

# Examination of the Appropriateness of Teaching Materials for Preventing Dangers during Ablution and Bathing of Infants by Mothers and Family Members

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## Abstract

**Purpose:** This study aimed to develop teaching materials to prevent the dangers of ablution and bathing infants, based on the dangerous experiences of mothers and family members, and examine their appropriateness. **Methods:** A total of 20 midwives and public health nurses were selected as participants. Teaching materials and anonymous self-administered questionnaires were distributed, and the participants were asked to view the teaching materials and fill in the questionnaires. Retrieval was done by mail. The teaching materials included digital content, such as videos, sounds, and characters, which incorporated dangerous situations, preventions, and innovations in ablution and bathing procedures. The analysis was conducted by simple tabulation for each survey item. The free description was coded to preserve anonymity. This study was conducted with the approval of the Research Ethics Review Board of the authors' affiliated university. **Results:** The teaching materials were found to be appropriate in terms of suitability to purpose, degree of difficulty of content, ease of viewing the videos, validity of time, appropriateness of expression, and usability. **Conclusions:** Ablution teaching materials that are used at the present time do not focus on dangers, and to date, no resources on bathing have been used as teaching materials. The created teaching materials in this study can be viewed multiple times, and mothers and family members who are unfamiliar with ablution and bathing can acquire knowledge regarding dangers and danger prevention. The addition of specific preventive measures and countermeasures for the occurrence of danger, along with practice, would result in the development of further appropriate teaching materials to reduce danger and alleviate anxiety.

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## Keywords

Ablution, Bathing, Danger, Teaching Material, Appropriateness

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### 1. Introduction

In Japan, as the family structure trends towards nuclear families and with the declining birthrate, there has been an increase in men and women who become parents with little contact experience with young children as well as raising children without sufficient knowledge and skills about childcare [1]. Furthermore, the weak relationships with residents [2] and the impact of the COVID-19 pandemic have decreased opportunities for exchanging information and obtaining support.

In childcare, ablution and bathing of infants include various actions such as dressing, washing, grasping the body, and moisturizing. Furthermore, there is a limit to the size of the place where these actions can be conducted; many of them are singular actions, and thus good dexterity is required. Therefore, ablution and bathing are thought to be some of the most difficult acts for families to conduct safely and comfortably without sufficient knowledge and practice.

A fact-finding survey of mothers and family members with a 3 - 4-month-old infant [3] showed that 60.0% and 64.9%, respectively, experienced danger during the ablution and bathing of their infants. The dangers experienced were as follows, in descending order of occurrence for each: for ablution, “I almost dropped the infant in hot water”, “I almost submerged the infant’s face in hot water”, and “I almost got soap foam in the infant’s mouth”; and for bathing, “I almost got soap foam in the infant’s mouth”, “I almost submerged the infant’s face in hot water”, and “I almost dropped the infant on the floor”. A total of 55.9% and 81.8% of mothers and family members, respectively, did not receive any instruction regarding possible dangers and prevention during ablution and bathing. Additionally, a fact-finding survey on the dangers experienced by mothers and family members with infants aged 1 year and 6 months [4] showed that 71.1% of the mothers and their family members experienced dangers. The most common dangers experienced were “I almost submerged the infant’s face in hot water”, followed by “I submerged the infant’s face in hot water”, and “the infant fell into hot water”. A total of 70.7% of mothers and family members did not receive any instruction regarding the dangers and prevention.

Ablution and bathing of infants are conducted every day, and the goals are not only to keep the infant clean, observe the whole body, and improve metabolism, but also to establish a lifestyle rhythm and provide physical contact between parents and children. The dangers of ablution and bathing are thought to hinder the achievement of these goals, and they may not only pose risks to the infant’s body and life, but also adversely affect attachment formation and parent-child relationships.

In Japan, there are many factors that lead to danger in the ablution and bathing of infants. It is thought that there is a need for a guideline that allows for safe and secure daily ablution and bathing in response to the many factors that lead to danger, such as situations where the mother or family member is forced to ablu- tute and bathe the child alone, situations where multiple children are taken care of at the same time, unfamiliar skills, and a decreased physical strength and ac- curacy of judgment due to fatigue.

Instruction on childcare is mainly provided in the form of grouped instructions during pregnancy and during the mother's postpartum hospitalization. Howev- er, in recent years, the length of postpartum hospitalization at facilities in Japan has been shortened [5], and it cannot be said that mothers and their family mem- bers receive sufficient instruction in such a short period of time. To date, instruc- tion on ablution and bathing has focused on procedures. Teaching materials such as pamphlets and videos are used for the instruction.

Additionally, to date, teaching materials have focused on general procedures and not on dangers. It has been reported that drowning occurred while bathing with the father, and that it occurred more frequently when someone other than the mother cared for the infant [6]. The reasons for this are that mothers are at the center of childcare instruction and that instruction to other family members is insufficient; due to the mother being at the center of childcare, the awareness of other family members about infant development and danger factors is insuffi- cient.

Along with the acquisition of skills such as procedure, the acquisition of know- ledge is required for mothers and family members to prevent dangers during the ablution and bathing of infants. According to the learning pyramid, audiovisual learning has twice the learning retention rate as reading. At the present time, in Japan, the use of digital content has become widespread and familiar. It has been said that self-study using audiovisual teaching materials can be done regardless of the time and location by preparing equipment such as an Internet environ- ment [7]. Furthermore, the following five learning effects of ICT (Information and Communication Technology) in basic nursing education have been reported: raising awareness of learning, acquiring knowledge, deepening understanding, clarify- ing images, and enhancing practical skills [8]. It is thought that the use of audi- ovisual teaching materials can contribute to the safe and comfortable ablution and bathing of infants by mothers as well as family members.

Based on the above, the purpose of this study is to develop teaching materials based on the dangerous experiences of mothers and family members and examine their appropriateness to prevent the dangers in the ablution and bathing of in- fants by mothers and family members.

## **2. Methods**

### **2.1. Definition of Terms**

- 1) Infant: A child aged less than one year.

2) Ablution: Hygiene care of an infant using a baby bath. This includes a series of actions such as preparation, dressing, washing, grasping the body, and care after washing.

3) Bathing: Hygiene care of an infant using a bathtub. This includes a series of actions such as preparation, dressing, washing, grasping the body, and care after washing.

4) Danger: Accidents that threaten the life and health of the child during ablu-tion and bathing, and events that almost resulted in an accident but passed with-out affecting the life or health of the child.

5) Digital content: These are audiovisual expressions such as characters, fig-ures, sounds, and videos that are expressed and recorded in a digital format. These can be played back using DVDs, smartphones, personal computers, and more.

## 2.2. Teaching Material Content

The teaching materials were digital contents using videos, sounds, and characters, which incorporated dangerous situations, preventions, and innovations in ablu-tion and bathing procedures.

1) Ablution teaching material content (**Table 1, Figure 1**)

**Table 1** shows the ablu-tion teaching materials, and **Figure 1** depicts an excerpt of a scene.

The time was set to approximately 10 min so that it would be easy to use with-out imposing a listening burden on the mother or family members.

2) Bathing teaching material content (**Table 2, Figure 2**)

**Table 2** shows the bathing teaching materials, and **Figure 2** depicts an excerpt of a scene.

The time was set to approximately 15 min so that it would be easy to use with-out imposing a listening burden on the mother or family members.

## 2.3. Creation of Teaching Materials

1) Factors such as the details and circumstances of dangers that mothers and family members were likely to experience and the innovations they used were extracted by the joint researchers based on literature review [9] and fact-finding surveys [3] [4] on infant ablu-tion and bathing.

2) Dangerous situations, prevention, and innovations were incorporated into the ablu-tion and bathing procedure by the joint researchers.

3) A man playing the role of a father who had no childcare experience was asked to ablu-tion and bathe an infant using a biological model.

Ablution and bathing are some of the childcare techniques that fathers often conduct. It was hoped that the teaching materials would be useful for mothers and family members who have little contact experience with young children when they are in unfamiliar childcare situations. Therefore, we selected a man who plays the role of a father who has no childcare experience as a model for the teaching materials.

**Table 1.** Ablution teaching material contents.

Content	Theme	Element
Title	“Baby ablution”	
Table of contents	“Introduction” “Ablution procedure and common dangers” “Innovations used by mothers and family members” “Introduction of convenient goods”	
Introduction	“Purpose of baby ablution”  “Dangers during ablution”	Keep the infant clean, observe the whole body, establish a lifestyle rhythm, and provide physical contact between parents and children  Proportion of mothers and family members who experienced dangers, and opinions of mothers and family members regarding dangers during ablution
Procedures and likely dangers	“Ablution procedure and common dangers”	Necessary goods, hot water temperature, hot water amount, time spent for ablution, ablution procedure, common dangers (almost dropped the infant in hot water, almost got soap foam in the infant’s mouth, almost submerged the infant’s face in hot water, etc.)
Instances where danger occurred	“Instances where danger occurred”	Instances where danger occurred (child made unexpected movement, conducted action alone, was not used to action, etc.)
Innovations used by mothers and family members	“Innovations used by mothers and family members”	Innovations used by mothers and family members (conducting action in the presence of many people who can help, using convenient goods, conducting action when no older children are nearby, etc.)
Introduction of convenient goods	“Introduction of convenient goods”	Goods during ablution (ablution net, foaming baby soap)

4) A researcher filmed the video.

5) Editing was done by a researcher using commercially available editing software (CyberLink PowerDirector365).

## 2.4. Research Participants

A total of 20 people, including advanced midwives, midwives belonging to midwifery associations, and public health nurses, were selected as participants to examine the appropriateness of teaching materials by professionals.

Advanced midwives refer to midwives certified by the CLoCMiP® Level III certification system; this system that examines the practical midwifery abilities of midwives and certifies that they have reached a certain level [10].

Theme  
1. Title

Narration

Ablution of a baby

2. Table of contents

Table of contents

Introduction  
Ablution procedure and common dangers  
Innovations used by mothers and family members  
Introduction of convenient goods

“In this video, we will talk about ‘Introduction,’ ‘ablution procedure and common dangers,’ ‘innovations used by mothers and family members,’ and ‘introduction of convenient goods.’”

3. Introduction (purpose)

Purpose

Cleaning the baby’s body  
Observing the whole body of the baby  
Establishing a lifestyle rhythm  
Initiating physical contact between parents and children

“Ablution of a baby has the goals of ‘cleaning the baby’s body,’ ‘observing the whole body of the baby,’ ‘establishing a lifestyle rhythm,’ and ‘initiating physical contact between parents and children.’”

4. Introduction (opinions on the dangers of ablution)

Regarding the dangers of ablution

We did not hear much about the dangers, so we wanted to know.

“Regarding the dangers of ablution, mothers and family members’ opinions included ‘we did not hear much about the dangers, so we wanted to know.’”

5. Procedures and likely dangers

Procedures and likely dangers

## 6. Hot water temperature

### The hot water temperature

Approximately 38 °C-40 °C Check with a hot water thermometer or with the inward side of the mother's or family member's arm.

"The hot water temperature should be approximately 38 °C-40 °C. Check with a hot water thermometer or with the inward side of the mother's or family member's arm."

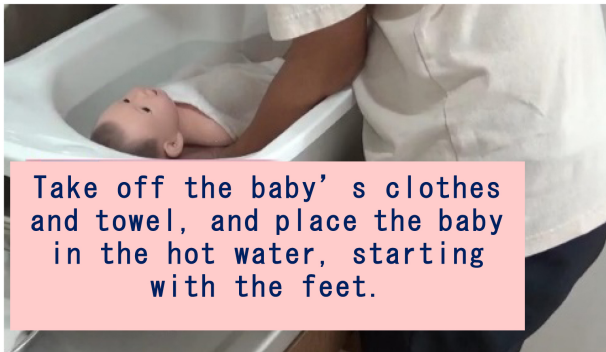
## 7. Required time

### Time for ablution

Don't worry too much about the time. Do not rush, and enjoy the process.

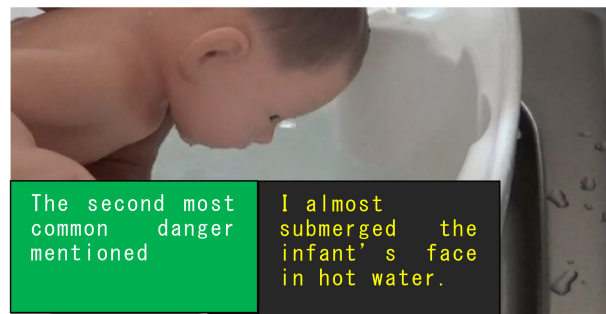
"It is time for ablution, but don't worry too much about the time. Do not rush, and enjoy the process."

## 8. Ablution procedure



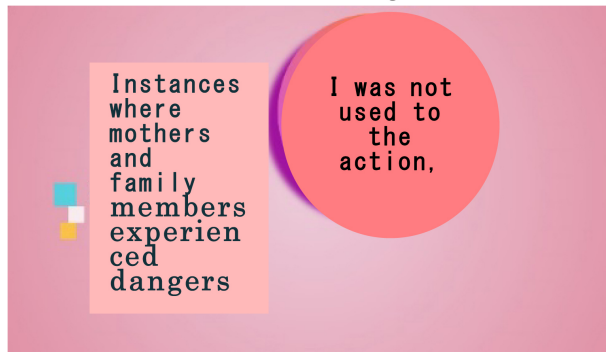
"Take off the baby's clothes and towel, and place the baby in the hot water, starting with the feet. After taking off the clothes, placing a towel or gauze will calm the baby down."

## 9. Common dangers



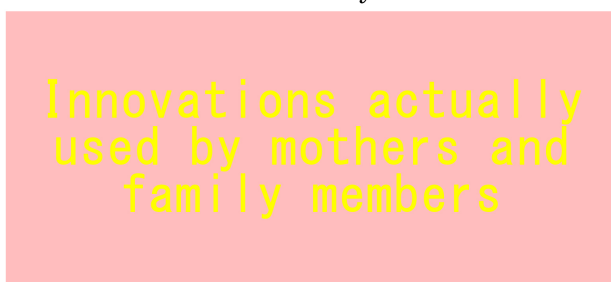
"The second most common danger mentioned is 'I almost submerged the infant's face in hot water.'"

## 10. Instances where danger occurred



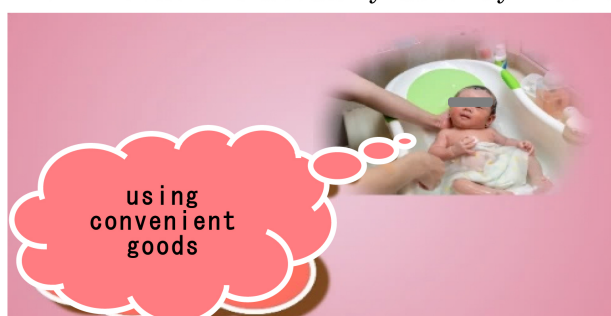
"Instances where mothers and family members experienced dangers included 'the child made an unexpected movement,' 'I conducted the action alone,' 'I was not used to the action,' 'I was in a hurry,' 'I was also taking care of other child,' 'the child was in a bad mood,' etc."

## 11. Innovations used by mothers and family members



“We will introduce innovations actually used by mothers and family members.”

## 12. Innovations actually used by mothers and family members



“Examples include ‘conducting action in the presence of many people who can help,’ ‘using convenient goods,’ ‘conducting action when no older children are nearby,’ etc.”

## 13. Introduction of goods



“We will introduce convenient goods for ablution.”

## 14. Introduction of goods



“This is an ‘ablution net.’ It can be difficult to wash a baby while supporting them with one hand. This is a product where you can place the baby during bath to support them.”

**Figure 1.** Ablution teaching material contents (excerpt).

## 2.5. Data Collection Method

### 1) Distribution and retrieval of questionnaires

Advanced midwives and midwives belonging to midwifery associations were selected using the snowball method, and public health nurses were selected by recommendations from managers of the facilities at which the nurses were affiliated, as well as the snowball method.

### 2) Survey period

**Table 2.** Bathing teaching material contents.

Content	Theme	Element
Title	“Baby bathing”	
Table of contents	“Introduction” “Bathing procedure and common dangers” “Innovations used by mothers and family members” “Introduction of convenient goods”	
Introduction	“Baby bathing goals”	Keep the infant clean, observe the whole body, establish a lifestyle rhythm, and provide physical contact between parents and children
	“Dangers during bathing”	Proportion of mothers and family members who experienced dangers, and opinions of mothers and family members regarding dangers during bathing
Procedures and likely dangers (Before fixed neck)	“Bathing procedure and common dangers”	Necessary goods, hot water temperature, hot water amount, bathing procedure, common dangers (almost got soap foam in the infant’s mouth, almost submerged the infant’s face in hot water, almost dropped the infant on the floor, etc.)
Instances where danger occurred (Before fixed neck)	“Instances where danger occurred”	Instances where danger occurred (conducted action alone, child made unexpected movement, was also taking care of another child, etc.)
Likely dangers (After fixed neck)	“Bathing procedure and common dangers”	Common dangers (almost submerged the infant’s face in hot water, submerged the infant’s face in hot water, dropped the infant on the floor, etc.)
Instances where danger occurred (After fixed neck)	“Instances where danger occurred”	Instances where danger occurred (conducted action alone, child made unexpected movement, was also taking care of another child, etc.)
Innovations used by mothers and family members	“Innovations used by mothers and family members”	Innovations used by mothers and family members (conducting action in the presence of many people who can help, using convenient goods, never losing sight of the baby, etc.)
Introduction of convenient goods	“Introduction of convenient goods”	Goods during bathing (bath mat, baby bath, bath chair, etc.), precautions for use (neck float)

November 7, 2021-December 21, 2021.

## 2.6. Questions

An anonymous self-administered questionnaire was created based on previous research. The questionnaire items were about the appropriateness of the teaching materials (suitability to purpose, degree of difficulty of content, ease of viewing the video, validity of time, appropriateness of expression, usability) and opinions and requests regarding the teaching materials.

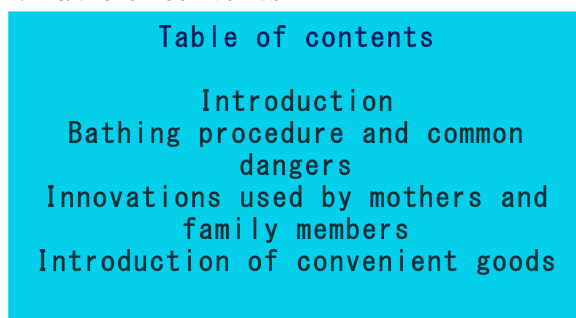
## Theme

## Narration

## 1. Title

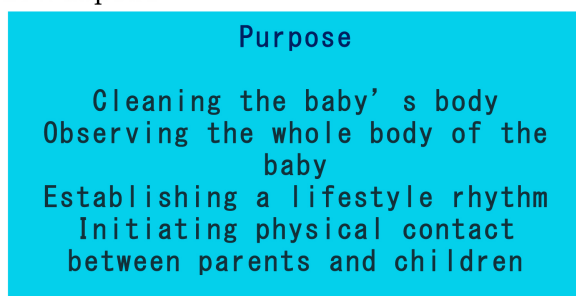


## 2. Table of contents



“In this video, we will talk about ‘Introduction,’ ‘bathing procedure and common dangers,’ ‘innovations actually used by mothers and family members,’ and ‘introduction of convenient goods.’”

## 3. Purpose



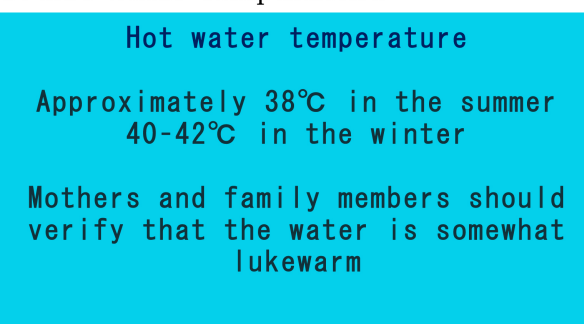
“Bathing of a baby has the goals of ‘cleaning the baby’s body,’ ‘observing the whole body of the baby,’ ‘establishing a lifestyle rhythm,’ and ‘initiating physical contact between parents and children’.”

## 4. Opinions on the dangers of bathing



Regarding the dangers of bathing, mothers and family members shared opinions such as ‘we want more information about the situations with actual accidents.’”

## 5. Hot water temperature



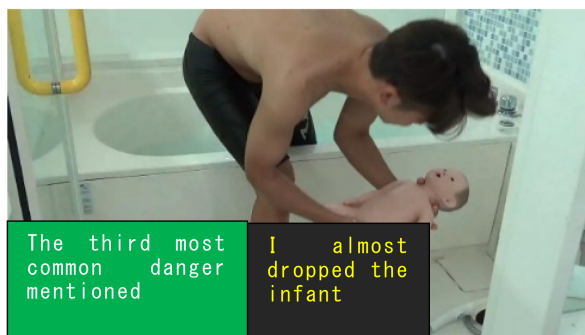
“The hot water temperature should be approximately 38 °C in the summer and 40–42 °C in the winter, and mothers and family members should verify that the water is somewhat lukewarm.”

6. Bathing procedure (before fixed neck)



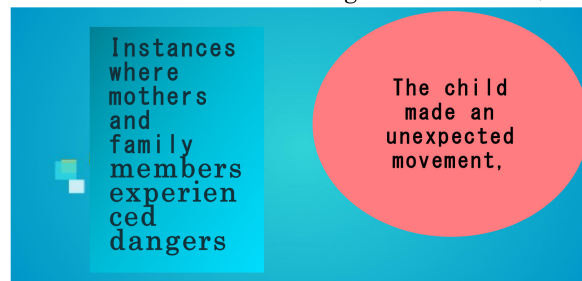
“Mothers and family members should sit in the bathtub on their knees.”

7. Common dangers (before fixed neck)



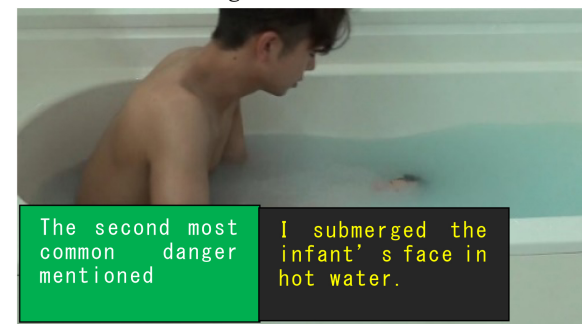
“The third most common danger mentioned is ‘I almost dropped the infant.’ The baby’s body becomes slippery due to soap foam and water.”

8. InstanceS where danger occurred (before fixed neck)



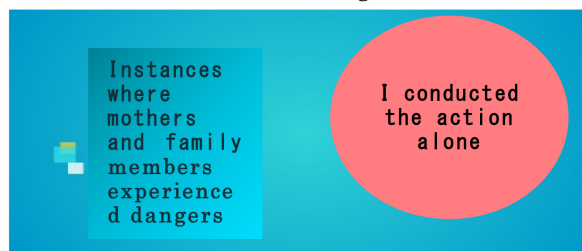
“Scenes where mothers and family members experienced dangers included ‘the child made an unexpected movement,’ ‘I conducted the action alone,’ ‘I was not used to the action,’ ‘the child was in a bad mood,’ ‘I was also taking care of another child,’ etc.”

9. Common dangers (after fixed neck)



“The second most common danger mentioned is ‘I submerged the infant’s face in hot water.’”

10. Instances where danger occurred (after fixed neck)



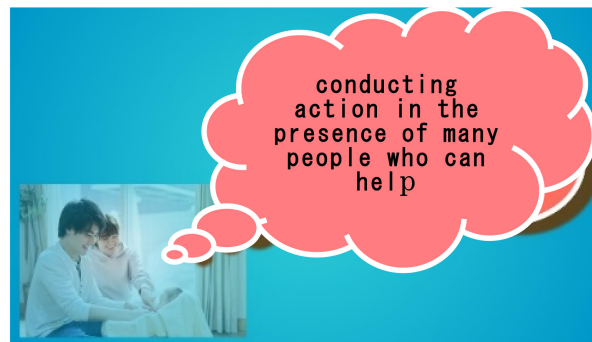
“Instances where mothers and family members experienced dangers included ‘I conducted the action alone,’ ‘the child made an unexpected movement,’ ‘the child was in a bad mood,’ ‘I was in a hurry,’ ‘I had not properly set up,’ ‘I had other errands,’ etc.”

11. Innovations used by mothers and family members



“We will introduce innovations actually used by mothers and family members.”

12. Innovations used by mothers and family members



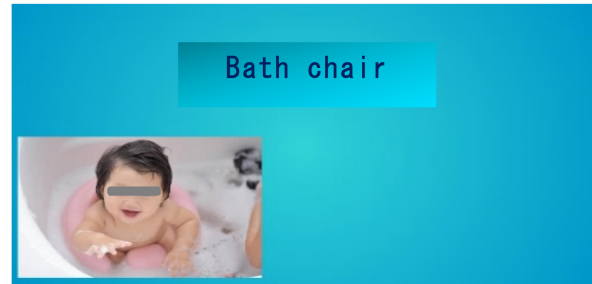
“Examples include ‘conducting action in the presence of many people who can help,’ ‘using convenient goods,’ ‘never losing sight of the baby,’ ‘using toys to distract the older child,’ etc.”

13. Introduction of goods



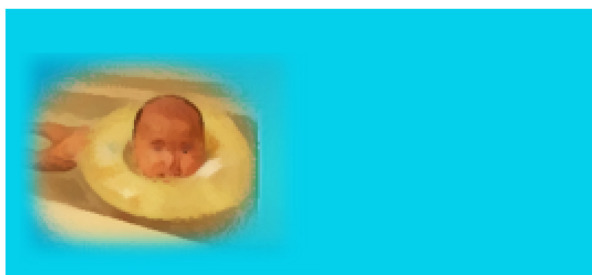
“We will now introduce some convenient goods.”

14. Introduction of goods



“This is a bath chair. Bath mats, baby baths, and bath chairs can be used to keep the baby waiting while the mother or family member is washing the infant’s body.”

15. Precautions when using goods



“You have likely often seen neck floats on TV and the Internet. However, accidents like drowning have often been reported with their use. Please do not use it in a bath to avoid situations such as losing sight of it.”

Figure 2. Bathing teaching material contents (excerpt).

## 2.7. Analysis and Evaluation Period

Analyses were conducted by simple tabulation for each survey item. Additionally, the free descriptions were coded.

## 2.8. Ethical Considerations

This study was conducted with the approval of the research ethics board of Osaka Medical and Pharmaceutical University (approval number 2020-223, May 26, 2021). The main researcher of this study provided a written explanation to the participants, and the participants' voluntary consent was confirmed by having them return the filled consent form with the questionnaire. The items explained to the participants were as follows: name of the research, statement that the research has been approved by the director of the research institution, name of the research institution and name of the research manager, purpose and significance of the research, method and duration of the research, reason for being selected as a research participant, benefits that the participant receives from research cooperation, a statement that this research is anonymous and coded so that individual research subjects cannot be identified from the research content in order to protect personal information, information storage and disposal methods, status of conflicts of interest related to research by the researchers, and responses to consultations from research participants and related parties.

## 3. Results

### 3.1. Questionnaire Retrieval Rate

The questionnaires were distributed to 20 people, all of whom responded, with a retrieval rate of 100%. If there were some non-response items or inappropriate responses, only those items were set as non-responses when conducting the analysis.

### 3.2. Participant Attributes (Table 3)

**Table 3** shows the age, occupation, years of work, and place of work of the participants.

In descending order of age, five people (25%) were in the age groups of "40 - 44 years" and "55 years" and four (20%) were in the age group of "35 - 39 years".

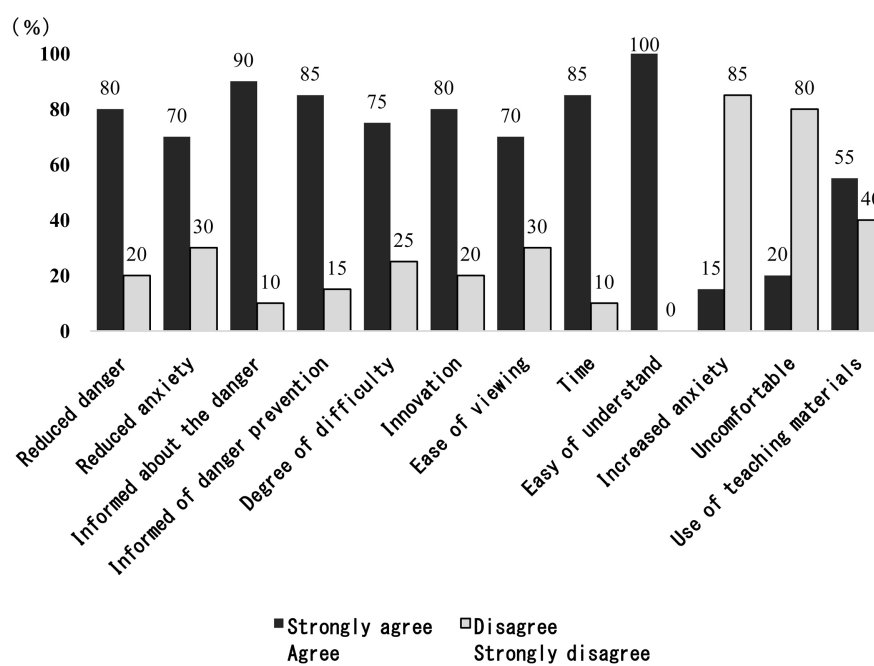
For occupations, eight people (40%) were "public health nurses", and 12 people (60%) were "midwives". For the years of work, seven people (35%) worked for "10 - 14 years", four (20%) for "20 - 24 years", and three (15%) for "5 - 9 years". Regarding the places of work, seven people (35%) worked in "educational institutions", five (25%) in "municipalities", and four (20%) in "midwifery centers".

### 3.3. Ablution Teaching Materials

- 1) Appropriateness of THE teaching materials (**Figure 3**)

**Table 3.** Participant attributes.

		Number of people	%
Age (years)	20 - 24	0	0
	25 - 29	0	0
	30 - 34	2	10
	35 - 39	4	20
	40 - 44	5	25
	45 - 49	3	15
	50 - 54	1	5
	55 or older	5	25
Occupation	Public health nurse	8	40
	Midwife	12	60
Years of work	Less than 5	1	5
	5 - 9	3	15
	10 - 14	7	35
	15 - 19	0	0
	20 - 24	4	20
	25 - 29	2	10
	30 - 34	1	5
	35 or more	2	10
Place of work	Hospital	3	15
	Clinic	1	5
	Midwifery center	4	20
	Municipality	5	25
	Educational institution	7	35

**Figure 3.** Appropriateness of ablation teaching materials.

**Figure 3** shows the appropriateness of the ablation teaching materials.

The proportions when combining “strongly agree” and “agree” responses were as follows: “reduced danger”, 16 people (80%); “reduced anxiety”, 18 (90%); “informed about the danger”, 18 (90%); “informed of danger prevention”, 17 (85%); “degree of difficulty”, 15 (75%); “innovation”, 16 (80%); “ease of viewing”, 14 (70%); “time”, 17 (85%); “ease of understanding”, 20 (100%); and “use of teaching materials”, 11 (55%). Additionally, the proportions when combining “disagree” and “strongly disagree” responses were as follows: “increase anxiety”, 17 (85%); and “uncomfortable”, 16 (80%).

2) Reasons for responses and opinions on the appropriateness of ablation teaching materials (**Table 4**)

**Table 4** lists the response reasons and opinions on the appropriateness of the ablation teaching materials.

For “reduced danger”, the reasons for “strongly agree” or “agree” responses included [being able to know in advance], such as “trying to avoid danger by knowing the possible dangers in advance”; and [being able to visualize the action], such as “easier to visualize the dangerous spots by seeing a video”. Reasons for the “disagree” or “strongly disagree” responses included [difficult to visualize], such as “being able to understand the overall picture of ablation, but ultimately the content has been created with a doll, cannot visualize unpredicted movements of babies”; and [lack of countermeasures], such as “lack of explanations on what to do if about to drop the baby’s head”.

For “reduced anxiety”, the reasons for the “strongly agree” or “agree” responses included [being able to visualize the action], such as “reduced anxiety because of better visualization”; and [being able to re-watch the video multiple times], such as “ablation videos have become popular; so, they can be re-watched multiple times and lead to reduced anxiety”. Reasons for the “disagree” or “strongly disagree” responses included [anxiety of conducting action does not decrease], such as “even with visualization, do not think that the anxiety of actually conducting action will decrease”; and [lack of countermeasures], such as “not clear from the DVD on how to avoid dangerous situations”.

For “informed about the danger”, the reasons for the “strongly agree” or “agree” responses included [gaining knowledge], such as “being able to learn deeply about the topic since there are few opportunities to learn about the dangers”; and [easy to understand], such as “reasons for why a certain accident occurred came up and were easy to understand”. Reasons for the “disagree” or “strongly disagree” responses included [difficult to understand], such as “difficult to understand by video”.

For “informed of danger prevention”, the reasons for the “strongly agree” or “agree” responses included [easy to understand], such as “actual countermeasures brought up and were easy to understand”; and [specific], such as “dangers were specifically communicated, and methods for avoiding them were also communicated”. Reasons for the “disagree” or “strongly disagree” responses included

**Table 4.** Responses with reasons and opinions on the appropriateness of ablution teaching materials.

Item (number of cases)		Code (excerpt)	Specific description (excerpt)
Reduced danger (14)	Strongly agree	Being able to know in advance	Trying to avoid danger by knowing the possible dangers in advance
	Agree	Being able to visualize the action	Easier to visualize the dangerous spots by seeing a video
	Disagree	Difficult to visualize	Being able to understand the overall picture of ablution, but ultimately the content has been created with a doll, cannot visualize unpredicted movements of babies
	Strongly disagree	Lack of countermeasures	Lack of explanations on what to do if about to drop the baby's head
Reduced anxiety (15)	Strongly agree	Being able to visualize the action	Reduced anxiety because of better visualization
	Agree	Being able to re-watch the video multiple times	Ablution videos have become popular; so, they can be re-watched multiple times and lead to reduced anxiety.
	Disagree	Anxiety of conducting the action does not decrease	Even with visualization, do not believe that the anxiety of actually conducting the action will decrease
	Strongly disagree	Lack of countermeasures	Not clear from the DVD on how to avoid dangerous situations
Informed about the danger (11)	Strongly agree	Gaining knowledge	Being able to learn deeply about the topic since there are few opportunities to learn about the dangers
	Agree	Easy to understand	Reasons for why a certain accident occurred came up and were easy to understand
	Disagree Strongly disagree	Difficult to understand	Difficult to understand by video
Informed of danger prevention (10)	Strongly agree	Easy to understand	Actual countermeasures brought up and were easy to understand
	Agree	Specific	Dangers were specifically communicated, and methods for avoiding them were also communicated
	Disagree Strongly disagree	Not specific	It was not very specific. There were no descriptions on what to do when the baby was dropped in hot water, and no innovations on how to avoid dropping the baby
Degree of difficulty (9)	Strongly agree	Not difficult	Content is not particularly difficult
	Agree	Easy to understand	Explanations were slow and careful, there were few specialized terminologies, and easy to understand
	Disagree Strongly disagree	Insufficient content	Content on the implementation of ablution is a bit weak

**Continued**

Innovation (10)	Strongly agree	Good atmosphere	Warm atmosphere overall, gentle BGM, and it was a video that I want to watch
	Agree	Implementation by a man	It is very good that the father was abluting the infant
	Disagree Strongly disagree	Not specific	It would be better to include more specific methods
Ease of viewing (14)	Strongly agree	Easy to view	It was easy to view since there was both narration and text
	Agree	Use of sound effects	Easy to understand because the dangerous points were alerted with sounds
	Disagree Strongly disagree	Cheerful atmosphere	It would be nice to have a more cheerful and fun atmosphere
Time (9)	Strongly agree	Just the right length of time	A length of time that can be viewed without difficulty
	Disagree Strongly disagree	Long	Approximately 5 - 8 min is best, a bit long
Easy of understand (7)	Strongly agree	Not difficult	There were no parts that felt difficult
	Agree	Easy to understand	Even detailed series of actions were easy to understand
Increased anxiety (4)	Strongly agree	Danger of increasing anxiety	Seems like it would make people feel that they need to properly learn how to ablate an infant
	Disagree Strongly disagree	Does not increase anxiety	Not feeling any particular actions or words that increased anxiety
Uncomfortable (8)	Strongly agree	Animation of the innovations	Movements such as those of the icons are concerning. They should be a bit simpler
	Disagree Strongly disagree	Not uncomfortable	It was not uncomfortable
Use of teaching materials (11)	Strongly agree	Easy to understand	Content was easy to understand, and it was good that the dangerous scenes were also properly communicated
	Agree	Can be used depending on the subject	Able to first use general ablation teaching materials, and then it can be used to instruct mothers who are more concerned

## Continued

	Disagree	Differences from reality	Actual infant and doll are ultimately different
	Strongly disagree	Addition of preventive measures	Would like to use it if it had more instructions from the perspective of prevention
		Being able to use it	Even in a local classroom, the action can be practiced only about once; so, with this kind of teach material, it can be shown to a partner or helper at home, which is very useful.
Opinion (16)		Being able to visualize the action	I have never seen a teaching material with a close-up on “dangers”; so it was easy to visualize, and it was also easy to communicate when instructing.
		Correction of contents	It would be better if the message, such as specific measures on how to prevent danger and conduct the action safely, is more prominent.
		How to use convenient goods	Convenient goods would be more convenient if how to use them was clarified.

[not specific], such as “It was not very specific. There were no descriptions on what to do when the baby was dropped in hot water, and no innovations on how to avoid dropping the baby”.

For “degree of difficulty”, the reasons for the “strongly agree” or “agree” responses included [not difficult], such as “content is not particularly difficult”; and “easy to understand”, such as “explanations were slow and careful, there were few specialized terminologies, and easy to understand”. Reasons for the “disagree” or “strongly disagree” responses included [insufficient content], such as “content on the implementation of ablution is a bit weak”.

For “innovation”, the reasons for the “strongly agree” or “agree” responses included [good atmosphere], such as “warm atmosphere overall, gentle BGM (Background Music), and it was a video that I want to watch”; and [implementation by a man], such as “it is very good that the father was abluting the infant”. Reasons for the “disagree” or “strongly disagree” responses included [not specific], such as “it would be better to include more specific methods”.

For “ease of viewing”, the reasons for the “strongly agree” or “agree” responses included [easy to view], such as “it was easy to view since there was both narration and text”; and [use of sound effects], such as “easy to understand because the dangerous points were alerted with sounds”, Reasons for the “disagree” or “strongly disagree” responses included [cheerful atmosphere], such as “it would be nice to have a more cheerful and fun atmosphere”; and [implementation with an infant], such as “actual infant should be used”.

For “time”, the reasons for the “strongly agree” or “agree” responses included [just the right length of time], such as “a length of time that can be viewed without difficulty”. Reasons for the “disagree” or “strongly disagree” responses included [long], such as “approximately 5 - 8 min is best, a bit long”.

For “ease of understanding”, the reasons for the “strongly agree” or “agree” responses included [not difficult], such as “there were no parts that felt difficult”; and [easy to understand], such as “even detailed series of actions were easy to understand”.

For “increased anxiety”, the reasons for the “disagree” or “strongly disagree” responses included [does not increase anxiety], such as “not feeling any particular actions or words that increased anxiety”. Reasons for the “strongly agree” or “agree” responses included [danger of increasing anxiety], such as “seems like it would make people feel that they need to properly learn how to ablate an infant”.

For “uncomfortable”, the reasons for the “disagree” or “strongly disagree” responses included [not uncomfortable], such as “it was not uncomfortable”. Reasons for the “strongly agree” or “agree” responses included [animation innovations], such as “Movements such as those of the icons are concerning. They should be a bit simpler”.

For “use of teaching materials”, the reasons for the “strongly agree” or “agree” responses included [easy to understand], such as “content was easy to understand, and it was good that the dangerous scenes were also properly communicated”; and [can be used depending on the subject], such as “able to first use general ablation teaching materials, and then it can be used to instruct mothers who are more concerned”. Reasons for the “strongly disagree” or “disagree” responses included [differences from reality], such as “actual infant and doll are ultimately different”; and [addition of preventive measures], such as “would like to use it if it had more instructions from the perspective of prevention”.

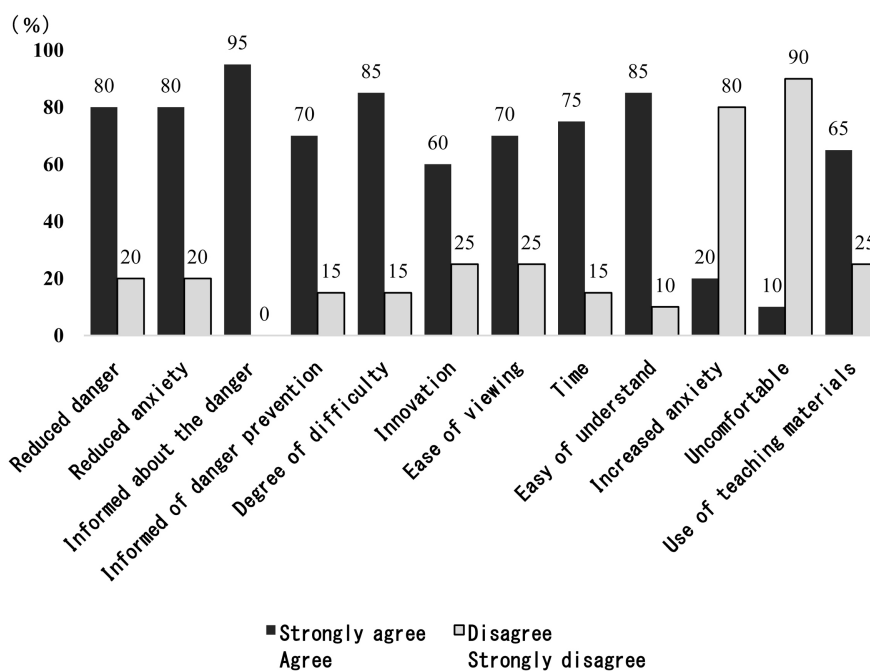
For “opinions on teaching materials”, reasons included [can be used], such as “even in a local classroom, the action can be practiced only about once; so, with this kind of teach material, it can be shown to a partner or helper at home, which is very useful”; [being able to visualize the action], such as “I have never seen a teaching material with a close-up on ‘dangers,’ so, it was easy to visualize, and it was also easy to communicate when instructing”; [correction of contents], such as “it would be better if the message, such as specific measures on how to prevent danger and conduct the action safely, is more prominent”; and [how to use convenient goods], such as “convenient goods would be more convenient if how to use them was clarified”.

### 3.4. Bathing Teaching Materials

#### 1) Appropriateness of teaching materials (Figure 4)

Figure 4 shows the appropriateness of the bathing teaching materials.

The proportions when combining the “strongly agree” and “agree” responses were as follows: “reduced danger”, 16 people (80%); “reduced anxiety”, 16 (80%); “informed about the danger”, 19 (95%); “informed of danger prevention”, 14 (70%); “degree of difficulty”, 17 (85%); “innovation”, 12 (60%); “ease of viewing”, 14 (70%); “time”, 15 (75%); “ease of understanding”, 17 (85%); and “use of



**Figure 4.** Appropriateness of bathing teaching materials.

teaching materials”, 13 (65%). Additionally, the proportions when combining the “disagree” or “strongly disagree” responses were as follows: “increased anxiety”, 16 people (80%); and “uncomfortable”, 18 (90%).

2) Reasons for responses and opinions on the appropriateness of bathing teaching materials (**Table 5**)

**Table 5** shows the reasons for responses and opinions on the appropriateness of bathing teaching materials.

For “reduced danger”, the reasons for the “strongly agree” or “agree” responses included [gaining knowledge], such as “I think there are few opportunities to learn how to bathe after finishing ablution; so, dangers decrease by knowing in advance”; and [easy to understand], such as “it was easy to understand what kinds of accident risks exist in which scene”. Reasons for the “disagree” or “strongly disagree” responses included [will not lead to decreased danger], such as “it was an opportunity to learn what is dangerous, but I do not think it will lead to decreased danger”.

For “reduced anxiety”, the reasons for the “strongly agree” or “agree” responses included [being able to visualize the action], such as “able to actually see the video of a person in the bathroom; so, it was easy to visualize and I thought it would reduce anxiety”; and [specific], such as “it is a specific way of bathing; so, it will be greatly reduced”. Reasons for the “disagree” or “strongly disagree” responses included [few innovations], such as “there were few innovations for avoiding danger”; and [annotations required], such as “the shower was used when washing the head, and hot water was splashing on the baby’s face. This happens even at home, but it would be reassuring to have an annotation that says ‘a small amount of splashing is okay’”.

**Table 5.** Response reasons and opinions on the appropriateness of bathing teaching materials.

Item (Number of cases)		Code (excerpt)	Specific description (excerpt)
Reduced danger (10)	Strongly agree	Gaining knowledge	I think there are few opportunities to learn how to bathe after finishing ablution; so, dangers decrease by knowing in advance
	Agree	Easy to understand	It was easy to understand what kinds of accident risks exist in which scene
	Disagree Strongly disagree	Will not lead to decreased danger	It was an opportunity to learn what is dangerous, but I do not think it will lead to decreased danger.
Reduced anxiety (13)	Strongly agree Agree	Able to visualize the action	Able to actually see a video of a person in the bathroom; so, it was easy to visualize and I thought it would reduce anxiety
		Specific	It is a specific way of bathing; so, it will be greatly reduced
	Disagree Strongly disagree	Few innovations	There were few innovations for avoiding danger.
		Annotations required	The shower was used when washing the head, and hot water was splashing on the baby's face. This happens even at home, but it would be reassuring to have an annotation that says "a small amount of splashing is okay"
Informed about the danger (9)	Strongly agree Agree	Gaining knowledge	There are no available learning opportunities, and this is a teaching material that allows people to learn again
		Easy to understand	It was easy to understand and to think about countermeasures because it summarized how dangerous scenes change according to the number of months after birth
Informed of danger prevention (9)	Strongly agree Agree	Gaining knowledge	I think there are many people who are confused when switching from ablution to bathing; so, it is good to be able to know the preventive methods in advance
		Explanations present	Careful explanations on prevention
	Disagree Strongly disagree	Not specific	There were few specific actions
Degree of difficulty (11)	Strongly agree Agree	Not difficult	I think it would be difficult for people who do it for the first time, but the content itself is not that difficult
		Easy to understand	Shown in a concrete manner so it is easy to understand

## Continued

	Disagree Strongly disagree	Innovations during implementation	What about innovations for when there are two children? People must want to hear more about this
		Differences due to developmental stage	Difference in precautions for before and after infant's fixed neck was unknown
Innovation (10)	Strongly agree Agree	Effects of video	Some would think that they want to look at videos more than text
		Drawing interest	Made to feel interested in what will happen in the bathroom
	Disagree Strongly disagree	Little feeling	I did not feel it very much
		Difficult to view	The icons were cluttered; so, it was a bit difficult to see
Ease of viewing (10)	Strongly agree Agree	Never existed before	Often hear about ablution videos or ablution methods, but rarely see videos on bathing methods in infancy; so, it is good to have
		Explanations present	There were explanations such as videos and convenient goods
	Disagree Strongly disagree	Difficult to view	The icons were cluttered; so, it was a bit difficult to see
		Difficult to visualize	Dolls were used; so, it is difficult to understand circumstances where an infant might thrash about.
Time (8)	Strongly agree Agree	Just the right length of time	A length of time that can be viewed without difficulty
	Disagree Strongly disagree	Long	A bit long; a length of approximately 10 minutes would be easier to use in classrooms as well
Easy of understand (6)	Strongly agree Agree	Easy to understand	There were easy-to-understand explanations
		Not difficult	There were no difficult words
Increased anxiety (4)	Strongly agree Agree	Danger of increasing anxiety	I thought it might result in anxiety, like you should not drop the infant
	Disagree Strongly disagree	Does not increase anxiety	It is only stating facts; so, I do not think it will increase anxiety
Uncomfortable (5)	Disagree Strongly disagree	Not uncomfortable	It was not uncomfortable
Use of teaching materials (9)	Strongly agree Agree	Can be used	This is a teaching material that has never been seen before, and I think it is a content that mothers and family members needed; so, would want to use them if the materials exist

## Continued

	Never existed before	Struggle over when to use it, but never existed before; so, I think it is good to have
Disagree Strongly disagree	Specific additions	If only there were a bit more of the introduction of specific actions or innovations for avoiding dangers
	Multiple children	Innovations can be thought of when there is only one child, but what to do when there are two children
Opinion (19)	Teaching material that has never been seen before now	There are not many instructional media about specific bathing; so, I watched it with great interest
	Easy to understand	It was a very easy-to-understand video that makes the process of baby-bathing fun
	Correction of contents	What to do when a dangerous event actually occurs
	Disclosure innovations	It feels good to be able to use YouTube and others, where it can be viewed at any time

For “informed about the danger”, the reasons for the “strongly agree” or “agree” responses included [gaining knowledge], such as “there are no learning opportunities, and this is a teaching material that allows people to learn again”; and [easy to understand], such as “it was easy to understand and think about countermeasures because it summarized how dangerous scenes change according to the number of months after birth”.

For “informed of danger prevention”, the reasons for the “strongly agree” or “agree” responses included [gaining knowledge], such as “I think there are many people who are confused when switching from ablution to bathing; so, it is good to be able to know the preventive methods in advance”; and [explanations present], such as “careful explanations on prevention”. Reasons for the “disagree” or “strongly disagree” responses included [not specific], such as “there were few specific actions”.

For “degree of difficulty”, the reasons for the “strongly agree” or “agree” responses included [not difficult], such as “I think it would be difficult for people who do it for the first time, but the content itself is not that difficult”; and [easy to understand], such as “shown in a concrete manner; so, it is easy to understand”. Reasons for the “disagree” or “strongly disagree” responses included [innovations during implementation], such as “What about innovations for when there are two children? People must want to hear more about this”; and [differences due to developmental stage], such as “difference in precautions for before and after infant’s fixed neck was unknown”.

For “innovation”, the reasons for the “strongly agree” or “agree” responses in-

cluded [effects of the video], such as “some would think that they want to look at videos more than text”; and [drawing interest], such as “made to feel interested in what will happen in the bathroom”. Reasons for the “disagree” or “strongly disagree” responses included [little feeling], such as “I did not feel it very much”; and [difficult to view], such as “the icons were cluttered; so, it was a bit difficult to see”.

For “ease of viewing”, the reasons for the “strongly agree” or “agree” responses included [never existed before], such as “often hear about ablution videos or ablution methods, but rarely see videos on bathing methods in infancy; so, it is good to have”; and [explanations present], such as “there were explanations such as videos and convenient goods”. Reasons for the “disagree” or “strongly disagree” responses included [difficult to view], such as “the icons were cluttered; thus, it was a bit difficult to see”; and [difficult to visualize], such as “dolls were used; so, it is difficult to understand circumstances where an infant might thrash about”.

For “time”, there were reasons like [just the right length of time], such as “a length of time that can be viewed without difficulty”. Reasons for the “disagree” or “strongly disagree” responses included [long], such as “a bit long. A length of approximately 10 min would be easier to use in classrooms as well”.

For “ease of understanding”, the reasons included [easy to understand], such as “there were easy-to-understand explanations”; and [not difficult], such as “there were no difficult words”.

For “increase anxiety”, the reasons for the “disagree” or “strongly disagree” responses included [does not increase anxiety], such as “it is only stating facts; so, I do not think it will increase anxiety”. Reasons for the “strongly agree” or “agree” responses included [danger of increasing anxiety], such as “I thought it might result in anxiety, like you should not drop the infant”.

For “uncomfortable”, the reasons for the “disagree” or “strongly disagree” responses included [not uncomfortable], such as “it was not uncomfortable”.

For “use of teaching materials”, the reasons for the “strongly agree” or “agree” responses included [can be used], such as “this is a teaching material that has never been seen before, and I think it is a content that mothers and family members needed; so, would want to use them if the materials exist”; and [never existed before], such as “struggle over when to use it, but never existed before; so, I think it is good to have”. Reasons for the “disagree” or “strongly disagree” responses included [specific additions], such as “if only there were a bit more of the introduction of specific actions or innovations for avoiding dangers”; and [multiple children], such as “innovations can be thought of when there is only one child, but what to do when there are two children”.

For “opinions on teaching materials”, reasons included [teaching material that has never before been seen], such as “there are not many instructional media about specific bathing; so, I watched it with great interest”; [easy to understand], such as “it was a very easy-to-understand video that makes the process of ba-

by-bathing fun”; [correction of contents], such as “what to do when a dangerous event actually occurs”; and [disclosure innovations], such as “it feels good to be able to use YouTube and others, where it can be viewed at any time”.

## **4. Discussion**

### **4.1. Participant Attributes**

For occupations, 40% were “public health nurses” and 60% were “midwives”. For the years of work, 35% worked for “10 - 14 years”, 20% worked for “20 - 24 years”, and 15% worked for “5 - 9 years”. For the places of work, 35% worked in “educational institutions”, 25% worked in “municipalities”, and 20% worked in “midwifery centers”. The participants were public health nurses and midwives who were professionals related to infants, mothers, and family members, and they had multiple places of work; thus, appropriateness could be examined from a wide perspective. However, the results might be biased because some of the participants were recruited using the snowball method.

### **4.2. Examination of the Appropriateness of Teaching Materials**

#### 1) Suitability for purpose

The teaching materials created were videos that included dangers experienced by mothers and family members, the situations in which those dangers were experienced, and the innovations by mothers and family members for preventing dangers during ablution and bathing procedures. The proportions for “strongly agree” and “agree” responses were as follows for ablution: “reduced danger”, 80%; “reduced anxiety”, 70%; informed about the danger”, 90%; and “informed of danger prevention”, 85%. Additionally, for bathing, the values were as follows: “reduced danger”, 80%; “reduced anxiety”, 80%; “informed about the danger”, 95%; and “informed of danger prevention”, 70%. Based on these results and the reasons for responses such as [being able to know in advance], [being able to visualize the action], and [gaining knowledge], it is assumed that knowledge about the dangers of ablution and bathing was successfully conveyed, and that this would be an appropriate teaching material for decreasing danger or alleviating anxiety. However, as can be seen in the reason for the response of [difficult to visualize], this study used model dolls as teaching materials, and it is inferred that it is difficult for mothers and family members who are dealing with infants for the first time to imagine the unexpected movements of actual infants. One example of a situation when experiencing a danger in ablution and bathing is the “child making an unexpected movement” [3] [4], and it is thought that showing some of such movements through real infants in a video would be effective. Moreover, it is believed that demonstration of ablution and bathing using model dolls as well as actual children is necessary.

For ablution, mothers mainly receive instruction at an inpatient facility during postpartum hospitalization. Additionally, in some cases, the mother may receive ablution instructions as part of the health education before childbirth. However,

over half of mothers and family members responded that they had not received any instruction regarding possible dangers and prevention during ablution [3]. Ablution instruction that is currently conducted in Japan focuses on the methods used, and it can be said that there is insufficient attention on danger prevention. The difference between teaching materials that are already in use and the materials created for this research is the latter's focus on dangers that are likely to occur and danger prevention.

Safe ablution and bathing of an infant requires acquiring knowledge about dangers and danger prevention. Lack of knowledge and awareness among mothers and family members has been indicated as one factor behind the occurrence of dangers [11]. It is thought that the dangers of ablution and bathing can be reduced by combining the viewing of the teaching material and practicing it. Additionally, as seen in the reason for the response of [lack of countermeasures], it is believed that adding specific preventive measures and countermeasures when a dangerous event occurs would lead to a teaching material that further reduces danger and anxiety.

#### 2) Degree of difficulty of content

The mothers and family members who viewed the teaching materials had various backgrounds, assessed by questions on whether they were primiparous or multiparous and whether they had a relationship with infants. Particularly, in Japan, with an increasing number of mothers and family members who have little experience of contact with young children, it has become necessary for explanations in teaching materials used for instruction to be in plain language and easy to understand. For the "degree of difficulty", the proportions of "strongly agree" or "agree" responses were 75% for ablution and 85% for bathing. Additionally, reasons for the responses included [not difficult] and [easy to understand]. It is assumed from these results that the degree of difficulty was generally appropriate.

#### 3) Ease of viewing the video

It is thought that the ease of viewing videos is important for mothers and family members to be interested in the teaching materials due to their busy lives. For ablution, the proportions of "strongly agree" or "agree" responses were 80% for "innovation" and 70% for "ease of viewing". For bathing, the proportions were 60% for "innovation" and 70% for "ease of viewing". Although the music, text, and sound effects made the video easy to view, there were reasons for responses such as [difficult to view], due to the movement of the icons, and [cheerful atmosphere]; thus, there is a need to innovative videos so that mothers and family members can be interested and enjoy viewing the videos as teaching materials on ablution and bathing; activities will be conducted every day.

#### 4) Validity of time

Mothers and family members have multiple roles such as childcare other than ablution and bathing, housework, and work. Therefore, it is difficult to spend a long time to view teaching materials. The teaching materials used in this study

were approximately 10 min long for ablu-tion, and about 15 min long for bath-ing. The proportions of “strongly agree” or “agree” responses were 85% for ablu-tion and 75% for bathing. For the time, the video can be assumed to be generally appropriate. However, there was a reason for response of [long], and there is a need to carefully select the content again, and make innovations so that mothers and family members can obtain the necessary information in a short period of time.

#### 5) Appropriateness of expression

This was a teaching material that focused on dangers, and depending on the way of expression, it was inferred that people would develop anxieties or fears about ablu-tion and bathing infants. For ablu-tion, the proportion of “strongly agree” or “agree” responses for “ease of understanding” was 100%. Meanwhile, the proportions of “disagree” or “strongly disagree” responses were 85% for “increased anxiety” and 80% for “uncomfortable”. Additionally, for bathing, the proportion of “strongly agree” or “agree” responses was 85% for “ease of understanding”. Meanwhile, the proportions of “disagree” or “strongly disagree” responses were 80% for “increased anxiety” and 90% for “uncomfortable”. It is thought from these results that the expression was appropriate. However, the teaching mate-rials could be viewed without increasing the anxieties of mothers and family members by adding innovations for making ablu-tion or bathing fun instead of only emphasizing the dangers, specific measures for preventing dangers, and the details and degrees of the dangers that would not pose a major problem to in-fants.

#### 6) Usability

For the “use of teaching materials”, the proportions of “strongly agree” or “agree” were 55% for ablu-tion and 65% for bathing.

Various video-based teaching materials are presently used for ablu-tion. How-ever, these do not focus on danger. There was a reason for the response of [being able to visualize the action], and it is possible to visualize not only the procedure but also the danger; thus, it is thought that the material can be used. Addition-ally, for bathing, no teaching materials have been used to date. Bathing is a daily lifestyle habit conducted in Japan. Even the bathing of infants often uses bath-tubs filled with hot water, and there are many opportunities for encountering danger. Therefore, it is believed that teaching materials that allow for the learn-ing of the basic flow of bathing as well as the possible dangers makes the materi-al usable.

However, although this is a teaching material that focused on danger, there are insufficient specific measures for danger prevention. Using the teaching ma-terial for the instruction of mothers and family members requires further im-provements to the material.

#### 7) Appropriateness of teaching materials

An examination by professionals of the appropriateness of the teaching mate-rials on ablu-tion and bathing that was created by this study, in terms of the sui-

tability to purpose, degree of difficulty of content, ease of viewing the video, validity of time, appropriateness of expression, and usability, showed that the teaching material was generally appropriate. Revising the teaching materials by adding more innovative videos, specific measures for prevention, and countermeasures for when dangers occur is necessary to prevent dangers in ablution and bathing.

## 5. Research Limitations and Future Prospects

In this study, teaching materials were developed based on the dangerous experiences of mothers and family members, and the appropriateness of the material was examined by professionals. Limitations of this research included the fact that the research participants were professionals who were recruited using the snowball method, and it cannot be said that this was a sufficient examination for determining whether the material was appropriate for viewing by mothers and family members or for reducing the dangers in ablution and bathing of infants.

A future task is to revise the created teaching material based on the results of this research, and then examine the appropriateness of the material with mothers and family members. The material should be further revised based on those examinations; an intervention study using the teaching material should be conducted with the mothers and family members, and the material should be refined accordingly.

## 6. Conclusions

The purpose of this study is to develop teaching materials based on the dangerous experiences of mothers and family members and examine their appropriateness in order to prevent the dangers of ablution and bathing infants by mothers and family members.

The following was clarified as a result.

1) The teaching material was appropriate in terms of suitability to purpose, degree of difficulty of content, ease of viewing the videos, validity of time, appropriateness of expression, and usability.

2) Ablution teaching materials that are currently used do not focus on dangers, and to date, no resources on bathing have been used as teaching materials. The created teaching materials can be viewed multiple times, and mothers and family members who are unfamiliar with ablution and bathing can acquire knowledge regarding dangers and danger prevention.

3) The addition of specific preventive measures and countermeasures for when danger occurs, and combining these with practice, will result in further effective teaching materials for reducing danger and alleviating anxiety.

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## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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