years or younger responded “very bad,” and “bad”. However of these, only 13.6% visit a gynecologist, and 28.8% did nothing.²⁾

Similarly, the rate of consultation among women 25 years or younger was less than 30%, even though they had irregular menstruation and approx. 10% had strong menstrual pain. Menstrual disorders were often overlooked. According to Mochizuki, the most frequent main complaint by young women visiting a gynecologist is menstrual disorder.³⁾

Furthermore, most surveys on menstrual disorder in young women are small-scale studies. -omission- Approximately 80% of girls with menstruation-related disorders were reported to experience difficulty in their physical exercises and study but did not consult with anyone. Consequently, an accurate portrayal of the actual condition of menstruation in pubescent girls is still not understood.⁴⁾

Currently, no studies have been carried out which define the concept of menstrual disorders in young women. Identifying the conceptual structure of menstrual disorders in young women would be meaningful for health-care professionals and deepen their understanding, as well as be the foundation for future research. Consequently, the purpose of this study is to define the conceptional structure of menstrual disorders in young women by conceptual analysis.

II. Operational definition of terms

Young women: women in their late teens to early 20s who have experienced ovulatory cycles for several years after their first menstruation and are more susceptible to functional dysmenorrhea.

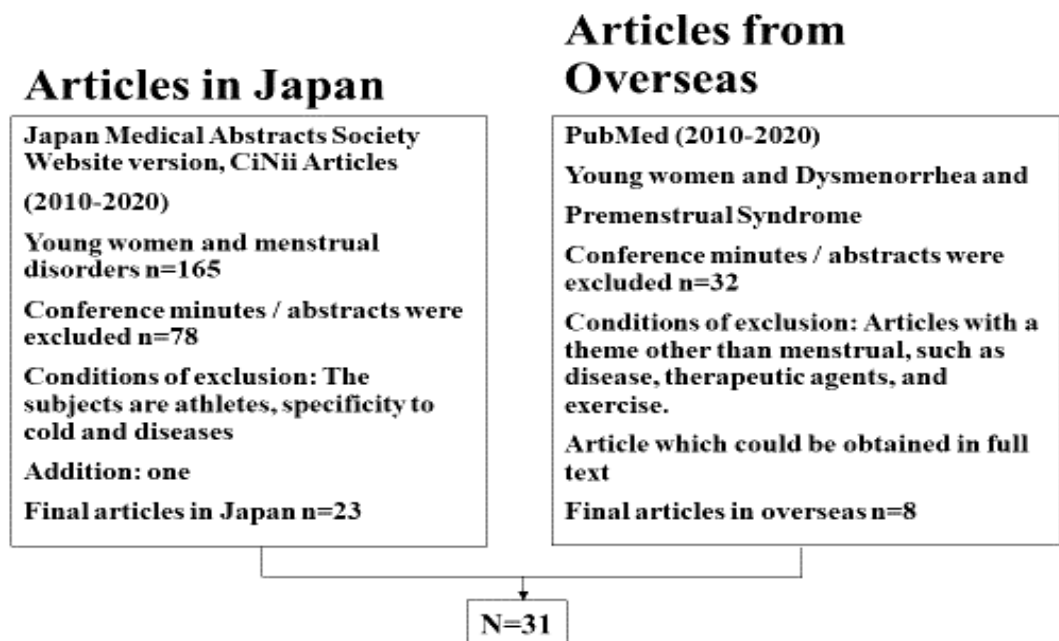
III. Research method

1. Selection of Articles

Articles from overseas were searched from PubMed (2010-2020) using the keywords “Young Women,” “Dysmenorrhea” and “Premenstrual Syndrome,” and conference minutes and review papers were excluded, and then original papers between 2010 and December 2020 were searched. The search was then narrowed down to articles published in academic magazines and with an abstract. resulting in a total of 32 articles extracted. From these 32 articles, studies regarding diseases and therapeutic agents, and studies with a theme other than exercise and menstruation were excluded, and 8 articles which could be obtained in full-text were extracted.

For articles in Japan, Japan Medical Abstracts Society website and CiNii Articles were searched using the keywords “Young Women” and “menstrual disorders.” 165 original papers published between 2010 and December 2020 were extracted. After conference minutes and review paper were excluded, 78 articles were extracted.

From these 78 articles obtained by the search, studies on a specific diseases and coldness, and studies targeting only athletes, were excluded, an article regarding the latest research on menstruation by the author was added, and a total of 23 articles were extracted. 8 articles from overseas and 23 articles in Japan, for a total of 31 articles, were targeted for analysis (refer to Fig. 1).



<Figure 1> Article extraction method and number of articles

2. Data analysis method

In this study, the conceptual analysis method of Rodgers (2000) was used to determine the conceptual analysis of menstrual disorders in young women. Since the philosophical foundation of this analysis has been refined and developed by changes over time, Rodger’s conceptual analysis was considered appropriate as the lifestyle of women with menstrual disorder has greatly changed over these past 30 years, and the environment surrounding young women is predicted to change with each generation.

The targeted articles were read intensively, attributes which comprise the concept, preconditions which show the background of menstrual disorders in young women and contents that correspond to the consequences as a result of the concept, were encoded and extracted. After that, the articles were divided into attributes, preconditions, and consequences, and the codes are classified into sub-categories, then the common items of the sub-categories were categorized, and correlation between categories were shown in a conceptual diagram (refer to Fig.2).

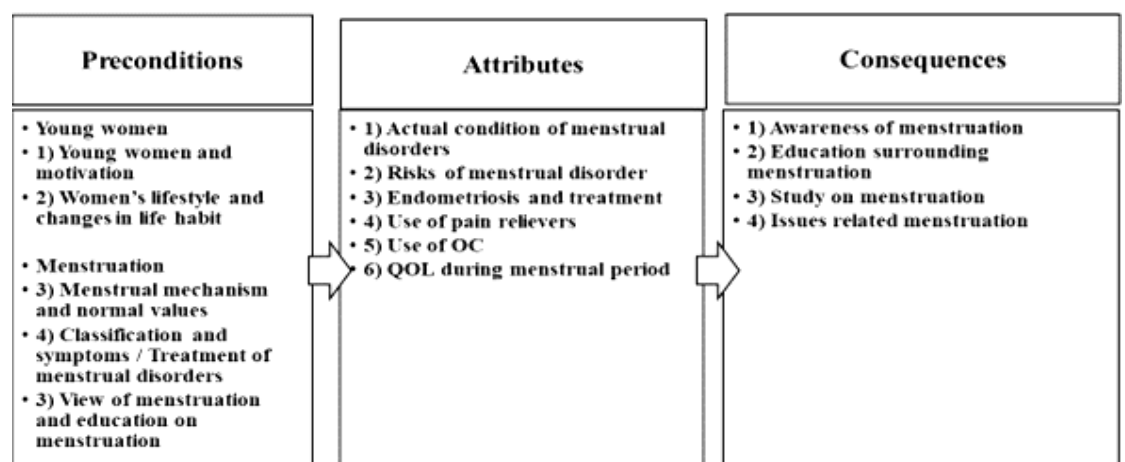
To ensure reliability and validity of the analysis, two professors of maternity nursing education supervised the analysis.

3. Ethical consideration

For the articles used in this study, quoted articles and the original sources were clearly described so as to avoid any copyright infringement.

IV. Results

The constructed concept of menstrual disorders in young women is shown in Fig. 2. Hereinafter, categories are shown as { }, sub-categories as [], and codes as “ ”. Here, the extracted categories are explained.



<Figure 2> Concept construct of menstrual disorders in young women

1. Attributes (Refer to Table 1)

As attributes of menstrual disorders in young women, six categories were extracted.

1) {Actual condition of menstrual disorders}

“Recognized symptoms of menstrual disorders increased 80% in Japan and abroad,”^{5,6} “Symptoms of menstrual disorders affected daily life / academic activities,”⁷ [Actual condition of symptoms during menstruation] increased, especially, [rate of dysmenorrhea and causes] exceeded 80%, with “excessive production of prostaglandin” determined to be the cause⁸. [Actual condition of irregular menstruation] was also approx. 25%, and “50% of women who have irregular menstruation had polycystic ovary syndrome (hereinafter referred to as PCOS).”⁷

In [Actual condition of menstruation concomitant symptoms / perimenstrual symptoms], “98.4% had symptoms.”⁵ In [Actual condition of menstrual pain], “lower abdominal pain (91%), lumbar backache (52.8%)” were observed. Regarding the [Actual condition of PMS], “In Europe, persons with premenstrual symptoms exceed 90%.” Also in Japan, “Patients with PMS and PMDD could potentially be 180,000 persons.” From this, the [Actual condition of menstrual disorders] affects most young women.

2) {Risks of menstrual disorders}

Among the [Risks of PCOS / irregular menstruation], “Ovulation disorder is the cause of 25-30% cases of infertility”¹²) and among [Risks of dysmenorrhea], the “risk of endometriosis is 2.6 times higher”¹³) and among [Risks of PMS], “persons with a family history of such risks are 4.19 times more likely to experience PMS.”¹⁴)

Furthermore, among the [Risks of hypermenorrhea], the “Risk of anemia” can be mentioned,^{7,15}) and regarding [Risks of abnormal age of menarche], “the risk of abnormal bleeding is 6.92 times higher.” From this, the {Risks of menstrual disorder} are very large.

3) {Endometriosis and treatment}

[Early endometriosis] can easily be “diagnosed as functional dysmenorrhea since internal examination and image diagnosis are not possible.”^{4,13}) [Causes of endometriosis] are “related to hormones and periodic menstruation,”¹⁶) and one of the [Signs of endometriosis] is “dysmenorrhea, which has spread among young women.”¹⁶) Furthermore, since “Late diagnosis of endometriosis” is listed among [Diagnosis and treatment of endometriosis]¹⁰), early detection of {Endometriosis and treatment} are difficult and delay in treatment is common.

4) {Use of analgesics}

Regarding the [Period of use of analgesics], it is “use is recommended in the early phase.”⁹) However, “persons who are averse to their use is 65%”⁹) due to [anxieties regarding use]. Consequently, [education of analgesics] is needed. Furthermore, regarding

the [rate of use of analgesics], “25-60% of young women use over-the-counter drugs.”⁹⁾ As a result, the “analgesic effect” is “insufficient in 40% of cases.”⁹⁾

Regarding [Therapeutic agents], “administration of NSAIDs”⁴⁾ is standard.

5) {Use of OC}

[Characteristics of OC users] include a “higher average age and a higher level of physical activity”.¹⁷⁾

Regarding [Efficacy of OC], “reduction in the amount of menstruation bleeding in RCT was clearly evident in 43% cases when administered to women with hypermenorrhea.”¹⁸⁾ However, the [Rate of use of OC] was found to have “a low distribution rate in Japan.”¹⁸⁾

6) {QOL during menstrual period}

“Q-LES-Q-SF”¹⁹⁾ is [a scale which can appropriately measure menstrual cycle QOL]. However, [satisfaction during menstrual period] was resulted in “satisfaction in the perimenstrual period in women 25 years and younger,”¹⁹⁾ and “rate of participation in the labor force for women 20-24 years old with functional dysmenorrhea is 69.1%, a decrease in not only QOL, but also QOW is observed,”^{1,7,10)} [Menstrual disorder adversely affects QOL], and {QOL during menstrual period} decreases.

<Table 1> Attributes of menstrual disorders in young women

Categories	Subcategories	Main code	Documentation
Actual condition of menstrual disorders	Actual condition of menstrual disorders	In Japan and abroad, menstrual symptoms were 30% before 1983 and increased to more than 80% after 2000; the number of young women complaining of menstrual symptoms over 30 years increased.	5) Kaimura&Ueda 6) Yamamoto
		Premenstrual and menstrual symptoms affected daily life / academic activities.	7) Karout, Hawai&Altuwajri
		Menstrual symptoms included lower abdominal pain (75%), bloating (75%), irritability (73%), increased appetite (64%), and acne (62%). Prevalence of lower abdominal pain was lower for East Asians than for Caucasians and South Asians.	17) Alicia, Jarosz&Ahmed
	Prevalence and causes of dysmenorrhea	Dysmenorrhea is the most common menstrual symptom with a prevalence of 85%.	4) Adachi
		Prevalence of dysmenorrhea in Iran is 22-28%, and most cases are primary dysmenorrhea.	19) Farideh, Sakineh&Moigan
		Dysmenorrhea is observed in 26% of 22-27 year olds and decreases to 21% for 31-36 year olds.	27) Brown W, Dobson A, Bryson L & Byles J
		7.7-57.8% were absent due to dysmenorrhea, 21.5% had reduced social activities, and back pain, headache, heavy bleeding were observed in half of the subjects.	10) Mark, Theodor, Moniek, Didi & Annemiek
		Prevalence of dysmenorrhea in Australian teens was 93%, 80% in Egyptian teens. A universal method to evaluate dysmenorrhea is lacking. Excessive prostaglandin production is a cause of dysmenorrhea pain.	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing
		Prevalence of dysmenorrhea in Ethiopia is 85.1%, due to family history and circumcision (female genital mutilation). 66% of case of dysmenorrhea experience lower abdominal pain, 28.4% mild, 24.2% moderate, 13.3% severe.	14) Muluken, Mamo & Desalegn 15) Ahmed, Atiea & Nadia
	Actual condition of irregular menstruation	25.2% of students with irregular menstruation have rare menstruation, rare menstruation is a symptom of PCOS, 50% of women with irregular menstruation have PCOS.	7) Karout, Hawai & Altuwajri
		Irregular menstruation affects life, health and work, irregular menstruation 24.38%.	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing
	Actual condition of menstruation concomitant symptoms / perimenstrual symptoms	Strong menstruation concomitant symptoms include decreased concentration, increased absenteeism, school absenteeism 25.3-51%, limited activity 60.4-63%, among those with menstrual symptoms 98.4%. Those with irregular sleeping and resting habits, no exercise habits, binge eating, smoking, and unhealthy stress management behaviors experience stronger perimenstrual symptoms.	5) Kaimura & Ueda
		88.2% have menstrual cramps, but do not address them. 32.8% have menstrual cramps that interfere with daily life.	5) Kaimura & Ueda
		Subjects with constant menstrual pain all the time (56.9%), occasional pain (43.1%), extreme pain (14.6%), moderate pain (68.1%). Mild pain (17.4%), 80% of those with menstrual pain experience difficulty in daily life, lower abdominal pain (91%), lumbar backache (52.8%). Menstrual pain symptoms include lower abdominal pain, headache, back pain, nausea, diarrhea, etc. Other non-medical faculty showed a 2.5 to 3 times higher risk of menstrual pain. Women in their late teens to early 20s have strong menstrual pain.	9) Hirata 13) Momoeda 22) Kaimura
	Actual condition of PMS	Subjects who experience premenstrual symptoms exceeded 90% in Europe, 77.3% of women have psychological impairment before and during menstruation, 30% PMS, 8% PMDD.	10) Mark, Theodor, Moniek, Didi & Annemiek
There are potentially 180,000 patients with PMS and PMDD, 1-4% with PMDD in Japan, 5-20% with moderate to severe PMS.		11) Hamanishi	
Psychobehavioral symptoms of premenstrual symptoms were irritability (34.8%), fatigue (28.7%), depression (26.3%), anxiety/tension (23.7%), physical symptoms included breast tenderness (52.3%), abdominal distension (33.9%), acne (26.0%), headache (19.0%), and joint and muscle pain (17.5%).		14) Muluken, Mamo&Desalegn	
The prevalence of PMS increases with dysmenorrhea, and school absenteeism and decreased work productivity were observed in patients with moderate to severe PMS.		19) Farideh, Sakineh&Moigan	
More than 60% of subjects experience premenstrual irregular symptoms. Premenstrual irregular symptoms have a negative impact on interpersonal problems, and many college students have premenstrual symptoms. PMS is observed in 35% of 22-27 year olds and decreases to 41% for 34-39 year olds.		24) Kagawa, Kitamura, Ninomiya & Terashima 27) Brown W, Dobson A, Bryson L & Byles J	
Risks of menstrual disorders	Risks of PCOS / irregular menstruation	PCOS is a risk of endometrial hyperplasia and endometrial cancer due to long-term estrogen exposure due to anovulation. Not only for amenorrhea treatment, but regular cancer screening, risk factors for future hypertension, hyperlipidemia, and diabetes.	3) Mochizuki
		Factors such as age, age at menarche, drinking, lack of exercise, lack of socializing, and BMI increase the risk of developing menstrual irregularities.	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing
		Menstrual disorders are a risk for developing osteoporosis, uterine cancer, etc. Ovulation disorders are the cause of infertility in 25-30% cases. About 70% of menstrual disorders are caused by abnormalities of the central hypothalamic-pituitary system. Irregular menstruation is associated with a 28% increase in the risk of coronary heart disease and a higher risk of type 2 diabetes.	12) Iwasa, Matsuzaki & Irahara 15) Ahmed, Atiea & Nadia
	Risks of dysmenorrhea	Patients with functional dysmenorrhea have a 2.6 times higher risk of developing endometriosis in the future.	13) Momoeda
		Persons with a family history of dysmenorrhea are 4 times more likely to develop dysmenorrhea. Dysmenorrhea is a hereditary factor.	14) Muluken, Mamo & Desalegn
	Risks of PMS	Persons with a family history of PMS are 4.19 times more likely to experience PMS, and those with irregular menstruation are 4.19 times more likely to experience PMS. 1.87 times more likely to have PMS, due to irregular menstruation which can cause PMS.	14) Muluken, Mamo & Desalegn
	Risks of hypermenorrhea	Blood loss due to menstruation affects QOL, heavy bleeding is a risk for anemia.	7) Karout, Hawai & Altuwajri 15) Ahmed, Atiea & Nadia
Risks of abnormal age at menarche	Abnormal age at menarche is 4.76 times that of the normal age of menarche, risk of rare menstruation is 3.17 times, and risk of abnormal bleeding is 6.92 times. Prevalence is high when age at menarche is less than 11 years or more than 14 years.	7) Karout, Hawai & Altuwajri	

Endometriosis and treatment	Early endometriosis	Early endometriosis cannot be diagnosed by internal examination or imaging, so it is diagnosed as functional dysmenorrhea, functional dysmenorrhea is an early stage of endometriosis exists, endometriosis causes infertility in 30-50% of women, treatment begins early in women with severe dysmenorrhea.	4) Adachi, 13) Momoeda
	Causes of Endometriosis	Endometriosis is present in 6-10% of women of reproductive age, onset is related to sex steroid hormones and cyclical menstruation.	16) Kitajima, Seno, Hiraki, Kawano, Hamaguchi & Fujishita
		Dieting causes abnormal uterine muscle contraction due to hormonal imbalance, resulting in increased menstrual blood reflux which promotes the development of endometriosis lesions.	25) Fujiwara
	Signs of endometriosis	13.0% of students experience menstrual pain extending to the anus, which is an indicator of endometriosis. Early detection and treatment of endometriosis before pregnancy.	7) Karout, Hawaii & Altuwajri
		Dysmenorrhea that progresses in young women and chronic pelvic pain outside of the menstrual period is organic dysmenorrhea caused by endometriosis. 10% of cases of severe dysmenorrhea show uterine abnormality, and dyspareunia may indicate endometriosis.	16) Kitajima, Seno, Hiraki, Kawano, Hamaguchi & Fujishita 15) Ahmed, Atia & Nadia
Diagnosis and Treatment of Endometriosis	Many general practitioners consider the diagnosis of endometriosis to be late. Endometriosis is seen in 25-70% of young women with chronic pelvic pain after laparoscopic surgery. Incidence of endometriosis greatly increases in women over 20 years of age. Treatment is pain control and inhibiting progression of endometriosis lesions. NSAIDs and low-dose pills are used, but if no effect, laparoscopic surgery is performed.	10) Mark, Theodoor, Moniek, Didi & Annemiek 16) Kitajima, Seno, Hiraki, Kawano, Hamaguchi & Fujishita	
Use of pain relievers	Period of use of pain relievers	Use of analgesics during the early stage of menstrual pain is recommended, 48.7% use analgesics at early stage, 51.3% use it when pain appears.	9) Hirata
	Anxiety regarding use	A negative stance toward the use of analgesics results in a delay of treatment. Regarding the reason for not using analgesics early 21% say they "should be patient", and 65% are reluctant to use them. Dependence, tolerance, concerned about side effects 55%, awareness of side effects 75%, when ineffective, it is easy to think tolerance has been developed.	9) Hirata
	Therapeutic agents	Treatment: NSAIDs, if endometriosis suspected use of low-dose EP combination.	4) Adachi
	Education on analgesics	Since the side effects are not understood, include education on therapeutic agents in school curriculum, consult with pharmacists and doctors, and provide thorough guidance. Introduction of the use of medicine in health and physical education at junior high schools from 2012, and education on the use of analgesics by high school students is needed.	9) Hirata
	Rate of use of analgesics	Use of analgesics a few days a month for menstrual pain is not a problem. 25-60% of young women use analgesics, and many use over-the-counter drugs. Analgesic use for menstrual pain is 54.2%, 426 times higher in the group with very severe menstrual pain and 38 times higher in the group with moderate menstrual pain.	9) Hirata
	Analgesic efficacy	Efficacy of analgesics lacking in 40% of cases, over-the-counter analgesics less effective than prescribed analgesics. Analgesic effect: markedly effective 60.3%, relief but still painful 37.2%, only slight relief 2.6%, insufficient effect 39.7%.	9) Hirata
	Information on analgesics	Information on analgesics was 75.6% from family, teachers, and friends, 10.3% from doctors and pharmacists, 9.0% from outer box description, and 5.1% from package insert. Regarding junior high school students, half of the mothers worry about their daughters' use of analgesics, accurate knowledge of analgesics is needed, even for parents.	9) Hirata
	Side effect of the use of analgesics	25.0% of patients do not know the side effects of the analgesic, 68.1% have side effects but do not know details, 6.9% understand the side effects and details. Side effects include drowsiness, headache/dizziness, stomach problems. Persons unfamiliar with the side effects are anxious simply because there are side effects and don't use them.	9) Hirata
Use of OC	Attributes of users of OC	The average age of OC users is higher, and physical activity is higher in OC users than in non-users.	17) Alicia, Jarosz & Ahmed
	Rate of use of OC	Caucasian women use OCs the most (43%), others (34%), South Asians (17%), East Asians (13%). For PCOS treatment, administration of progestins to promote periodic bleeding and normalize menstruation. Postmenopausal women do not have reservations regarding the use of OCs, but the prevalence of OCs is low in Japan. Women with dysmenorrhea have a lower rate of OCP use.	17) Alicia, Jarosz & Ahmed 18) Koumura 27) Brown W, Dobson A, Bryson L & Byles J
		Efficacy of OC	Use of OC improves premenstrual symptoms, there are fewer severe side effects, OC promotes the good management of premenstrual symptoms, and alleviates moderate/severe premenstrual symptoms. Efficacy of OC for dysmenorrhea is clearly evident in RCT, reduction in menstrual bleeding after OC administration in women with hypermenorrhea in 43% of cases.
QOL during menstrual period	Scales which can appropriately measure menstrual cycle QOL	Scales such as SF-36, SF-12, and WHOQOL are not suitable to assess variation in QOL during the menstrual cycle. Q-LES-Q-SF is a suitable scale which can assess the variation of QOL during menstrual cycle.	19) Farideh, Sakineh & Mojgan
	Degree of satisfaction of menstruation	Satisfaction with the peri-menstrual period among women under 25 years of age is lower than that for women over 25 years of age. In the Q-LES-Q-SF, scores for physical and psychosocial factors are significantly lower during the premenstrual week than in the late follicular phase.	19) Farideh, Sakineh & Mojgan
	Menstrual disorders negatively affect QOL	Rate of participation in the labor force for 20-24 year olds with functional dysmenorrhea is 69.1% QOW as well as QOL is decreased, and economic loss due to increased absenteeism/medical use is observed. PMDD decreases QOL of students suffering from PMS. Moderate and severe dysmenorrhea and PMS negatively affect QOL.	1) Yamamoto 7) Karout, Hawaii & Altuwajri 10) Mark, Theodoor, Moniek, Didi & Annemiek 19) Farideh, Sakineh & Mojgan 27) Brown W, Dobson A, Bryson L & Byles J

2. Preconditions (Refer to Table 2)

Regarding preconditions influenced by the subjects, {Young women and motivation}, {women's lifestyle and change in life habits}, could be extracted, those influenced by menstruation itself, five preconditions, namely {menstrual mechanism and normal values}, {classification and symptoms / treatment of menstrual disorders}, and {view of menstruation and education of menstruation} were extracted.

1) {Young women and motivation}

[Definition of young women] is "women in their late teens to early 20s who experience extreme menstrual pain"⁵⁾ and do carry out self-care without "[motivation] of goals"²⁰⁾.

2) {Women's lifestyle and changes in life habits}

[Change of women's lifestyle] is large. Late marriage and births later in life -omission- tended to increase the frequency of menstruation, and as a result, "increased dysmenorrhea".¹⁾ The [effect on reproductive function] occurred due to [changes in life habits] and [the effect of missing breakfast].

However, there is a strong [desire to lose weight], and [meals and life rhythm are important], so there is a need for [intervention of life habits].

3) {Menstrual mechanism and normal values}

[Definition of menstruation], [normal values of menstruation], [menstrual feedback mechanism], and [normal value of first menstruation] are almost the same in Japan and abroad.

4) {Classification and symptoms / Treatment of menstrual disorders}

Menstrual disorders are varied and classified as [Abnormality in the first menstruation period], [definition of menstrual disorder], [causes and classification of amenorrhea], [disorders in menstrual cycle], [abnormal bleeding], [definition of dysmenorrhea], [tendency of dysmenorrhea], [functional dysmenorrhea and organic dysmenorrhea, definition], [symptoms of PMS], [causes and treatment of PMS], and [tendency of PMS].

5) {View of menstruation and education on menstruation}

Since "younger women have a more negative view of menstruation,"²¹⁾ they have "strong menstruation concomitant symptoms."^{5,22)} Although "The Netherlands is an open society, the taboo of menstruation has not broken."¹⁰⁾ The [menstruation taboo] exists. In Japan, [Dissatisfaction regarding menstrual education and lack of knowledge] is observed, [Coping behavior during menstrual period] is not effective.

<Table 2> Preconditions of menstrual disorders in young women

Categories	Sub- categories	Main code	Documentation
Young women and motivation	Definition of young women	Young women over 18 years old and under 25 years old [Definition of young women] is "women in their late teens to early 20's who experience extreme menstrual pain" ⁵⁾ and do carry out self care without "[motivation] of goals" ²⁰⁾ .	1) Yamamoto, 20) Fukuyama 5) Kaimura & Ueda
	Motivation	Behaviors and life habits which lead to improved QOL include the reasons for the behavior, preparation factors that motivate behavior, and the behavior There are reinforcing factors that provide continuous and sustained rewards and motivation, and enabling factors needed to realize the behavior Provision of knowledge is needed, but without the motivation of goals necessary for self-care, self-care is not carried out.	5) Kaimura & Ueda 20) Fukuyama
Women's lifestyle and change in life habits	Change in women's lifestyle	Marriage and childbirth later in life, over 30 years old at time of first childbirth, declining birthrate. Frequency of menstruation 10 times that of before World War 2. Frequency of menstruation has increased, and more women experience dysmenorrhea Changes in women's lifestyles: 1) westernized diet, 2) earlier sexual maturity, 3) higher education, 4) Increase number of working people, 5) Marriage later in life, 6) Decreased birthrate, 7) Increased frequency of menstruation, 8) Increased life expectancy	1) Yamamoto 28) Yasui
	Increased stress	Stress among women aged 12 and older was 40.4% in 1995 and 52.2% in 2007. Stress is higher among younger women Female reproductive organs are sensitive to physical and physiological stress, and high stress negatively affects both physically and emotionally.	5)Kaimura & Ueda, 22)Kaimura 8)Emmanuel,Samuel,Yaoyao, Xinxin & Xueqing
	Change in life habits	In terms of sleeping habits, most women go to bed after 2:00 a.m., and the percentage of women who miss breakfast was 28.6%. After school enrollment, increase from 6.0% to 24.7% after 3 months, exercise habit is low at 10.8%, smoking habit is high at 12.8%	22) Kaimura
	Effect of missing breakfast	Missing breakfast negatively affects menstrual cycle disorders, reproductive function, and affects daily QOL	25) Fujiwara
	Effect on reproductive function	Abnormalities in reproductive function caused by irregular dietary habits occur and interfere with the period of motherhood. Diet restrictions which are disassociated with diurnal rhythms have a synergistic negative effect on reproductive functions	25) Fujiwara
	Intervention in life habits	Comprehensive interventions to effectively regulate behavior and life habits, and promotion factors are needed.	5) Kaimura & Ueda
	Diet and the desire to be thin	As the ideal for a young women to weigh less than the standard weight, the number of underweight women 20-29 years old has increased, doubling from 30 years ago. Many teenage girls want to be thinner than necessary, and dieting is strongly related as a trigger for amenorrhea.	5) Kaimura & Ueda, 25) Fujihara 26) Narahara
	meals and life rhythm are important	Consistency in meals and life rhythm can minimize the negative affect reproductive function while dieting.	25) Fujiwara
Menstrual mechanism and normal values	Definition of menstruation	Menstruation is periodic bleeding from the endometrium which occurs approximately once a month and stops spontaneously within a limited number of days. Menstruation is exfoliative bleeding of the endometrium caused by the disappearance of sex steroid hormones secreted by the ovaries.	3) Mochizuki 26) Narahara
	Menstruation and normal values	A normal range is a cycle of 25-38 days, with a ± 6 day variation, lasting 3-7 days and 20-140 ml of menstrual bleeding. If ovulation is normal, average blood loss is 33.2 (10-84) ml, cycle is 26-35 days, bleeding is 3-6 days with a maximum on Day 2	3) Mochizuki, 26) Narahara 7) Karout,Hawai & Altuwajri 8)Emmanuel,Samuel,Yaoyao, Xinxin & Xueqing, 15) Ahmed,Atlea & Nadia
	Menstrual feedback mechanism	In young women, the hypothalamic-pituitary-ovarian system is immature, there is anovulation shortly after menarche, and there is no ovulation. Cycles are indeterminate during the first 2 years after menarche, 80% at 5 years, and more than 90% at 6-7 years.	6) Yamamoto, 18) Koumura,
	Normal values of the first menstruation	Irregular menstrual cycle immediately after menarche, anovulatory bleeding, 25-50% anovulatory bleeding even 4 years after menarche. Mean age of menarche is 12.3 \pm 1.5 years, range is 11-16 years	3) Mochizuki, 25) Fujiwara 8)Emmanuel,Samuel,Yaoyao, Xinxin & Xueqing, 15) Ahmed,Atlea & Nadia

Classification and Symptoms / Treatment of menstrual disorders	Abnormal timing of menarche	Menarche onset at less than 10 years of age (premature menstruation), menarche onset at 15 years of age or older (delayed menstruation), no menstruation until 18 years of age	4) Adachi, 29) Koumura
	Definition of menstruation disorder	Secondary amenorrhea: suspension of menstruation for more than 3 months	4) Adachi, 12) Iwasa, 29) Koumura
		Frequent menstruation: menstrual cycle of 24 days or less, Rare menstruation: menstrual cycle of 39 days or more Irregular cycle: menstruation that does not match the normal cycle of 25-38 days, cycle variation: continues within ±6 days	4) Adachi
	Causes and Classification of Amenorrhea	Causes of secondary amenorrhea - reduced eating (43.6%), overeating (6.3%), stress (10.7%)	28) Yasui
		There are two types of secondary amenorrhea: first-degree amenorrhea and second-degree amenorrhea.	26) Narahara
		Secondary amenorrhea with weight loss is classified as weight loss amenorrhea or anorexia nervosa	26) Nakahara, 28) Yasui, 30) Koumura,
	Menstruation cyclic disorder	Causes of hypothalamic amenorrhea: stress, weight loss, exercise burden, environmental changes	26) Narahara
		Abnormal menstrual cycle: hypothalamic-pituitary-ovarian dysfunction, suppression causes: inappropriate eating habits, stress, excessive exercise Dieting: increased menstrual cycle disorder, past experience dieting: no menstrual cycle disorder but strong menstrual pain	25) Fujiwara
		Polycystic ovary syndrome (PCOS): 5-8% cause of infertility Extremely short menstruation: bleeding for 2 days or less, Extremely long menstruation: bleeding for 8 days or more	18), 29) Koumura, 28) Yasui 4) Adachi
	Abnormal bleeding	Excessive menstruation: abnormally heavy bleeding; Hypogonadism: abnormally light menstrual bleeding	4) Adachi
		Abnormal bleeding: need to change the sanitary napkin more than 5 times a day - discharge of blood clots (heavy menstrual flow) Clots during menstruation: severe menstrual pain	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing, 15) Ahmed, Atlea & Nadia 30) Tada & Asaka
	Definition of dysmenorrhea	Dysmenorrhea: a pathologic symptoms accompanying the menstrual period.	30) Tada & Asaka
	Trends in dysmenorrhea	Dysmenorrhea, under 25 years old 43.1% , school life affected 40%.	1) Yamamoto
		Menstrual concomitant symptoms in more than 70% to 90% of cases, strong menstrual pain in late teens and early 20s, 88.2% with menstrual pain Interference with daily life 30%, school absenteeism 10%, interference in daily life 32.8% but not addressed	5) Kaimura & Ueda
		Approximately 1/4 had dysmenorrhea, psychological complaints, significant fatigue, and decreased activity in one out of three persons	10) Mark, Theodoor, Moniek, Didi & Annemiek, 27) Brown W, Dobson A, Bryson L & Byles J
		Dysmenorrhea is observed in 20-24 year olds and decreases thereafter, 21-35 day menstrual cycle decreases	14) Muluken, Mamo & Desalegn
	Functional dysmenorrhea and Organic dysmenorrhea	Mean age of menarche 12 years old, 7 years older after menarche, ovulatory cycle and functional dysmenorrhea from 19 years old	6) Yamamoto
		Classified as functional dysmenorrhea if there is no organic cause or as organic dysmenorrhea if there is organic disease.	13) Momoeda
Functional dysmenorrhea is painful during menstruation without organic disease, starts several hours before bleeding, and lasts 48-72 hours Organic dysmenorrhea affects fertility and requires treatment.		19) Farideh, Sakineh & Mojan 31) Ayabe	
Causes and treatment of dysmenorrhea	Treatment includes non-steroid, anti-inflammatory analgesics, non-pyrine analgesics, antispasmodics, and low-dose pills.	6) Yamamoto	
	Women with dysmenorrhea have high levels of PGs in the endometrium and menstrual blood, and ischemic changes cause lower abdominal pain and back pain	31) Ayabe	
Definition of PMS	Premenstrual syndrome: physical and mental symptoms begin 3-10 days before the onset of menstruation and decrease with the onset of menstruation	4) Adachi	
	Mental and physical symptoms that occur repeatedly before menstruation are called PMS, and those with strong mental symptoms are called PMDD	11) Hamanishi, 14) Muluken, Mamo & Desalegn	
	Premenstrual symptoms include physical and psychosocial symptoms occur in the late luteal phase and decrease a few days after the onset of menstruation.	17) Alicia, Jarosz & Ahmed	
PMS Symptoms	PMDD is often associated with aggressive behavior, hindering interpersonal relationships Physical symptoms include swelling, headache, fatigue; psychological symptoms including anxiety, depression, etc. More than 80% of women experience these symptoms regularly	11) Hamanishi 17) Alicia, Jarosz & Ahmed	
Causes and treatment of PMS	PMS is caused by a decrease in progesterone, which leads to a decrease in serotonin secretion, depression, and fatigue. Symptoms such as irritability occur, treatment methods are hormonal therapy, herbal therapy, psychotropic drugs, symptomatic treatment, and LEP preparations	7) Karout, Hawai & Altuwaijri, 15) Ahmed, Atlea & Nadia, 18) Koumura	
	Symptoms disappear with the onset of menstruation in 97.8% of cases of PMS. When symptoms appear, daily life is affected	8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing	
Trends in PMS	Many women in their late teens and early twenties experience psychosocial symptoms caused by menstrual pain before menstruation.	22) Kaimura	
	More than one-third of women suffer from PMS, with prevalence peak approximately at the age of 35.	27) Brown W, Dobson A, Bryson L & Byles J	
View of menstruation and menstrual education	Negative view of menstruation and positive view of menstruation	A negative view of menstruation as 'troublesome' is strong, and the younger the person is, the more negative the view of menstruation is.	21) Kaimura & Ueda
		A negative reactions during menarche influences the formation of a negative view of menstruation. Persons with a negative view of menstruation have more concomitant symptoms with menstruation.	5) Kaimura & Ueda, 22) Kaimura
		A healthy lifestyle and a positive view of menstruation reduce menstrual-associated symptoms	21) Kaimura
	Menstruation taboo	The Netherlands is an open society, but lacks openness to menstrual complaints and menstrual taboos have not been broken.	10) Mark, Theodoor, Moniek, Didi & Annemiek
	Dissatisfaction regarding menstrual education and lack of knowledge	Menstruation education is provided, but 33.3% are dissatisfied with the education because it is insufficient 24% of junior high and high school students have some knowledge of the menstruation mechanism, a lack of knowledge regarding menstruation is indicated.	5) Kaimura & Ueda
Coping behavior during menstrual period	Regarding frequently used medications such as analgesics, have students read the package inserts in class and recognize specific side effects	9) Hirata	
	Common coping behaviors during menstruation include "lie down and rest" and "endure."	21) Kaimura & Ueda	

3. Consequences (Refer to Table 3)

Regarding consequences, four categories, namely {Awareness of menstruation}, {education surrounding menstruation}, {research on menstruation}, {issues related to menstruation} were extracted.

1) {Awareness of menstruation}

Regarding [Acceptance of menstruation], “modification of awareness of menstruation”²³⁾ and “comprehensively understanding physical, mental, and social factors,”⁵⁾ and “education of knowledge regarding perimenstrual symptoms, and enlightenment / PR activities”²⁴⁾ are needed.

Furthermore regarding [Awareness of premenstrual symptoms], “rather than negatively accepting it, assisting a person to understand the importance of acceptance”²⁴⁾ is valuable.

2) {Education surrounding menstruation}

In [Actual condition of visiting a gynecologist], “85.9% of women in their 20s experience PMS, but awareness of disease and visits to a gynecologist are low.”¹¹⁾ The rate of visiting a gynecologist is not high. Regarding [Support during the menstrual period], since there is little “information support,”⁵⁾ it does not lead to “continued knowledge and self-care.”¹⁾ One [Meaning of health education regarding menstruation] is that “early detection of disorders such as a menstrual disorder is beneficial”⁷⁾.

3) {Studies on menstruation}

Regarding [Studies on menstruation are behind], “conditions surrounding menstruation have not changed, even though more than 10 years have passed since indications were defined by the Ministry of Health, Labour and Welfare.”⁵⁾ However, “improvement in menstruation concomitant symptoms due to self-care has been observed according to some studies.”¹⁾

Since [Development of a scale for menstruation is poor], “research on a scale development is needed”⁵⁾ due to “few new development is needed”⁵⁾ due to “few new developments in Menstrual Distress Questionnaire (MDQ) and PMS memory”⁵⁾.

4) {Issues related menstruation}

Regarding [Compensation for the lack of knowledge on menstruation and response] “an appropriate response is not taken due to the lack of knowledge on menstruation and too few places where health consultations are provided.”²²⁾ Regarding [Consultation leading to a visit to the gynecologist], among persons who receive a consultation for menstruation in Japan, “80% are mothers,”⁵⁾ “influenced by the advices of their family.”⁵⁾ Regarding [Improvement of the negative influence on society], since “menstruation issues influence family, society, and the national economy,”^{8,14,22,24)} improvement is needed.

<Table 3> Consequences of menstrual disorders in young women

Categories	Sub-categories	Main code	Documentation
Awareness of menstruation	Awareness to accept menstruation	In Japan, menstruation is only treated from the medical perspective, but there are few multifaceted perspectives that include the mental and social aspects. In the future, a comprehensive view of the physical, mental, and social factors and demonstrating how they are interrelated, is needed.	5) Kaimura & Ueda
		Medical treatment and counseling at a medical institution can promote a change in perception of menstruation and positive coping choices can be more easily made.	23) Kagawa, Tsuchiya, Saito & Terashima
	Awareness of premenstrual symptoms	It is possible not only to accept menstruation, but also think positively about it. Menstruation is a familiar problem and affects QOL. Support through education of knowledge regarding perimenstrual symptoms, and enlightenment / PR activities	24) Kagawa, Kitamura, Ninomiya & Terashima
		For premenstrual symptoms, there is a difference in resilience and seeking support and in the perception of menstruation regarding mental and physical complaints. There is also a difference in knowledge and how to deal with it.	23) Kagawa, Tsuchiya, Saito & Terashima
Education surrounding menstruation	Practice of gynecology examination and diagnosis	Through counseling, students with premenstrual symptoms can learn how not to view menstruation negatively, but realize the importance of accepting it, their original worries can be alleviated.	24) Kagawa, Kitamura, Ninomiya & Terashima
		Care when interviewing and examining teenage patients is important. If the pelvic examination is traumatic, they may refuse to see the doctor and reject medical treatment. Checking for sexual intercourse and pregnancy, and half of all visits to gynecologists by young women are for menstrual disorder.	3) Mochizuki
		85.9% of women in their 20s experience PMS, but awareness of the disease is low and they have not visited a gynecologist because the symptoms go away after menstruation, they are not aware of the disease and do not seek medical attention.	11) Hamanishi
	Support during menstrual period	Screening women with strong premenstrual symptoms can encourage them to seek medical attention and prevent secondary problems	24) Kagawa, Kitamura, Ninomiya & Terashima
		Less than 30% of women receive education on self-care of menstrual pain, and this is not connected to continued knowledge, and self-care. No information on symptom relief, daily living, etc. is provided during menstrual education.	1) Yamamoto
	Significance of health education regarding menstruation	Young women receive emotional support, but are not given practical support regarding symptom relief and daily living.	5) Kaimura & Ueda
		Health education on menstrual disorders that targets female students and their parents, including education on reproductive health, in the school curriculum is considered beneficial for early detection of disorders such as menstrual disorder.	7) Karout, Hawai & Altuwaijri
Study of menstruation	Study of menstruation is behind	The use of PMS memory and education on menstruation concomitant symptoms are important	24) Kagawa, Kitamura, Ninomiya & Terashima
		Understanding events even under stressful conditions and positive recognition is important in maintaining and improving health.	
		Studies have clarified that menstruation concomitant symptoms have a major physical and mental effect, but improvement of such symptoms is observed by self care.	1) Yamamoto
	Development of menstrual scale are few	Conditions surrounding menstruation have not changed, even though more than 10 years have passed since indications were defined by the Ministry of Health, Labour and Welfare	5) Kaimura & Ueda
In the future, a comprehensive view of the physical, mental, and social factors have each been studied, but a comprehensive view of factors and demonstrating how they are interrelated, is needed. Studies of perimenstrual symptoms which focus on the QOL of young women are behind			
Issues related Menstruation	Lack of knowledge on menstruation	MDQ and PMS memory are tools to measure menstruation concomitant symptoms, but they have been modified and used independently, with little new development.	5) Kaimura & Ueda
		Perception of perimenstrual symptoms is subjective, and symptom assessment requires objectification and quantification. Consequently, research for the development of a scale is needed.	
	Consultations which lead to a medical examination	Menstrual pain is a health issue which is caused by insufficient treatment due to women's lack of knowledge and society's lack of understanding.	20) Fukuyama
		Due to the lack of knowledge on menstruation and the fact that there are not enough places where health consultations are provided.	22) Kaimura
	Improvement on the effect on society	80% of consultations for menstruation are by mothers and are influenced by the advice of their family.	5) Kaimura & Ueda
		43.7% consulted with the doctor, 11.4% were referred to a gynecologist, 9.8% had endometriosis, adenomyosis, fibroids, and PCOS.	10) Mark, Theodor, Moniek, Didi & Annemiek
Menstrual problems consulted doctors, pharmacists, mothers, sisters, friends.		15) Ahmed, Atiea & Nadia	
	Menstruation issues influence family, society, and the national economy.	5) Kaimura & Ueda, 8) Emmanuel, Samuel, Yaoyao, Xinxin & Xueqing, 14) Muluken, Mamo & Desalegn, 22) Kaimura, 24) Kagawa, Kitamura, Ninomiya & Terashima	

V. Discussion

1. Attributes of menstrual disorders in young women

The concept of menstrual disorders in young women was defined as “in actual conditions of menstrual disorders, there is great variation, such as dysmenorrhea, PMS, irregular menstruation, and accordingly, related risks have been observed, and the existence of endometriosis is also partially indicated. Analgesics and OC are not appropriately utilized, and QOL of young women during menstrual period decreases.”

2. Background of menstrual disorders in young women

1) Young women's lifestyle and change in life habits

One precondition, [Women's lifestyle and changes in life habits], is significant as background. Over the past 30 years, women's lifestyles in Japan have greatly changed. As popularization of higher education, advances in society, trends in decreased birthrate due marrying and having children later in life, have continued, the average age for a women's first birth was over 30 years. Total fertility rate in 2020 was 1.34, and continues to fall. Consequently, after World War 2, the frequency of menstruation has significantly increased, and more women experience dysmenorrhea.¹⁾

Furthermore, life habits of young women have also greatly changed. “the number of women 20-29 years with a low body weight has increased, twice that of 30 years ago” as represented by the [desire to lose weight].^{5,25)} Dieting causes the menstrual cycle to become irregular, and the weight loss eventually leads to amenorrhea. For persons who have dieted in the past, even if amenorrhea is treated and the menstrual cycle returns to normal, strong menstrual pain often remains.²⁶⁾

Sleeping habits have also changed due to the spread of the Internet, and the number of persons who go to sleep after 2 am has increased. The proportion of women in their 20s who miss breakfast is 28.6%. Exercise habits are few, and the number of women who partake in luxury items such as smoking and alcohol, have increased, as the number of working women has increased.²²⁾ Since “diet restrictions which are disassociated with diurnal rhythms have a synergistic negative effect on reproductive functions”²⁵⁾, menstrual disorders can easily occur in the daily lives of young women in the modern generation.

2) Negative view of menstruation and lack of education on menstruation

“A negative the view of menstruation as ‘troublesome’ is strong, and the younger the person is, the more negative the view of menstruation is.”²¹⁾ “A negative reaction to the person's first menstruation affects the formation of a negative view of menstruation.”^{5,22)}

In Japan, menstruation education is provided for all elementary school students, but “33.3% are dissatisfied with the education because it is insufficient.”⁵⁾ Since “24% of junior high and high school students have some knowledge of the menstruation mechanism, a

lack of knowledge regarding menstruation is indicated,”⁵⁾ and consideration of the contents of the menstruation education is needed.

3. Issues in menstruation education and research surrounding young women

In Japan, “80% of consultations for menstruation are by mothers,” “influenced by the advice of their family.”⁵⁾ Overseas however, “43.7% consult with a physician.”¹⁰⁾

Regarding [Actual condition of visiting a gynecologist] in Japan, “85.9% of women in their 20s experience PMS, but awareness of the disease is low and they have not visited a gynecologist because the symptoms go away after menstruation.”¹¹⁾ The rate of young women visiting a gynecologist is low. Although “they experience menstrual pain -omission- an appropriate response is not taken due too few places where health consultations are provided.”²²⁾ Consequently, an environment where “consultations which lead to the action of visiting a gynecologist,” are needed.

Regarding [Support during menstrual period], since “information support which connects to practical self-care, such as symptom alleviation and ideas in daily life are few,”⁵⁾ “health education on menstrual disorders that targets female students and their parents, including education on reproductive health, in the school curriculum is considered beneficial for early detection of disorders such as menstrual disorder.”⁷⁾ Similarly, [improvement in the negative effect to society] by {a compensatory response to the lack of knowledge on menstruation}.

While [research on menstruation is behind] is currently observed, “studies have clarified that menstruation concomitant symptoms have a major physical and mental effect, but improvement of such symptoms is observed by self-care.”¹⁾ Consequently, consideration of menstruation education to help young women perform self-care is needed.

[Development of a scale for menstruation is poor] is observed, and MDQ and PMS memory, etc. are scales developed in 1900s. Study on the development of a new scale for menstruation which considers the background of modern young women is important in the future.

VI. Conclusion

The concept of menstrual disorders in young women was defined as “in actual conditions of menstrual disorders. There is great variation, such as dysmenorrhea, PMS, irregular menstruation, and accordingly, related risks have been observed, and the existence of endometriosis is also partially indicated. Analgesics and OC are not appropriately utilized, and QOL of young women during menstrual period decreases.” Consideration of the background of modern young women who easily experience menstrual disorders, and promotion of better menstruation education are important.

VII. Limitations and future asks of this study

One limitation of this study is that analysis on the use of terms is based on a limited number of articles. The possibility of bias in article extraction can be mentioned.

Moreover, menstrual disorders in young women are individualized, therefore individual factors which can influence the process of developing a menstrual disorder are thought to exist. In the future, the refinement of the concept is needed, and verification in practice with young women are needed.

This study adds to and revises the contents presented at the 62nd Academic Conference of the Japan Society of Maternal Health.

There is no conflict of interest regarding the contents of this paper.

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REVIEW ARTICLE

**Factors Affecting the Sense of Life Worth Living
and Cognitive Function for Older Caregiver;
Current Situation and Issue based on Literature Considerations**

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ABSTRACT

As population ages rapidly, the need for caregivers will continue to increase. Family caregivers play an important role in delaying and possibly preventing institutionalization of older patients with chronic diseases. Caregiving by family members related to their subjective well-being and cognition. Especially, the sense of life worth living (ikigai in Japanese) is essential to maintaining their life-satisfaction and caregiving. However, there is a lack of research focusing on the sense of life worth living in older caregivers. The aim of this narrative review was to investigate the factors affecting the sense of life worth living and cognitive function for older caregiver. Two experimental studies were extracted: one qualitative study, and one quantitative study. There were no reports that evaluated the cognitive function in older caregivers. The sense of life worth living is associated with cognitive function and vice versa, it is possible to those factors that affect in life worth living also affect in cognitive function. In conclusion, this review suggest that intervention programs are associated with promoting the sense of life worth living of older caregivers. Further studies are needed to clarify the factor affecting this relationship between the sense of life worth living and cognitive function in older caregivers.

< Keywords >

The sense of life worth living, cognitive function, older caregiver, review

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I. Introduction

With a rapid increase of the aged in Japan, there is a growing number of aged with chronic health problems in the community. Care for older adults would probably not be possible without the contributions of family caregivers. The person who most often takes on the role as caregiver is a spouse¹⁾. According to a survey by the ministry of health, labor, and welfare in 2019, the majority of family members who care for older adults who need support or long-term care are spouses at 23.8%, and those who need long-term care of "70-79 years old" are cared by who are "70-79 years old" at 56.0% and 31.6% of those who are "80-89 years old" are caring for them²⁾. Current trends in family patterns including lower fertility, higher rates of childlessness³⁾, family caregiver was also getting older. Moreover, the numbers of caregivers with much burden of caregiving at home have recently increase¹⁾.

Family caregivers may have reduced health, pain, cognitive function and impaired their quality of life (QoL) by their caregiving¹⁾. On the other hand, caregiving also has positive impacts include affection from care recipients, often based on prior relationships, and encouragement from the wider local community⁴⁾. Although the impact of caregiving on QoL among older people has been observed in the literature^{1,4)}, evidence remains insufficient as regards older family caregivers' well-being and cognitive health and its relation to caregiving.

Recently, the relationship between the sense of life worth living and QoL has been paid to attention in caregiving. The sense of life worth living is related to life-satisfaction, self-esteem, moral, happiness as well as evaluation towards meaning of one's life⁵⁾. It is essential to maintaining a healthy life and is an indicator of mental and physical well-being⁶⁾. In relation to dementia caregiving, positive aspects of caregiving are associated with better mental health, satisfaction with life, and competence/self-efficacy⁷⁾. However, those studies have investigated the positive mood of caregiving, there is a lack of research focusing on the sense of life worth living and cognitive function in older caregivers and what is affecting that relationship between the sense of life worth living and cognition.

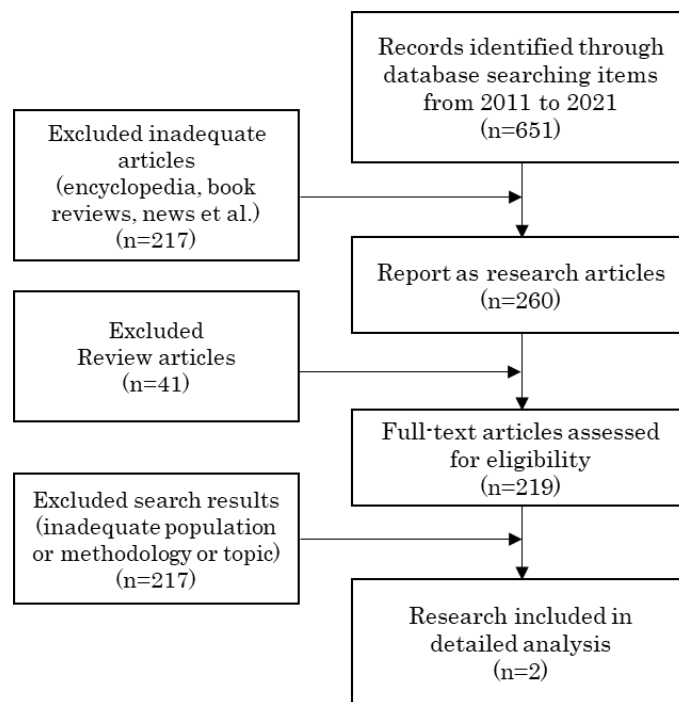
In Japan the life worth living is translated with *ikigai*, which roughly corresponds to 'purpose in life'⁸⁾ and 'meaning of life'⁹⁾. However, it has been also argued that this word cannot be exactly translated in English and Japanese. In this study, we defined "the sense of life worth living" as the feeling that makes life worth of living because it is reported that the increase of the sense of life worth living may play an important role in the prevention of the development of caregiver burden⁵⁾.

The aim of this narrative review was to investigate the factors affecting the sense of life worth living and cognitive function for older caregiver and review the current situation and issue based on literature considerations.

II. Methods

1. Search strategy and selection criteria

The search strategy consisted of a combination of search keywords related to the life worth living and cognitive function and family caregivers: “the life worth living” and “the meaning of life” and “the purpose of life” and “cognitive function” “caregivers” and “family caregiver”. The following electronic databases were searched for studies from January 2011 to September 2021 through the ScienceDirect. Science Direct (<http://www.science-direct.com>) is one of the greatest bibliographic and full text electronic collections about science, technology, and medicine¹⁰. To identify studies suitable for inclusion in this review, two reviewers separately examined the titles and abstracts of the studies in the search results. Only qualitative and quantitative studies were included as inclusion criteria, and those studies had to be research article published in only English. Figure 1 illustrates the literature search process.



<Figure 1> Flowchart of the search strategy

2. Study quality

The quality was assessed using the Quality Assessment Tool for Studies with Diverse Designs (QATSDD). The QATSDD is a validated quality assessment tool for use with methodologically heterogeneous studies, using 14 items on a 4-point Likert scale. Indicator were rated on a 4-point Likert scale, with possible total scores ranging from 0 to 42; higher scores indicated higher quality reporting¹¹.

III. Findings

1. Interventions affecting the sense of life worth living and cognitive function for older caregiver

As a result of searching articles by search strategy, two studies were extracted: one qualitative study, and one quantitative study. No paper achieved the maximum score on the QATSDD (table 1). One qualitative study performed face to face interview, and it is reported that informal care affected mental health in the total participants and in both sexes as well as cognitive well-being in women¹²⁾. One quantitative study performed music performances for 12 months, and it is reported that attending the music café promotes the self-reported and observable wellbeing of participants¹³⁾.

2. The intervention affecting the sense of life worth living in caregivers

Interventions for caregivers of older adults are measures aimed at reducing the caregiving-related demands or stressors experienced by informal caregiver of older adults and/or improving the function of the caregiver such as stress coping, mental health¹⁴⁾. Many interventions have been developed to support caregivers of persons with cognitive impairment and enhance both caregiver well-being and ability to provide care¹⁵⁾. A variety of approaches as described in the following explanation have been implemented with older caregivers.

Regarding psychoeducational intervention, these interventions have been developed together with family caregivers experiencing different stressful situations across their care trajectory¹⁶⁾. It is a psychoeducational group program focused on cognitive appraisal of stressors, empowerment of family caregivers through a heightened awareness of their strengths and their capacity to change their perception of stress and exercise control over their environment and utilization of three coping strategies for dealing with stressful situations: problem solving, reframing, and stress symptoms management. This review reported that psychoeducational group program is related to perceived challenge of caregiver role such as motivation to find solutions¹⁶⁾.

Regarding the cognitive-behavioral intervention, these approaches apply techniques from cognitive-behavioral intervention to caregivers and focus on identifying and modifying related beliefs, developing a new behavior repertoire to deal with caregiving demands, and foster activities that may promote positive subjective well-being¹⁷⁾. Acceptance and commitment therapy is a recent approach in process-based cognitive-behavior therapy. This report suggested that the supported online ACT intervention produced significant effects on mental health over the duration of the intervention and the Acceptance and commitment therapy was effective to the comparison interventions¹⁸⁾.

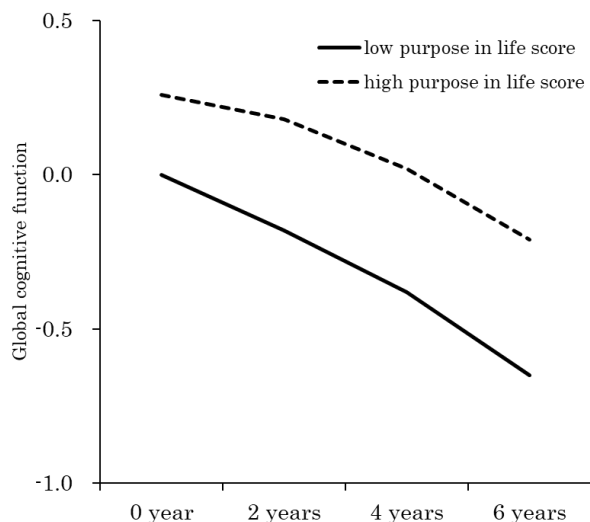
Moreover, there are encouraging preliminary data on music and art interventions, and these creative interventions are related with personal developments, such as learning new skills, welcoming the opportunity to gain cognitive and behavioral skills, and having opportunities to unload emotions in a safe space were important to caregivers¹⁹⁾.

<Table 1> Summary of the studies included in the review

Reference & Quality rating	Design and sample size	Methods	Outcome	Results
Hajek et al. (2015) ¹²⁾ Quality rating score: 35	A population-based, representative survey of the community-dwelling population aged 40 and older 11,264 observations (mean age=59.1 years in save 2, 63.1 years in wave 3, 65.5 years in wave 4)	Individuals were interviewed at home by trained staff using a standardized questionnaire.	Life satisfaction (cognitive well-being) was quantified by using the Satisfaction with Life Scale (SWLS) and positive and negative affect (affective well-being) was assessed using the Positive and Negative Affect Schedule (PANAS). informal caregiving was replaced by self-reported average time per week for help/assistance	Longitudinal regressions showed that informal care affected mental health in the total sample and in both sexes and cognitive well-being in women. The effect of informal care on mental health was moderated by self-efficacy in the total sample. Furthermore, longitudinal regressions revealed that self-efficacy affected in mental health due to informal care.
Smith SK et al. (2001) ¹³⁾ Quality rating score: 28	A qualitative study, 7 care partners and 3 former care partners ages ranged from 50-87 years	Twelve live music performances were hosted at a purpose refit facility at the author's institution, once a month for 12 months. Baseline semi-structured interviews explored the meaning of music and expectations of the upcoming music cafes. Dementia care mapping and unstructured observations were the observation methods used to capture 'in the moment' experiences of attending music café. Follow-up semi-structured focus groups explored the impact of music on subjective wellbeing.	Dementia care mapping which is originally designed to evaluate the quality of care and capture the mood and the level of engagement values. ME values range from + 5 indicating high positive mood and sustained engagement to -5 representing significant distress.	The findings demonstrate that attending the music café promotes the self-reported and observable wellbeing of participants in three ways: (1) by offering opportunities for peer support and a reduction in feelings of isolation through a shared love of music; (2) group interaction with music meets an unmet need for meaningful musical experiences in supportive enabling environments.

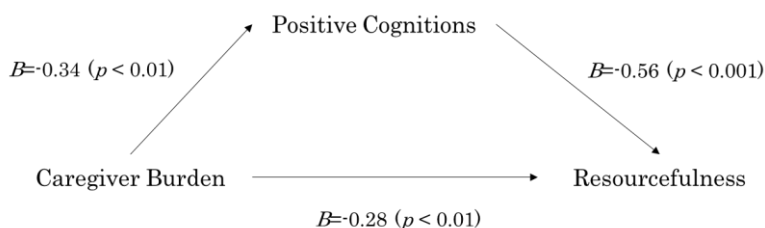
3. The sense of life worth living on risk of dementia and mild cognitive impairment (MCI) in healthy older adults

Boyle and his colleagues are reported that the sense of life worth living is associated with cognitive and psychological health in older adults. Figure 2 shows the trajectories of cognitive decline for participants with high vs low purpose in life. Persons with greater purpose started at a higher level of cognitive function than did those with low purpose but declined less rapidly than did those with low purpose²⁰.



<Figure 2> Decline in global cognition for participants with high vs low scores on the purpose in life measure (Boyle PA et al., 2010, p.13)

Especially, Lewis and his colleagues reported that the purpose in life is associated with higher scores on overall cognitive function, as well as the domains of executive functioning and episodic memory in adults²¹. Positive cognition has also been reported to be involved in the relationship between caregiver burden and resourcefulness of their life as a mediator factor (Figure 3)²².



<Figure 3> Decline in global cognition for participants with high vs low scores on the purpose in life measure (Bekhel AK. 2012, p.4)

IV. Discussion

In this study, a small number of studies including qualitative and quantitative studies were extracted by the search strategies. There were no reports that investigated the factors affecting cognitive function in older caregivers, even though the search included cognitive function as one of the keywords. Our study suggests face to face interview and musical experience are related to the sense of life worth living in older caregiver^{12,13}. In addition, psychoeducational interventions, cognitive-behavioral interventions, and creative interventions are also promote willing to caregiving and positive well-being¹⁶⁻¹⁸. Finally, the sense of life worth living is associated with cognitive health in older adults²⁰.

The sense of life worth living was associated with cognitive function but also inverse relationship as mentioned by previous studies²⁰⁻²², and it is possible to those factors that affect in life worth living also affect in cognitive function in older caregivers. On the other hand, it is reported that the human relationships were the factor for meaning in life and a source of strength in life more often by the persons with high cognitive functioning²³. Social activities were most consistently associated with improvements on global memory measures, overall executive functioning, working memory, visuospatial abilities, processing speed and global cognition²⁴. The participation in social activities substantially mitigated the negative impact of caregiving on mental health²⁵. However, further research is needed to investigate whether social relationship or social activities affects the relationship between the sense of life worth living and cognitive function.

In considering the findings, some limitations of this review should be discussed. The study is based on a systematic search strategy, but we used only one database. In comparison to other review, the search strategy may be limited. Moreover, no review protocol was registered. However, the results in this review show the positive aspects in caregiving, focused on enhancing the sense of life worth living than the negative side. Therefore, we would like to suggest this review might be helpful to maintenance of family caregiving for the future.

V. Conclusion

This review shows that intervention program can be beneficial for promoting the sense of life worth living in older caregivers. Further studies are needed to clarify the factor affecting the relationship between the sense of life worth living and cognitive function in older caregivers.

Acknowledgements

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