

# A Survey of Bath Time Incidents Experienced by Mothers and Families of Children Aged 18 Months

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## Abstract

**Purpose:** The potential dangers of infant bathing have an effect not only on the infant's body and life but also on the formation of emotional bonds in the parent-child relationship. This study will explore actual dangers experienced by mothers and families. **Method:** We distributed an anonymous, self-reported questionnaire at infants' 18-month health checkup, which was collected via postal service. 304 valid responses were received and formed our sample data. Descriptive statistical analysis was performed for each category surveyed. Inferential statistics were used to compare the dangerous incidents experienced with regard to differences between primipara/multipara and the presence/absence of guidance concerning such incidents. This study was approved by the research ethics committees of the affiliated university. **Results:** 70% of mothers and families experienced incidents while bathing their infants, with the most common incidents consisting of, in order of frequency, near immersion of the face, actual immersion of the face, and falling into the bath. The most common situations reported when incidents occurred were bathing the infant by oneself, the infant moving unexpectedly, or taking care of other children, in that order. Approximately 70% of mothers and families had not received instruction on the potential dangers or how to prevent them. **Conclusion:** This study has elucidated the dangerous situations experienced in the course of bathing infants in the home and the measures taken to prevent such situations. Instructive tools are needed which can be used to easily provide mothers and families with correct information.

## Keywords

Bath Time, Incidents, Experience, Children

## 1. Introduction

Along with increasing nuclearization of families and a declining birthrate, Japan has seen an increase in men and women who have had little experience dealing with young children becoming parents, as well as an increase in parents who lack the knowledge and skills that pertain to raising children [1] [2]. Furthermore, a weakening of community ties means fewer opportunities for support or the exchange of information [3].

Caring for an infant involves a number of elements, including feeding, putting the infant to sleep, changing diapers, and bathing. Bathing in particular is a multifaceted process involving a number of steps, including changing clothes, washing, keeping hold of the infant, and moisture management. Moreover, bathing space is often limited, and many of the steps are independent actions that demand considerable attention and dexterity. It is also necessary to monitor the infant's condition and adapt bathing methods accordingly. In recent years, the length of post-birth hospital stays at Japanese medical facilities has been shortened [4] to an extent that almost no instruction on proper bathing techniques is given [5]. As a result of this situation, families lack adequate knowledge and practice, making safe and comfortable bathing a difficult undertaking.

As there is an element of danger when bathing, unexpected accidents are known to occur. According to a 2019 demographic survey conducted by the Ministry of Health, Labour, and Welfare, unforeseen accidents were the 3<sup>rd</sup> leading cause of death among infants under one year of age [6]. Incidents that occurred during bathing included life-threatening accidents such as drowning, falls, and burns. The number of cases of near drownings during bath time was higher for infants under one year of age than for other age groups, and fatal accidents did occur [7]. In the current state of Japanese society, parents can hardly avoid situations in which they must bathe their infant without the help of another or in which they have to take care of multiple children at the same time. Inexperience and impaired judgement due to fatigue are also among the many factors which lead to dangerous accidents. Bathtime incidents can be supposed to include drops due to slippery hands, soup getting in the eyes, drowning in the tub, and burns. According to Heinrich's triangle, 300 minor incidents occur for every major injury. It can be assumed that a large number of families experience close calls in the course of their daily bathing routine that go unreported. As existing reports are made up mostly of more serious accidents, the statistics on such close calls are unclear [7]. In a survey on mothers' worries about bathing their infants, over half reported they had concerns. 36.8% of primipara and 17.1% of multipara reported feeling a sense of danger associated with bathing [5]. These results highlighted a need for support from nursing professionals regarding safe bathing practices and the prevention of accidents.

Bathing is a daily practice with many purposes, for not only physical aspects like hygiene, observation of the state of the body, and improvement of metabolism, but also for mental aspects like establishing a life rhythm and parent-child

intimacy. Bathtime dangers prevent the fulfillment of these goals, potentially threatening the formation of emotional bonds and having negatively influencing the parent-child relationship, in addition to the immediate dangers to the infant's body and life.

From the above points, we have concluded that measures must be taken to assist mothers and their families in safely and confidently bathing their newborns. With this in mind, we conducted this study with the purpose of exploring the dangers related to infant bathing experienced by mothers and families in Japan that are not yet apparent.

## 2. Method

### 1) Terminology

- a) Infant: A child of less than one year of age.
- b) Bathing: The washing of an infant in a bathtub, including related acts such as preparation, dressing, washing, holding the infant's body, and post-bath care.
- c) Dangers/Incidents: Bathtime accidents which threaten the life or health of the child, as well as close calls which did not have a lasting effect on the child's life or health.

### 2) Study design & survey period

#### a) Study Design

Fact-finding survey.

#### b) Survey Period

June 12, 2020-September 23, 2020.

### 3) Subjects

Mothers who brought their infants for their 18-month health checkup were surveyed to investigate the conditions around infant bathing.

### 4) Method of data collection

With the advance permission of a health center located in Osaka Prefecture, researchers verbally requested participation following 18-month health check-ups. Mothers who gave consent received an anonymous, self-reported questionnaire, which was collected via postal service.

### 5) Contents of survey

The survey contained 20 questions in total, prepared for this study with reference to prior research. Subjects were asked to respond with respect to their infant's first year of life. Pretesting was conducted on four mothers with children aged 18 months.

### 6) Method of analysis & evaluation

Each item of the self-reported responses was analyzed using the statistics software SPSS version 27.0. Additionally, inferential statistics were used to compare the differences between primipara/multipara and the presence/lack of instruction pertaining to experienced dangers. Inferential statistics were verified using the  $\chi^2$  test or Fisher's exact test, with a significance level of less than 5%.

### 7) Ethical considerations

This study was conducted with the approval of the Osaka Medical and Pharmaceutical University Ethics Committee (Approval code: Nursing-142 2862, approved January 28, 2020). With the advance permission of a health center located in Osaka Prefecture, questionnaires and explanatory materials were distributed to mothers following their infants' 18-month health checkups. Consent was given in writing upon submission of the questionnaire. Subjects were informed of the study's title, the names of the involved research organizations, the name of the principal investigator, the purpose of the study, the method and term of the study, the reason they were selected to participate, that the benefit of their participation would be their contribution to the field of nursing and that there would be no direct profit or compensation for their cooperation, that personal information would be anonymized and coded in such a way that such information would not be personally identifiable, that anonymity would be maintained in any published data, the method of storage and disposal of personal information, the circumstances involving conflicts of interest with the research, and the availability of the researchers or related parties for consultation. The content of the questionnaire was carefully selected in order to minimize the burden on participants.

### 3. Results

#### 1) Questionnaire collection rate

Questionnaires were given to 679 individuals, and 304 responses were received (collection rate of 44.8%). Responses that contained partially incomplete or inappropriate answers were classified as no response during the analysis.

#### 2) Subject characteristics (Tables 1-3)

**Table 1** shows the number and age of children in each household, **Table 2** shows the parents' employment status, and **Table 3** shows the parents' bathing habits.

**Table 1.** Number of children and age of older children in household.

		#	%
Number of Children (n = 304)	Second child or later	159	52.3
	First child	145	47.7
Age of Older Children (n = 159)	1 year	9	5.7
	2 years	4	2.5
	3 years	24	15.1
	4 years	53	33.3
	5 years	34	21.4
	6 years	20	12.6
	7+ years	44	27.7
	No response	3	1.9

**Table 2.** Parents' employment status (n = 304).

	Number (%)				
	Employed	Unemployed	On childcare leave	Other	No response
Mothers	135 (44.4)	117 (38.5)	40 (13.2)	3 (1.0)	9 (3.0)
Fathers	293 (96.4)	2 (0.7)	0 (0.0)	0 (0.0)	9 (3.0)

**Table 3.** Parents' bathing habits (n = 304).

	Number (%)					
	Bath (daily)	Shower only	Shower usually, with occasional bath	Shower in summer, bath in winter	Other	No response
Mothers	181 (59.5)	11 (3.6)	29 (9.5)	77 (25.3)	1 (0.3)	6 (2.0)
Fathers	154 (50.7)	24 (7.9)	43 (14.1)	70 (23.0)	3 (1.0)	11 (3.6)

159 subjects (52.3%) were on their second child or later, while 145 were on their first (47.7%). Of the 159 subjects who responded that they had two or more children, the most common ages were as follows: 53 subjects (33.3%) had a five-year-old, 44 (27.7%) had a child of age 7 or older, and 34 (21.4%) had a five-year-old. For both mother and fathers, the 30 - 34 age group was the most common, with 131 (43.1%) and 115 (37.8%) respectively. 135 mothers (43.1%) and 293 fathers (96.4%) were employed. 40 mothers (13.2%) were on maternity leave. The majority of mothers (200, 65.8%) gave birth in hospitals. 256 subjects (84.2%) lived in nuclear families. Regarding bathing habits, 181 mothers (59.5%) and 154 fathers (50.4%) usually took a bath every day.

### 3) State of children's bathing

#### a) Bathing routine (Table 4)

The breakdown of subjects' bathing routines for their children is shown in Table 4.

232 mothers (76.3%) and 67 fathers (22.0%) were the primary bath giver. 204 fathers (67.1%) and 89 mothers (29.3%) assisted with bathing.

The most common cleaning agent used for bathing was foamy soap, with 261 subjects (85.9%). The most common washing implement was the hands (270 subjects, 88.8%), followed by gauze (135 subjects, 44.4%). 248 subjects (84.9%) responded that they rinsed their infant with the showerhead, and 129 (39.5%) rinsed by pouring water. The most common response concerning bathing equipment was that none was used (150 subjects, 49.3%). Pieces of bathing equipment used were: bath seats (88 subjects, 28.9%), bath mats (82 subjects, 27.0%), and neck-worn flotation rings (18 subjects, 5.9%). 22 subjects (7.2%) used other equipment such as baby bathtubs.

#### b) Dangers experienced (Table 5, Figure 1 and Figure 2)

Table 5 shows whether subjects experienced incidents or not, Figure 1 shows what dangers were experienced, and Figure 2 shows the situations in which incidents occurred.

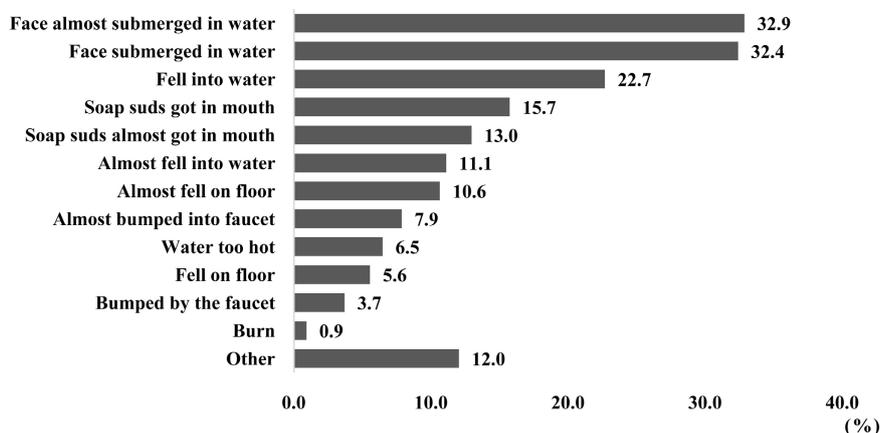
213 subjects (71.1%) responded that they had experienced incidents.

**Table 4.** State of children's bathing (n = 304).

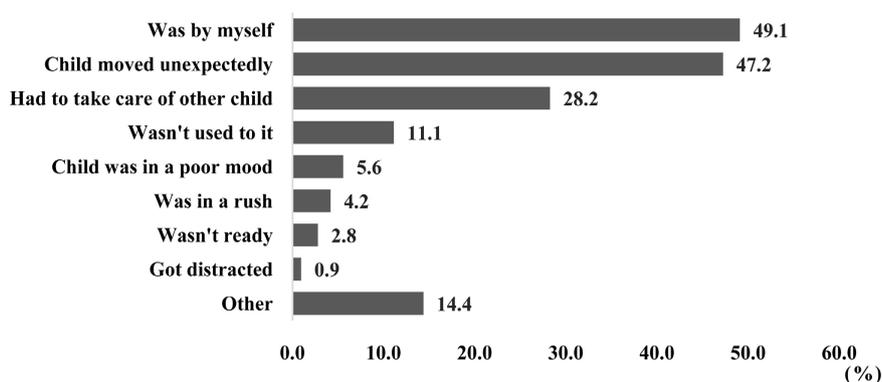
		#	%
Primary bath giver	Mother	232	76.3
	Father	67	22.0
	Paternal grandfather	1	0.3
	Siblings	2	0.7
	Other	2	0.7
Assists with bathing (multiple response)	Mother	89	29.3
	Father	204	67.1
	Maternal grandmother	45	14.8
	Maternal grandfather	13	4.3
	Paternal grandmother	11	3.6
	Paternal grandfather	2	0.7
	Siblings	35	11.5
	None	28	9.2
	Other	2	0.7
	No response	1	0.3
Cleansers used (multiple response)	None	3	1.0
	Solid soap	47	15.5
	Liquid soap	33	10.9
	Foam soap	261	85.9
	Body wash	19	6.3
	Other	2	0.7
Washing instruments (multiple response)	Hands	270	88.8
	Gauze	135	44.4
	Towel	18	5.9
	Other	14	4.6
Rinsing method (multiple response)	Shower	258	84.9
	Pouring water	120	39.5
	No response	1	0.3
Bathing equipment (multiple response)	None	150	49.3
	Bath chair	88	28.9
	Bath mat	82	27.0
	Neck-worn flotation ring	18	5.9
	Other	22	7.2
	No response	1	0.3

**Table 5.** Experienced dangerous incidents (n = 304).

	Number	%
Yes	216	71.1
No	88	28.9



**Figure 1.** Incidents experienced (n = 216) (Multipleresponse).



**Figure 2.** Situation during incidents (n = 216) (Multipleresponse).

Among mothers and their families who had experienced incidents, the most common were, in order of frequency, near-submersion of the face (n = 71, 32.9%), submersion of the face (n = 70, 32.4%), and falling into bathwater (n = 49, 22.7%). Similarly, the most common situations when incidents had occurred were giving the bath alone (n = 106, 49.1%), the child moving unexpectedly (n = 102, 47.2%), and taking care of other children (n = 61, 28.2%).

#### c) Measures taken to prevent incidents (**Figure 3**)

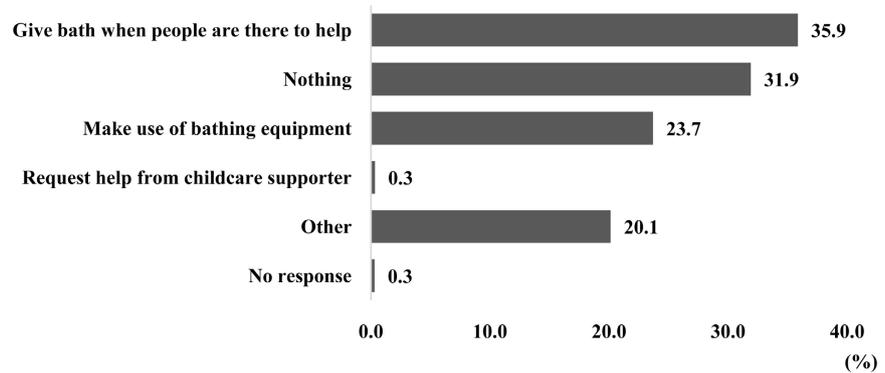
**Figure 3** shows what measures were taken to prevent incidents.

Regarding methods of preventing incidents, the most common responses were: giving a bath when many people are around to help (n = 109, 35.9%), nothing (n = 97, 31.9%), and using helpful bathing equipment such as bath seats (n = 72, 23.7%).

#### d) State of instruction (**Table 6**)

215 mothers and families (70.7%) had not received instruction regarding the possible dangers that can occur during bathtime or the prevention of such dangers.

**Table 6** shows the state of instruction regarding the dangers that can occur during bathtime and the prevention of such dangers.



**Figure 3.** Measures taken against incidents (n = 304) (Multipleresponse).

**Table 6.** State of instruction concerning possible bathing incidents.

		#	%
Content (n = 89) (multiple response)	What kinds of incidents can happen	81	91.0
	Prevention methods	43	48.3
	Other	4	4.5
Place of instruction (n = 89) (multiple response)	Maternity classes	35	39.3
	Parenting classes	25	28.1
	During hospital stay after childbirth	68	76.4
	Health exam	12	13.5
	Home visit	3	3.4
Source of information (n = 304) (multiple response)	Other	5	5.6
	Internet	114	37.5
	Maternity magazine/parenting materials	104	34.2
	Nurse, midwife, or health professional	122	40.1
	No information received	55	18.1
	Other	26	8.6
	No response	12	3.9

Among 89 respondents who received instruction, the content of the instruction included what kinds of incidents can happen (n = 81, 91.0%) and prevention methods (n = 43, 48.3%). The most common settings in which instruction was received were during the hospital stay after childbirth (n = 68, 76.4%) and in maternity classes (n = 35, 39.3%).

The most common sources of information concerning bathtime dangers were from a nurse/midwife/public health nurse (n = 122, 40.1%) and the Internet (n = 114, 37.5%).

e) Comparison of incidents and situations between primipara/multipara and based on the presence of instruction (**Table 7** and **Table 8**)

**Table 7** compares the dangers experienced by primipara and multipara and the situations in which they were experienced. **Table 8** compares the dangers

**Table 7.** Comparison of experienced incidents and situations between Primipara and Multipara.

	Experienced Incident	Number of Children				$\chi^2$	Significant difference	
		2 <sup>nd</sup> child+		1 <sup>st</sup> child				
		#	%	#	%			
Content	Experienced dangerous incident	No	48	30.2	40	27.6	0.250	n.s.
		Yes	111	69.8	105	72.4		
	Face almost submerged	No	121	76.1	112	77.2	0.055	n.s.
		Yes	38	23.9	33	22.8		
	Almost fell into water	No	149	93.7	131	90.3	1.182	n.s.
		Yes	10	6.3	14	9.7		
	Soap suds nearly got in eyes	No	141	88.7	135	93.1	1.775	n.s.
		Yes	18	11.3	10	6.9		
	Water too hot	No	154	96.9	136	93.8	1.619	n.s.
		Yes	5	3.1	9	6.2		
	Almost fell on floor	No	149	93.7	132	91.0	0.777	n.s.
		Yes	10	6.3	13	9.0		
	Almost bumped into faucet	No	152	95.6	135	93.1	0.894	n.s.
		Yes	7	4.4	10	6.9		
	Face submerged	No	123	77.4	111	76.6	0.028	n.s.
		Yes	36	22.6	34	23.4		
	Fell in water	No	129	81.1	126	86.9	1.864	n.s.
		Yes	30	18.9	19	13.1		
	Soap suds in eyes	No	145	91.2	125	86.2	1.900	n.s.
		Yes	14	8.8	20	13.8		
Burn	No	158	99.4	144	99.3	0.004	n.s.	
	Yes	1	0.6	1	0.7			
Fell on floor	No	155	97.5	137	94.5	1.802	n.s.	
	Yes	4	2.5	8	5.5			
Bumped into faucet	No	155	97.5	141	97.2	0.017	n.s.	
	Yes	4	2.5	4	2.8			
Other	No	147	92.5	131	90.3	0.431	n.s.	
	Yes	12	7.5	14	9.7			
Situation	Was giving bath alone	No	116	73.0	82	56.6	8.986	**
		Yes	43	27.0	63	43.4		
	Was in a rush	No	152	95.6	143	98.6	2.413	n.s.
		Yes	7	4.4	2	1.4		
	Was taking care of other children	No	99	62.3	144	99.3	64.892	**
		Yes	60	37.7	1	0.7		

## Continued

Was distracted	No	157	98.7	145	100.0	1.836	n.s.
	Yes	2	1.3	0	0.0		
Wasn't used to it	No	156	98.1	124	85.5	16.548	**
	Yes	3	1.9	21	14.5		
Wasn't prepared	No	156	98.1	142	97.9	0.013	n.s.
	Yes	3	1.9	3	2.1		
Child was in poor mood	No	151	95.0	141	97.2	1.033	n.s.
	Yes	8	5.0	4	2.8		
Child moved unexpectedly	No	113	71.1	89	61.4	3.194	n.s.
	Yes	46	28.9	56	38.6		
Other	No	141	88.7	132	91.0	0.459	n.s.
	Yes	18	11.3	13	9.0		

\*\* $p < 0.01$ ; n.s.: not significant.

**Table 8.** Comparison of incidents and situations based on presence of instruction.

	Experienced Incident	Instruction given?				$\chi^2$	Significant difference
		Yes		No			
		#	%	#	%		
Experienced dangerous incident	No	23	25.8	65	30.2	0.590	n.s.
	Yes	66	74.2	150	69.8		
Face almost submerged	No	69	77.5	164	76.3	0.055	n.s.
	Yes	20	22.5	51	23.7		
Almost fell into water	No	81	91.0	199	92.6	0.207	n.s.
	Yes	8	9.0	16	7.4		
Soap suds nearly got in eyes	No	81	91.0	195	90.7	0.007	n.s.
	Yes	8	9.0	20	9.3		
Water too hot	No	84	94.4	206	95.8	0.294	n.s.
	Yes	5	5.6	9	4.2		
Almost fell on floor	No	79	88.8	202	94.0	2.424	n.s.
	Yes	10	11.2	13	6.0		
Almost bumped into faucet	No	81	91.0	206	95.8	2.750	n.s.
	Yes	8	9.0	9	4.2		
Face submerged	No	68	76.4	166	77.2	0.023	n.s.
	Yes	21	23.6	49	22.8		
Fell in water	No	73	82.0	182	84.7	0.322	n.s.
	Yes	16	18.0	33	15.3		
Soap suds in eyes	No	78	87.6	192	89.3	0.175	n.s.
	Yes	11	12.4	23	10.7		

## Continued

	Burn	No	89	100.0	213	99.1	0.833	n.s.
		Yes	0	0.0	2	0.9		
	Fell on floor	No	85	95.5	207	96.3	0.099	n.s.
		Yes	4	4.5	8	3.7		
	Bumped into faucet	No	88	98.9	208	96.7	1.117	n.s.
		Yes	1	1.1	7	3.3		
	Other	No	82	92.1	196	91.2	0.076	n.s.
		Yes	7	7.9	19	8.8		
	Was giving bath alone	No	56	62.9	142	66.0	0.271	n.s.
		Yes	33	37.1	73	34.0		
	Was in a rush	No	85	95.5	210	97.7	1.031	n.s.
		Yes	4	4.5	5	2.3		
	Was taking care of other children	No	64	71.9	179	83.3	5.052	*
		Yes	25	28.1	36	16.7		
	Was distracted	No	89	100.0	213	99.1	0.833	n.s.
		Yes	0	0.0	2	0.9		
Situation	Wasn't used to it	No	77	86.5	203	94.4	5.405	*
		Yes	12	13.5	12	5.6		
	Wasn't prepared	No	88	98.9	210	97.7	0.470	n.s.
		Yes	1	1.1	5	2.3		
	Child was in poor mood	No	87	97.8	205	95.3	0.959	n.s.
		Yes	2	2.2	10	4.7		
	Child moved unexpectedly	No	55	61.8	147	68.4	1.220	n.s.
		Yes	34	38.2	68	31.6		
	Other	No	83	93.3	190	88.4	1.641	n.s.
		Yes	6	6.7	25	11.6		

\*:  $p < 0.05$ ; n.s.: not significant.

experienced based on the presence or absence of instruction concerning those dangers and the situations in which they were experienced.

When comparing primipara and multipara, more mothers and families with one child responded they gave a bath alone or were not used to giving baths, while significantly more mothers and families with multiple children responded that they were taking care of another child. Furthermore, when comparing by the presence of instruction, significantly higher percentages of subjects who had received instruction responded that they were looking after other children or not used to giving baths when an incident occurred than those who had not.

f) Comparison of prevention measures between primipara/multipara and based on presence of instruction (**Table 9** and **Table 10**)

**Table 9.** Comparison of prevention measures between Primipara and Multipara.

	Experienced Incident	Number of Children				$\chi^2$	Significant difference
		2 <sup>nd</sup> child +		1 <sup>st</sup> child			
		#	%	#	%		
No measures taken	No	108	67.9	99	68.3	0.004	n.s.
	Yes	51	32.1	46	31.7		
Give bath when people are there to help	No	104	65.4	91	62.8	0.232	n.s.
	Yes	55	34.6	54	37.2		
Make use of bathing equipment	No	124	78.0	108	74.5	0.515	n.s.
	Yes	35	22.0	37	25.5		
Request help from childcare supporter	No	158	99.4	145	100.0	0.915	n.s.
	Yes	1	0.6	0	0.0		
Other	No	122	76.7	121	83.4	2.134	n.s.
	Yes	37	23.3	24	16.6		

n.s.: not significant.

**Table 10.** Comparison of prevention measures based on presence of instruction.

	Experienced Incident	Instruction given?				$\chi^2$	Significant difference
		Yes		No			
		#	%	#	%		
No measures taken	No	68	76.4	139	64.7	4.002	*
	Yes	21	23.6	76	35.3		
Give bath when people are there to help	No	48	53.9	147	68.4	5.706	*
	Yes	41	46.1	68	31.6		
Make use of bathing equipment	No	63	70.8	169	78.6	2.129	n.s.
	Yes	26	29.2	46	21.4		
Request help from childcare supporter	No	88	98.9	215	100.0	2.424	n.s.
	Yes	1	1.1	0	0.0		
Other	No	75	84.3	168	78.1	1.475	n.s.
	Yes	14	15.7	47	21.9		

\*: p &lt; 0.05; n.s.: not significant.

**Table 9** compares the primipara and multipara concerning measures for preventing incidents. **Table 10** compares subjects based on whether they had received instruction on these dangers.

No significant differences were found when comparing the measures taken between primipara and multipara. When comparing groups based on the presence of instruction, significantly more subjects who had received instruction gave a bath when there was someone to help than those who did not. Significantly more subject who had not received instruction responded that they took

no preventative measures than those who had.

#### 4) Opinions and requests for nurses concerning the dangers of infant bathing

Opinions and requests for nursing professionals included proper infant bathing technique, concrete examples of dangers, preventative measures, methods and caution points for bathing multiple children at once, methods and caution points for giving a bath alone, methods and caution points of bathing together with the baby, proper use and caution points of bathing products, and the timing/frequency of instruction.

Among mothers with multiple children and their families, opinions surfaced in categories such as methods and caution points for bathing multiple children at the same time, methods and caution points for giving a bath alone, and concrete examples of dangers.

Forming the category of methods and caution points for bathing multiple children at the same time were responses such as: *“My oldest is still small and can’t bathe by himself, so when I put them in together my hands are full enough with just him.”*, *“Bathing with my kids is very difficult. Even one child is plenty, so it would have been a great help if I had gotten some advice for bathing more than one at a time.”*, and *“I can handle looking after my first by [him]self, but two is too much. I wish I had been taught a good way to do it or what order is best—something I could put into practice right away.”*

Forming the category of methods and caution points for giving a bath alone were responses such as: *“When I give my baby a bath by myself I’m so nervous even from just washing my hair, I can’t stand it. I can’t even close my eyes.”*, *“I would have liked if someone explained step-by-step how to do it by myself.”*, and *“I wish I knew what to be careful of when I have to give my baby a bath by myself once they start moving around and can stand while holding on to something, and what to do with the baby while I’m washing myself.”*

Forming the category of concrete examples of dangers were responses such as: *“I wasn’t told about any dangers (that I remember). I think a kind of video course with examples of what can happen would be good to have.”*, *“Hearing about everyone’s close calls would be a good learning experience.”*, and *“I had never heard about bathtime dangers, so day-to-day I never really thought about it. Whenever something dangerous happened, it always worked out, so I count myself lucky, but it even just being told about past incidents would be great for being prepared.”* Subjects also expressed interest in concrete methods and caution points for using bathing goods.

Among mothers with one child and their families, opinions surfaced in categories such as concrete examples of dangers, bathing methods, and methods and caution points for giving a bath alone.

Forming the category of concrete examples of dangers were responses such as: *“I don’t remember ever being asked at checkups about our bathtime routine. I’m careful, but I’d like the kind of incidents that have happened to be common knowledge. There are unique dangers for different ages, so it doesn’t apply only*

*to babies. I would like there to be well-put-together materials to help with that.”, “Even if you think you’re being careful and you think you’re watching, in an actual situation there’s a lot you can miss. I wish they would give us examples to learn from.”, and “My baby almost drowned even though the water wasn’t deep. I wish someone would have told me about what can happen.”*

Forming the category of bathing methods are responses such as: “*When I was in the hospital they told me how to give the baby a bath and I practiced, but when I bathed together with my baby I was nervous because I didn’t know how to best do it safely. I wish they had taught me that.*”, “*They taught me how to use a baby bathtub, and it’s easy to find things online, but I didn’t know what to do next.*”, and “*I didn’t have any opportunity to learn what to do after my baby grows out of the baby bath [and we start to use the regular tub/shower.]*”

Forming the category of methods and caution points for giving a bath alone were responses such as: “*Many mothers have to put in the majority of the effort of raising children, so I think most of them have had close calls when bathing their babies by themselves. Of course, things will always happen, but I think we’ll be more aware of the risks of death and injury if health professionals emphasize that education.*”, “*I wish they had taught me what to do after coming home with the baby and how to be more efficient at bathtime. When you have to do it all yourself, being slow and clumsy leads to more risk of something happening.*”, and “*I wished someone told me the best order when I take a bath with my baby. Washing myself first and then my baby after I’m finished, for example.*”

## 4. Observations

### 1) Subject characteristics and background

According to the 2019 Comprehensive Survey of Living Conditions [8], 82.5% of households were nuclear households. The percentage of nuclear households in this study was similar, at 84.2%.

Additionally, the same survey [8] reported that the employment status in 2019 for mothers whose youngest child was one year old was full-time for 33.6%, part-time/temporary for 19.3% and unemployed for 41.6%. This study showed a situation similar to that shown by the national survey, with 57.6% of mothers being employed, including those on childcare leave.

Over half of mothers and fathers said they bathe in the tub every day. Bathing is an essential everyday custom in Japan; bathing customs affect perceptions about bathing and cultural factors such as lifestyle. Bathing styles change based on country and region, and also generation. In present-day Japan, the custom of bathing with only a shower has become more prevalent. However, compared to other countries, the custom of bathing in a tub nearly every day may be thought of as characteristic of Japan. Because of this, it is very common to use a tub of hot water when bathing infants as well, which may present many opportunities for incidents to occur.

### 2) The state of bathing

In Japan, the amount of time women spend on childcare and housework is longer than in Western countries. These long hours create a burden for women. In this study, 76.3% of mothers and 22.0% of fathers identified as a primary bath giver, while 67.1% of fathers and 29.3% of mothers identified as having an assisting role in bathing. Bathing can be considered an aspect of childcare that fathers have an easy time participating in. However, 96.4% of fathers work, and the current working conditions in Japan make it difficult for many fathers to participate in childcare considering the life rhythms of an infant. Furthermore, fathers have few opportunities to seek guidance from childcare specialists. There have been cases of near-drownings while babies were in the bath with their father, and a greater number of cases in which the baby was in the care of someone other than the mother have occurred than cases in which the mother was present [9]. A possible reason for this may be that childcare instruction is heavily focused on mothers; inadequate family-oriented instruction leads to other members of the family having inadequate knowledge and thus an increase in incidents. It can be surmised that excessive urging from specialists for mothers and families to participate in infant care places a burden on fathers. It is important to promote cooperation from the commercial sector so fathers can participate in infant care, to support mothers so they can comfortably take care of the child by themselves, and to create an environment in which fathers can find information and consult as needed in their limited time.

The most common washing solvent used was foaming soap (85.9%). The most common washing implements were the hand (88.8%) followed by gauze towels (44.4%). The most common methods of rinsing were with the shower head (84.9%) and by pouring water (39.5%). Self-foaming soap may be the most common due to the importance of lathering the soap when washing, and because it may be difficult to do this while holding the baby. By placing a foaming soap dispenser in the proper location, one can hold the baby with one arm and access the soap without taking their eyes off of it, reducing the risk of an accident.

When rinsing, it is important not to leave any residue from the cleanser on the skin. Using the showerhead is an effective way to adequately rinse in modern homes where a showerhead has become commonplace. Water temperature can also be an issue, so it may be necessary to keep the shower equipment in good repair to ensure safety.

49.3% of respondents reported not using bathing equipment, which was the largest group. Equipment used was bath seats (28.9%), bath mats (27.0%), neck-worn flotation rings (5.9%), and baby tubs/other (7.2%). In recent years, many baby care goods have come to the market, offering a variety of convenient products. Bath seats and mats may help when bathing with one's baby by providing a place for the baby while the mother or family member washes themselves. Using these products may offer a sense of comfort and safety. However, when using these products, a short lapse of attention can lead to a major incident. Kato [10] reports that a top incident involving infants younger than 1 year of age was

near-drowning involving bath equipment. There have been numerous other reports of accidents involving bath equipment, including those involving neck-worn flotation rings and bathe seats [7]. The public must be educated on the proper application of such equipment, on the risks to their use, and on the prevention of those risks.

### 3) Incidents experienced

71.1% of mothers and families experienced dangers involved with bathing. The most common dangers experienced by these families were, in order from most to least frequent, the baby's face being nearly submerged (32.9%), the baby's face being submerged (32.4%), and the baby falling into the water (22.7%).

According to previous research, the number of bathtime incidents involving infants below the age of one year has been reported at 143 times the number involving children age 5 - 19 years old [11], and five out of eight drowning cases were younger than one year old [12]. Furthermore, there have been many reports of non-fatal drownings such as while using a neck-worn flotation ring [13] [14] [15] [16], slipping into the tub and inhaling water while the mother was shampooing her hair, [15] and drowning in the tub while bathing with family [17]. The top reported incidents experienced by mothers and their families reported this study was also related to drowning; the danger of drowning in the tub can be considered a major risk factor.

The most common situations in which an incident occurred were when giving the bath alone (49.1%), the baby moving unexpectedly (47.2%), and looking after another child (28.2%). Related to these incidents are the characteristic trait of children to injure themselves through being unaware of the danger of their surroundings due to physical and mental immaturity, the dangers changing along with their development and their unawareness of the accidents that can occur due to this trait, and their tendency to lose their balance and fall over, among other things. Furthermore, early infancy is a period of rapid development, with new behaviors emerging without warning, such as turning over, sitting up, crawling, grasping objects to stand up, etc. They are also prone to behave in ways adults would not expect. Because of this, it can be thought that the most commonly reported situations (giving bath alone, the baby moved unexpectedly, and looking after other children) are particularly high-risk.

70.7% of mothers and families had not received guidance about possible bath-time dangers or their prevention. Furthermore, the large number of opinions of and demands for nursing professionals (such as bathing methods, examples of bathtime dangers, prevention measures, methods and caution points of bathing multiple children at once, measures and caution points of giving a bath alone, uses and caution points of bathing equipment, and instruction timing/frequency) suggest a need for guidance from these professionals. While some of the dangers that can occur during bathtime can be prevented via an adult exercising caution, families being unaware how common childhood accidents are due to a lack of guidance, the behavioral changes that come with development, and the unpredictability of possible accidents are likely contributing factors to the occurrence

of accidents involving infants. Families have few opportunities to obtain valuable guidance. Even among these, there are fewer still to learn about bathtime dangers, so it is necessary to provide specific guidance on potential dangers and their prevention. The prevention measures in this study (such as bathing when there are others around to help and using helpful products such as bath seats) may be helpful to mothers and families in the future and including them in instruction for the prevention of bathtime incidents may be effective. Additionally, since the sources of information regarding bathtime dangers were nurses/midwives/public health nurses (40.1%) and the Internet (37.5%), there may be a demand for instructional tools that enable mothers and families to easily obtain accurate information during their daily lives.

When we compared which dangers were experienced by one-child and multiple-child mothers and the situations when they occurred, significantly more single-child mothers and their families answered that they gave their baby a bath by themselves and that they were not accustomed to bathing an infant, while significantly more multiple-child mothers and their families answered that they were taking care of other children. It can be inferred that inexperience is linked to accidents in single-child families in particular. Considering bathing methods were among the demands single-child mothers and families had for the nursing profession, it can be assumed that without instruction in the basics, families' lack of practice in proper bathing procedure leads to incidents. It can also be gathered that in families with multiple children there are numerous opportunities for incidents to occur when parents are distracted because multiple children are in the bath at the same time. Reports of accidents related to siblings bathing together [18] [19] or occurring while the mother was distracted with an older sibling [20] have appeared in previous research. That methods and caution points of bathing multiple children at once was a concern expressed to nurses by multiple-child families leaves little doubt that families who must keep an eye on both an infant and their older children and have little choice but to bathe them together feel a sense of anxiety over the danger of bathing multiple children at the same time.

Furthermore, when we compared by the presence of instruction, significantly higher percentages of subjects who had received instruction responded that they were looking after other children or not used to giving baths when an incident occurred than those who had not. This suggests that the current instruction given is inadequate for preventing incidents when multiple children are being taken care of or the parent is not yet used to giving baths. It is necessary to explain what kinds of dangers can occur in concrete terms and how to prevent them, while considering the situation of each individual household.

There were no significant differences when we compared the preventative measures taken by primipara and multipara. Furthermore, when we compared these measures by the presence of instruction, a significantly higher percentage of subjects who had received instruction waited to bathe their child until someone was there to help than families who did not. Likewise, a significantly higher

percentage of subjects who had not received instruction took no measures than those who had. Thus, receiving instruction may lead to greater awareness and execution of preventative measures such as lending assistance.

## 5. Future Matters

This study has revealed the state of dangers encountered by Japanese mothers and families in the course of bathing their infants, the situations in which they occur, and preventative measures are taken. Looking to the future, these trends should be compared with those of other countries. Concrete measures that nurses can take should be considered based on the results of this research, and an intervention study conducted.

## 6. Conclusions

The objective of this study was to reveal as-of-yet unknown bathtime-related dangers experienced by mothers and families in Japan, spurred by the need for measures to help mothers and families bathe their infants safely and with confidence. As a result, we have arrived at the following observations:

- 1) 70% of mothers and families have experienced bathtime-related dangers or incidents.
- 2) Among mothers and families who have experienced bathtime-related dangers, the most common was the infant's face's being nearly submerged, the infant's face's being fully submerged, and the infant's falling into the water, in that order.
- 3) The most common situations in which bathtime incidents occurred were when giving a bath alone, when the child moved unexpectedly, and when looking after other children, in that order.
- 4) Approximately 70% of mothers and families have not received guidance on possible bathtime incidents or their prevention.
- 5) For single-child mothers, in particular, a lack of childcare skills and inexperience is linked to the occurrence of bathtime incidents, while for multiple-child mothers bathing multiple children at the same time causes distraction and leads to incidents.
- 6) Even with instruction, subjects experienced incidents while tending to multiple children or due to inexperience.
- 7) Mothers and families are experiencing bathtime incidents, and prevention is necessary. The use of tools to allow mothers and families to easily obtain accurate information in the course of instruction is desirable.

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## Conflicts of Interest

There are no conflicts of interest related to this study.

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