

# Chapter 2

## Development and Evaluation of a Meal Assistance and Oral Care Training Module for Aspiration Pneumonia Prevention

August 2023

**This chapter should be cited as**

Nugraha, S. (2023), 'Development and Evaluation of a Meal Assistance and Oral Care Training Module for Aspiration Pneumonia Prevention', in Yuko O. Hirano (ed.), *Development and Assessment of a Meal Assistance and Oral Care Module for Care Workers in Asian Countries*. ERIA Research Project Report FY2023 No. 09, Jakarta: ERIA, pp.12-28.

## Chapter 2

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Susiana Nugraha

### Introduction

This chapter reports the process of developing the meal assistance and oral care training module. Indonesian researchers were invited to Osaka, Japan, during 23–27 January 2020 to attend a workshop with Japanese researchers. As explained in Chapter 1, during the workshop, Indonesian and Japanese researchers who were either nurses, care workers, or occupational therapists, analysed the footage of 11 cases, including four dementia cases and seven stroke cases filmed in Indonesia. By checking the lists of meal assistance and oral care (Higashijima and Watanabe, 2018), the researchers identified the pros and cons for each healthcare profession in being attentive to meal assistance and oral care so that we can list the most appropriate items that are required regardless of the type of profession.

### 1. Workshop on Module Development

#### 1.1. Making Matrices for Outlining the Content of the Module

The workshop aimed to develop an appropriate module that met the conditions of care settings in Indonesia. This workshop succeeded in identifying several items in oral care, which are a concern in the development of oral care modules for long-term care facilities in Indonesia. After the two-day intense discussions, we developed two types of matrices: (a) assistance according to the time of care and (b) assistance according to the type of disease (dementia or stroke). Each matrix comprised items, significance, purpose of care, and focal points (Table 2.1 and Table 2.2).

**Table 2.1. Responses According to Time**

	<b>Item</b>	<b>Significance/Purpose</b>	<b>Point</b>
Before meals	<p>Frailty prevention:</p> <ul style="list-style-type: none"> <li>• Balloon volleyball</li> <li>• Party horn</li> <li>• Exercise</li> <li>• Singing, etc.</li> </ul>	<p>A decrease in physical strength leads to pneumonia, so physical and oral functions need to be maintained.</p> <p>Further, this will also help in maintaining cognitive and social functions, which will encourage independence during meals.</p> <p>Moreover, this will also reduce the level of assistance.</p>	<ul style="list-style-type: none"> <li>• Assessment</li> </ul> <p>Using the meal checklist, identify at an early stage people who have problems before meals.</p> <ul style="list-style-type: none"> <li>• Method</li> </ul> <p>A) Securing satisfactory nutrition from oral intake            B) Adequate exercise            C) Participation in leisure activities</p>
During food preparation	Eating posture	<p>The muscles involved in breathing, posturing, and swallowing are complementary and overlap to perform muscle activity. Therefore, the deterioration of posture heavily affects breathing and swallowing.</p>	<ul style="list-style-type: none"> <li>• Assessment</li> </ul> <p>Check for improper eating posture.</p> <p>[Points to check]</p> <p>Check whether:</p> <ul style="list-style-type: none"> <li>A) the chair sitting position is centred</li> <li>B) both soles are on the floor</li> <li>C) the head is centred</li> <li>D) both shoulders are not raised</li> </ul> <ul style="list-style-type: none"> <li>• Method</li> </ul> <p>Adjust posture to meet points A to D.</p>

	Item	Significance/Purpose	Point
During meals	Appropriate table and chair height	To safely and efficiently* carry food to the oral cavity * Efficiently: Without fatigue in the upper limbs	<ul style="list-style-type: none"> <li>• Assessment <ul style="list-style-type: none"> <li>A) Difference: Distance from the table top to the chair seat</li> <li>B) Table width</li> </ul> </li> <li>• Method <ul style="list-style-type: none"> <li>A) Appropriate difference: Sitting height (length from the head to top of the chair seat) <math>\times 1/3</math> - 1 to 2 cm Adjust table or chair height</li> <li>B) Prepare a table wide enough for both elbows (i.e. lapboard)</li> </ul> </li> </ul> <p>P66, 67</p>
	Spoon size	Reduces the risk of aspiration and choking due to improper bite size and pace	<ul style="list-style-type: none"> <li>• Assessment <ul style="list-style-type: none"> <li>A) Select a spoon based on lightness, ease of holding, taking in, and operation.</li> </ul> </li> <li>• Method</li> </ul> <p>P65 to 66</p>
	Position of meal assistance Assistance from the front	Eye contact Inside of the mouth can be observed Timing can be easily measured	<p>Assistance from the front</p> <ol style="list-style-type: none"> <li>1. The size of a teaspoon is the basic size of a spoon for assistance.</li> <li>2. Insert the spoon into the centre of the mouth.</li> <li>3. Try to bring the spoon to the sulcus of the tongue.</li> <li>4. Lightly press the tongue.</li> <li>5. When using a large spoon, do not insert the entire spoon into the mouth. Adjust the amount and support</li> </ol>

	Item	Significance/Purpose	Point
			<p>the spoon with the lower lip.</p> <p>6. Ensure that the person's face is not raised when pulling out the spoon.</p> <p>7. Do not pull out the spoon until the person closes their mouth (it is important for the person's upper lip to take in the food).</p>
	Position of meal assistance Assistance from the side	When assistance cannot be provided from the front	Same as above. Assume a position where the mouth can be seen well and provide assistance.
	Assistance for hydration Assistance when using a cup		<ol style="list-style-type: none"> <li>1. Place the cup on the lower lip.</li> <li>2. Tilt the cup so that the upper lip is on top of the water.</li> <li>3. Prevent the neck from tilting backwards.</li> <li>4. Let the person sip.</li> <li>5. Pull back the cup.</li> </ol>
	Assistance for hydration Straw	Ease of drinking Suitable for people who do not want to use cups	<ol style="list-style-type: none"> <li>1. Let hot drinks moderately cool off.</li> <li>2. Fix the straw in place by making a hole in the PET bottle, etc.</li> <li>3. Encourage or assist the person to close their lips. If the upper lip is not closed, negative pressure will not occur, and liquids cannot be swallowed.</li> </ol>

	Item	Significance/Purpose	Point
Swallowing	Breathing assistance	During pulmonary aspiration, the foreign object (saliva, food, etc.) must be expectorated. Therefore, it is necessary to increase the expiratory (expectoration) flow rate. Respiratory assistance is performed for the purpose of increasing the expiratory flow rate.	<ul style="list-style-type: none"> <li>• Implementation conditions</li> <li>A) When choking</li> <li>B) When a grumbling sound (p19) was confirmed before, during, and after the meal</li> <li>C) When disordered breathing (rhythm, number of times) occurs before the meal</li> </ul> <ul style="list-style-type: none"> <li>• Assessment</li> <li>A) Check quality of voice and breathing before the meal</li> </ul> <p>Specific example (p118)</p> <ul style="list-style-type: none"> <li>• Hoarse voice (rattled voice or grumbling sound)</li> </ul> <p>Cause: Food is stuck in the vocal cords or pharynx. Response: Have the person drink water or clear their throat. Once their voice clears up, let them have another bite of food.</p> <p>(Redacted)</p> <li>B) Apart from whether the person is choking, also check when, what kind, and how food was ingested. Also check the condition that led to choking.</li> <ul style="list-style-type: none"> <li>• Method</li> <li>A) Lightly press the upper part of the chest according to the cough (expiration).</li> </ul> <p>* In some cases, coughing is encouraged.</p>

	Item	Significance/Purpose	Point
			<p>* Older adults are at risk of breaking their ribs, so adjust the force accordingly.</p> <p>B) In case of asphyxiation, perform the back tapping method (p11).</p>
	Modifying the food form	In order to reduce the risk of aspiration and asphyxiation, food must be modified according to the swallowing or masticatory function.	<p>Refer to the Indonesian guidelines</p> <ul style="list-style-type: none"> <li>• Increase thickness: Reduces food inflow rate</li> <li>• Bite-size/Mixer: For tooth loss and reduced masticatory function</li> </ul>
	Reclining	<p>Facilitates the delivery of food.</p> <p>*Effective for people who store food in the oral cavity, are unable to send food to pharynx, or expel food from the mouth.</p>	<ul style="list-style-type: none"> <li>• Assessment <ul style="list-style-type: none"> <li>A) Are they able to close their mouth?</li> <li>B) Is food stored in the mouth?</li> </ul> </li> <li>• Method <ul style="list-style-type: none"> <li>A) Use a reclining bed or a wheelchair with an adjustable backrest.</li> <li>B) Roll a futon, etc. to recline the person at an angle.</li> </ul> </li> </ul> <p>Caution ①: Gradually decrease the angle from 90° to find an angle where improvement of assessments A and B is observed.</p> <p>②: Reclining can only be applied if the person's disorder is mainly in the oral cavity. Reclining may cause aspiration when the disorder is in the pharynx (delay or disappearance of swallowing reflex).</p>

	Item	Significance/Purpose	Point
After meals	Oral care	Most aspiration pneumonia is often caused by 'silent aspiration'. This condition often occurs during the night-time or during sleep. Therefore, although oral care after meals is important, oral care before bedtime is extremely important.	

Source: Authors.



**Table 2.2. Responses According to Disease**

Item		Significance/Purpose	Methods	Point
Hemiplegia	Accumulation in the paralysed side of the mouth	Remove food residue		Perform oral care
	People who are unable to eat by themselves	Assist in chewing or passing food	Place food on top of the molar on the healthy side	Place food on top of teeth opposite to the paralysed side
		Prevent aspiration	When gulping down a drink	Face the paralysed side and help the choking person drink
Alzheimer's dementia	'I haven't eaten yet'		Give a small amount of sweets	Do not say that they have already eaten. Instead, give food with low calories.
		Change of mood	Hobbies, strolls	Aim to change their mood
			Food partitions	Do not change total amount
	Pica	This may become an obsession when repeated	Do not place anything nearby that might be placed inside the mouth	Must be addressed immediately
		Desire for stronger stimulus	Have the person eat dried squid and kelp	Give when hungry

Item		Significance/Purpose	Methods	Point
		Encourage the use of the five senses and divert attention away from the mouth	Move the body	Change the mood (standing, sitting, and walking are large stimuli)
Lewy body-type dementia	Visual hallucination	Clear up confusions	Process what they saw	Divert attention using a poster or furniture, etc.
		Clear up confusions	Replace objects being used	Replace plates with ones without patterns
Frontotemporal dementia	Overeating	Prevent obesity	Replace food with low-calorie food	Symptoms will recede in about six months
	Standing up during the meal	Prevent distraction	1. Have them eat alone 2. Have them face the wall whilst eating	Adjust the environment
	Eating quickly with the plate near their mouth	Prevent this from happening	1. Use heavy tableware 2. Fix tableware to the table with suction cups	Relax
	Eating quickly	Prevent aspiration	1. Serve the food one dish at a time 2. Use a small spoon	
End-stage dementia	Mouth does not open	Open mouth	Press K point	When mouth opens, use a thin spoon to deliver food

Item		Significance/Purpose	Methods	Point
	Passing down food is weak	Increase oral pressure	Massage cheeks	
		Swallowing reflex is difficult to induce when the temperature is the same as the body temperature	Cool the food	Serve food that the person has eaten before
		Deliver directly to the back of the tongue	Use tools (syringe, or easy-gulp [Rakuraku Gokkun], etc.)	Check the volume and place where food will be injected

Source: Authors.

## **1.2. Development of the Training Module in Indonesia**

The module was developed through a scientific process and is in accordance with the current condition of care workers in long-term care facilities in Indonesia. The Indonesian researchers combined the matrices developed during the workshop, with several adjustments based on the culture and customs of the older adults in their country. This process was supported by the results of interviews with long-term care managers regarding oral care knowledge and previous studies (Hirano et al., 2021). A training module was developed based on the checklist.

## **1.3. Development of Training Materials in Indonesia**

Training materials were also developed for use in the intervention study. These were based on the translation of the text written by Higashijima and Watanabe (2018) by Susiana Nugraha and Lisna Augsutina, separately from the current study. The content of the training materials in the chapters is as follows:

### **(1) Ageing process:**

Basic knowledge of the ageing process.

### **(2) Anatomy and physiology:**

Anatomy and physiology of the digestive system.

### **(3) Swallowing ageing effect:**

The ageing effect on sensory afferent/efferent nerves.

### **(4) Swallowing process problems:**

Dysphagia, aspiration, and choking.

### **(5) Assessment and treatment of swallowing disorders:**

Choking and dysphagia assessments.

### **(6) Position provides feeding assistance:**

The opponent and side positions were explained. The incorrect position when providing feeding assistance was also given to make a comparison with the correct position.

### **(7) Provision of appropriate and safe feeding assistance:**

Providing food assistance, drink assistance, key points when feeding older adults, checking leftover food in the mouth, maintaining a correct position for the older adults when eating, and adjusting the wheelchair whilst eating.

### **(8) Introduction of eating and drinking utensils in Japan:**

Eating and drinking using utensils used in Japan, adjusting hand positions when eating, and choosing the dining table appropriately.

### **(9) Exercises to maintain swallowing function:**

Mouth and face exercise, PATAKARA mouth exercise, exercise to maintain and strengthen the swallowing muscles, and exercise to strengthen the hand and finger muscles.

#### **1.4. Development of Assessment Tools for Use in the Intervention Study**

An assessment tool was developed comprising 25 questions derived from the module. It contains four general knowledge questions on long-term care, one question based on the pre-meal period, six questions on food preparation, eight questions on the period during the meal, five questions on assisting and safe swallowing, and one question on the post-meal period (Appendix 2.1).

## **2. Intervention Study**

The pandemic postponed this study for 2 years. An intervention study was conducted in Indonesia in June 2022. Sixty caregivers in long-term care facilities in West Java and Jakarta provinces were invited as study participants. Due to the limited time for conducting an intervention study to meet the deadline of the study, a cross-over design was not applied. Nonetheless, the intervention study was carefully conducted using the following procedures.

### **2.1. Recruiting Study Participants**

There are two types of care facilities for older adults in Indonesia: private care facilities and public care facilities. The two are diverse in terms of management; therefore, we recruited groups separately.

#### **2.1.1. Study participants from private care institutions**

Seventeen care workers who worked in private long-term care institutions were recruited.

#### **2.1.2. Study participants from public care institutions**

Twenty-two care workers working in government-owned long-term care institutions were recruited.

### **2.2. Data Analysis**

The intervention study was conducted such that both groups received the same treatment before and after training; therefore, some bias in the intervention can be ruled out. Accordingly, the assessment tool was distributed to each trainee prior to training (pre-test) and after training (post-test). Pre-test and post-test assessments were conducted to identify the success of the training intervention in implementing meal assistance and oral care. The pre-test and post-test results by cross-sectional analysis are shown in Table 2.3. There were no differences in terms of the distribution of pre-test and post-test results by Group 1 conducted in Jakarta, Group 2 conducted in West Java, gender, educational background, or type of nursing home. It can be assumed that the trainees in this study were homogeneous, regardless of the workplace, type of institution, and socio-demographic characteristics.

### 2.2.1. Cross-sectional analysis of the distribution of pre-and post-test scores

**Table 2.3. Independent Sample T-test for Each Group**

Group Category	Pre-test		Post-test		Changes	
	Mean	p-value	Mean	p-value	Mean	p-value
<b>Training Group</b>						
Group 1 (Jakarta)	18.47	0.228	20.35	0.455	1.88	0.695
Group 2 (West Java)	19.18		20.77		1.59	
<b>Gender</b>						
Female	18.92	0.806	20.88	0.130	1.96	0.348
Male	18.77		20.00		1.23	
<b>Education</b>						
College degree	18.56	0.380	21.00	0.217	2.44	0.098
Non-college degree	19.09		20.30		1.22	
<b>Type of Nursing Home</b>						
Private	19.10	0.426	20.55	0.884	1.45	0.455
Public	18.63		20.63		2.00	

Source: Authors.

### 2.2.2. Cross-sectional analysis of the distribution of pre-test and post-test scores

Changes in the pre-test and post-test scores were analysed using a matched-pair t-test (Table 2.4). The results indicated that the knowledge scores of the trainees increased significantly before and after training in each group. This demonstrates the efficacy of the training module.

**Table 2.4. Changes in Knowledge of Meal Assistance and Oral Care Before and After the Training**

Group	Knowledge Score	Mean	SD	N	Δ (difference)	p-value
<b>All</b>	Pre-test	18.87	1.809	39	1.72	<0.0001
	Post-test	20.59	1.712			
<b>Group 1</b>	Pre-test	18.47	1.375	17	1.88	0.007
	Post-test	20.35	1.656			
<b>Group 2</b>	Pre-test	19.18	2.062	22	1.59	0.002
	Post-test	20.77	1.771			

Source: Authors.

### **3. Monitoring of Meal Assistance and Oral Care Practices**

Approximately three months after the training programme, a field observation study was conducted to assess the implementation of meal assistance and oral care in long-term care facilities.

The observations and interview findings demonstrated the following:

1. Caregivers who attended oral care training shared the information obtained from the training results with the staff at the long-term care facilities. They conducted small talks to deliver new knowledge to other staff members.
2. The caregivers emphasised that appropriate knowledge is important in taking care of the older adults, especially in preventing aspiration during meals.
3. There are some limitations in applying feeding support guidelines, such as the shortage of utensils that should be used for the older adults in special conditions.
4. The long-term care facility manager is very supportive in allowing the study participants to continue to make efforts to help feed properly and safely, even though the ratio between caregivers and the number of older adults is still very low.
5. Several skills and knowledge gained from the training cannot be implemented in long-term care facilities because of the limited tools and facilities in the nursing home. For example, eating utensils are limited to conventional spoons and forks, and limitations in providing food in homes that are not based on the condition of the older adults.
6. The caregivers were expected to have further training programmes to increase their knowledge and skills, especially in caring techniques in Japan.

### **4. Conclusion**

Oral care is new knowledge for older adults' caregivers in long-term care facilities in Indonesia. Training programmes effectively increased caregivers' knowledge before and after the training programme. The trainees implemented the knowledge and skills acquired during training in their respective workplaces. However, the limitations of long-term care facilities make it difficult for caregivers to fully implement their knowledge. Fundamental changes are needed in nursing home care to avoid the risk of aspiration pneumonia.

The results of this study are expected to be developed into a policy brief so that the government and long-term care providers can make changes in providing appropriate care for older adults, especially in efforts to prevent aspiration pneumonia.

Considering that 95% of Indonesian long-term care systems are based in the community, it is necessary to develop a new model that is applicable to family caregivers or community caregivers using the media and simple language that can be easily understood by people from all educational backgrounds.

## References

Higashijima, M. and N. Watanabe (2018), *Aspiration Pneumonitis Prevention for Older People Starting Today*. Tokyo: Ishiyaku Shuppan.

Hirano, Y., S. Nugraha, H. Shiozu, M. Higashijima, and T.W. Rahardjo (2021), 'Measuring Attentiveness toward Oral Care Needs: A Comparative Study of Indonesian Care Workers in Japan and Indonesia', *Human Resources for Health*, 19, p.71. doi.org/10.1186/s12960-021-00614-y



# Appendices

## 2.1. Oral Care Training Evaluation

### ORAL CARE TRAINING EVALUATION

NAME : \_\_\_\_\_  
 INSTITUTION : \_\_\_\_\_  
 AGE : \_\_\_\_\_  
 EDUCATION : \_\_\_\_\_

**Instructions: Choose the correct answer by marking (v) in the 'true' or 'false' column.**

No.	Questions	True	False
<b>General knowledge</b>			
1	The movement of the swallowing muscles only works with conscious movement		
2	Decreasing visual function can decrease the eating ability		
3	Basically, all people have a swallowing reflex		
4	Decreased olfactory function due to ageing will not reduce salivary gland production		
<b>Before meals</b>			
5	One of the goals of mouth and facial exercises is to maintain and increase the strength of the tongue, lips, and cheek muscles.		
<b>During food preparation</b>			
6	The right dining table is one that cannot be adjusted in height		
7	A proper position when providing feeding assistance can prevent aspiration		
8	The right position in providing feeding assistance to older adults should be in the position of the neck upturned and leaning forward		
9	A spoon with a flat surface is suitable for clients who have difficulty moving their wrists		
10	When choosing eating utensils, the most important thing to consider is their strength/durability, cleanliness, and safety		

No.	Questions	True	False
11	A good eating utensil is one that can make it easier for older adults to eat independently		
<b>During meals</b>			
12	The readiness of older adults to receive food can be seen when it is time to insert the food, the mouth opens, and the tongue is on the back of the teeth		
13	For older adults who use dentures, if the dentures are not installed, the spoon must be placed at the base of the rounded tongue		
14	If the food to be given is in the form of porridge, do not put the whole spoon into the mouth but place the spoon on the lower lip		
15	The right time to take out/remove the spoon is when the upper and lower lips are closing		
16	For older adults who become easily tired and have difficulty opening their mouths, it is better when eating to use a small teaspoon/spoon		
17	When helping to feed older adults with severe dementia or dysphagia, it is better to use the position on the left/right side of the older adult when feeding		
18	Due to a decrease in finger and hand muscles, many older adults are not able to be independent and hold a spoon or chopsticks properly		
19	In older adults with upper body muscle decline from the elbow to the forearm, it is best to support the hand position		
<b>Swallowing</b>			
20	Cutting food into smaller pieces will help prevent choking		
21	Older adults with dysphagia (impaired swallowing) are not at risk of choking		
22	People who are choking but do not have a cough reflex are at less risk of aspiration than people who have a cough		
23	Choking occurs due to the inability to breathe caused by a blockage in the throat or airways		
24	Eating in a flexed neck position will increase the risk of choking		
<b>After meals</b>			
24	Cleaning up the mouth cavity after meals can prevent the remaining food/foreign objects from entering the respiratory tract		