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A Survey of Dangers Experienced by Mothers and Families of Infants Aged 3 - 4 Months during Ablution and Bathing

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Abstract

Purpose: The purpose of this study is to explore the dangers experienced by mothers and families of infants aged 3 - 4 months in Japan during ablution and bathing. **Method:** We distributed an anonymous, self-reported questionnaire at infants' 3 - 4-month health checkup, which was collected via postal service. 170 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 primi/multipara and the presence/absence of guidance concerning such incidents. This study was approved by the research ethics committees of the affiliated university. **Results:** 60.0% of mothers and families experienced dangers while washing their infant in a baby tub or similar apparatus (ablution), and 64.9% did while bathing their infant in the normal bath. For ablution, the most common dangers were, in order, nearly dropping the infant in the water and nearly getting soap suds in the mouth. For bathing, these were nearly getting soap suds in the mouth, near submersion of the face, and nearly dropping the infant in the water. The percentage of mothers and families who did not receive instruction regarding potential dangers and their prevention was 55.9% for ablution and 81.8% for bathing. **Conclusion:** This study revealed the dangers experienced by mothers and families of infants aged 3 - 4 months in Japan during ablution and bathing. Further consideration into the prevention of these dangers is necessary.

Keywords

Ablution, Bathing, Incidents, Experience, Infants

1. Introduction

Caring for an infant involves a variety of elements, including feeding, putting the infant to sleep, changing diapers, and bathing. Bathing in particular is a multifaceted process involving a series of actions, including changing clothes, washing, keeping hold of the infant, and moisture management. Moreover, in Japan bathing space is often limited, and the many independent actions involved demand considerable dexterity. It is also necessary to monitor the infant's condition and adapt bathing methods accordingly. For mothers and families lacking adequate knowledge and practice, safe and comfortable bathing can be a difficult undertaking.

Bathing and washing are important for infant hygiene, observation of the state of the body, improvement of metabolism, establishing a life rhythm, and parent-child intimacy. In recent years, the length of post-birth hospital stays in Japan have shortened [1], and wait-to-bathe and delayed bathing policies (known as "dry technique" in Japan), in which blood, amniotic fluid, and meconium are wiped off the newborn while leaving the vernix as undisturbed as possible, have increased in popularity [2]. Due to this, there are fewer opportunities to wash the infant in the hospital, and many mothers bring their babies home having never practiced washing them. This situation has made it difficult to acquire these skills during a standard hospital visit. In Japan, the standard advice is to wash the baby in a special baby tub until its one-month checkup, after which it may be bathed in the family bath. However, little specific instruction as to actual technique is given [3].

As there is an element of danger when bathing, unexpected accidents are known to occur. In the current state of Japanese society, parents can hardly avoid situations in which they must bathe their infant without help or in which multiple children are in need of care at the same time. Inexperience and impaired constitution or judgement due to fatigue are also among the many factors which lead to accidents. The majority of drowning incidents occur in the family bath [4] [5] [6], and have occurred during moments of insufficient supervision, even when a family member was present [4]. There is also a continuous stream of new baby care products coming to the market. Drowning incidents involving bathing equipment were among the most common types of drowning incidents reported [7]. There were also fatal drownings among the reported cases [8].

Underreporting of incidents also obfuscates bathtime dangers. According to Heinrich's triangle, 300 minor incidents occur for every one 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.

Existing research concerning infant washing and bathing has evaluated newborn care and revealed facts about the instruction of mothers and baby skin care issues from the time of delivery to discharge from the hospital. However, no research has touched on the troubles families have in relation to bathing their infants at home [9]. The results of this study show that over half of subject moth-

ers had bathing-related troubles, 36.8% of primipara and 17.1% of multipara felt a sense of danger associated with bathing. Subjects wished for more support and safety tips from nurses concerning bathing [3]. Furthermore, although there were reports of fatal accidents, the dangers actually experienced by mothers and families were unclear [10].

The state of local communities and parenting are changing, and insufficient consideration has been given to guidance on ablution and bathing. On top of this, the dangers experienced by families are ambiguous. It is a problem that measures are not being taken despite the fact that dangers can be expected to arise from the lack of instruction in present-day Japan.

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 at home. With this in mind, we conducted this study with the purpose of exploring the situation in Japan regarding the risks related to ablution and bathing experienced by families with infants aged 3 - 4 months.

2. Methods

1) Terms

a) Washing/Ablution: Sanitary care using a specialized baby tub, with warm or lukewarm water, and the series of related actions including preparation, changing, washing, holding the body, and post-washing care.

b) Bathing: Sanitary care which takes place in the family bath, often with hot water, as a part of the normal daily routine and the series of related actions including preparation, changing, washing, holding the body, and post-washing care.

c) Dangers: Accidents during ablution or bathing which threaten the life or health of the infant, as well as close calls which did not have a lasting effect on the infant's life or health.

2) Study Design & Survey Period

a) Study Design

Fact-finding survey

b) Survey Period

June 9, 2020-August 24, 2020.

3) Subjects

Mothers who brought their infants for their 3 - 4-month health checkup at a health center in city A and had experience with both bathing and ablution. Using G * Power, the minimum required sample size to ensure an effect size of 0.5, given $\alpha = 0.05$ and a power of 0.8, was calculated to be 134 subjects.

4) Method of Data Collection

With the advance permission of a health center located in Osaka Prefecture, researchers verbally requested participation following 3 - 4-month health checkups. 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, some of which were prepared for this study with reference to prior research [9]-[15]. Pretesting was conducted on four mothers with children aged 3 - 4 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 was used to compare the differences between primipara/multipara and the presence/lack of instruction pertaining to experienced dangers. Inferential statistics were verified using the χ^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 10, 2020). With the advance permission of a health center located in Osaka Prefecture, questionnaires and explanatory materials were distributed to mothers following their infants' 3 - 4-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 318 individuals, and 170 responses were received (collection rate of 53.4%). For questionnaires which contained incomplete or inappropriate answers, those 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.

77 subjects (45.3%) were on their second child or later, while 93 were on their first (54.7%). The 30 - 34 age group was the most common both for mothers and fathers, with 67 mothers (40.6%) and 65 fathers (39.2%) in that range. 13 mothers (7.6%) and 157 fathers (92.4%) were working. 89 mothers (52.4%) were on

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

		#	%
Number of Children (n = 170)	Second child or later	77	45.3
	First child	93	54.7
Age of Older Children (n = 77) (multiple response)	1 year	3	3.9
	2 years	20	26.0
	3 years	22	28.6
	4 years	22	28.6
	5 years	10	13.0
	6 years	15	19.5
	7+ years	12	15.6
	No response	3	3.9

Table 2. Parents' employment Status (n = 170).

	Number (%)				
	Employed	Unemployed	On childcare leave	Other	No response
Mothers	13 (7.6)	58 (34.1)	89 (52.4)	2 (1.2)	8 (4.7)
Fathers	157 (92.4)	3 (1.8)	3 (1.8)	1 (0.6)	6 (3.5)

Table 3. Parents' bathing habits (n = 170).

	Number (%)					
	Bath (daily)	Shower only	Shower usually, with occasional bath	Shower in summer, bath in winter	Other	No response
Mothers	91 (53.5)	17 (10.0)	28 (16.5)	25 (14.7)	2 (1.2)	7 (4.1)
Fathers	81 (47.6)	18 (10.6)	33 (19.4)	28 (16.5)	4 (2.4)	6 (3.5)

maternity leave, and 3 fathers (1.8%) on paternity leave. The majority of mothers (116, 68.2%) gave birth in hospitals. Regarding bathing and showering habits, bathing in a tub was most common, with 91 mothers (53.5%) and 81 fathers (47.6%) taking a bath every day.

3) The state of ablution

a) Washing routine (Table 4)

Table 4 shows the breakdown of subjects' washing routines for their children.

128 mothers (75.3%) and 35 fathers (20.6%) were the main parent to wash their infant. 105 fathers (61.8%) and 72 mothers (42.4%) played an assisting role in ablution.

The most common cleaning agent used for ablution was foamy soap, with 140 subjects (82.4%). The most common washing implement was the hands (140

Table 4. State of children's ablution (n = 170).

		#	%
Primary washer	Mother	128	75.3
	Father	35	20.6
	Maternal grandmother	10	5.9
	Paternal grandmother	1	0.6
	Sibling	1	0.6
	Other	2	1.2
	No response	1	0.6
Assists with washing (multiple response)	Mother	44	25.9
	Father	105	61.8
	Maternal grandmother	72	42.4
	Maternal grandfather	15	8.8
	Paternal grandmother	8	4.7
	Sibling	14	8.2
	None	8	4.7
	Other	6	3.5
	No response	2	1.2
Cleansers used (multiple response)	Solid soap	25	14.7
	Liquid soap	8	4.7
	Foam soap	140	82.4
	Body wash	27	15.9
	No response	1	0.6
Washing instruments (multiple response)	Hands	140	82.4
	Gauze	134	78.8
	Towel	5	2.9
	No response	1	0.6
Rinsing method (multiple response)	Shower	71	41.8
	Pouring water	131	77.1
	Other	5	2.9

subjects, 82.4%), followed by gauze (134 subjects, 78.8%). 131 subjects (77.1%) responded that they rinsed their infant by pouring water over it, and 71 (41.8%) rinsed with the shower head.

b) Dangers experienced during ablution (Table 5, Figures 1-4)

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

Table 5. Experienced incidents during ablution (n = 170).

	#	%
Yes	102	60.0
No	68	40.0

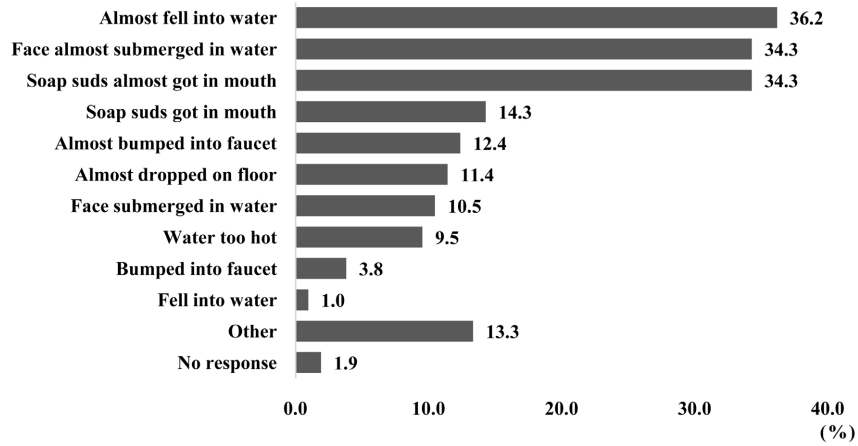

Figure 1. Incidents experienced during ablution (n = 102) (Multiple response).

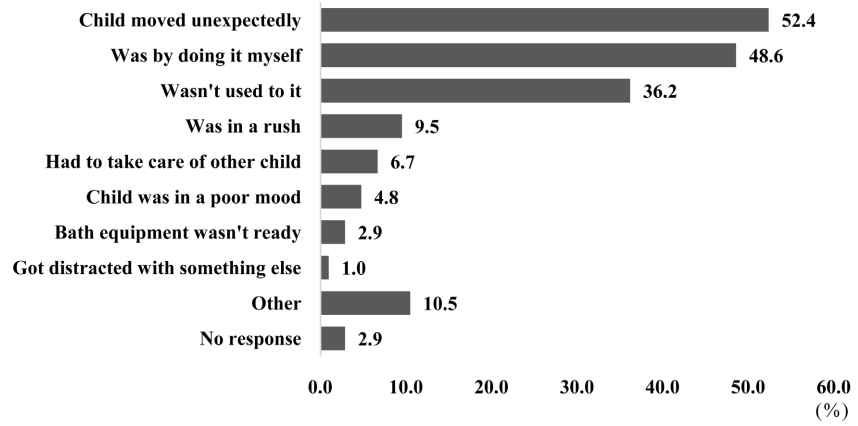

Figure 2. Situations when incidents occurred during ablution (n = 102) (Multiple response).

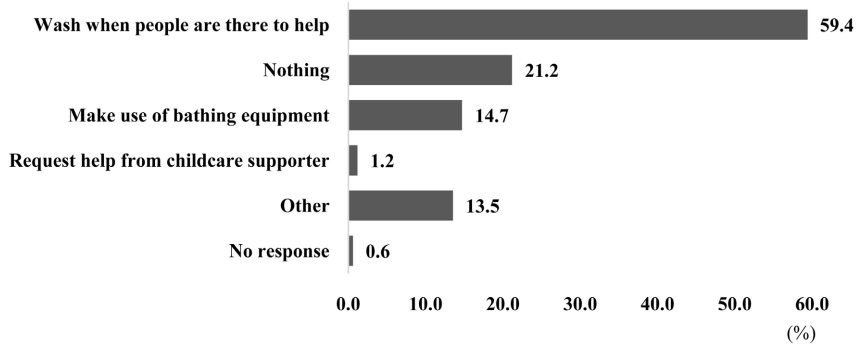

Figure 3. Measures taken to prevent incidents during ablution (n = 170) (Multiple response).

which incidents occurred, and Figure 3 shows what measures were taken to prevent incidents.

102 subjects (60.0%) responded that they had experienced dangers during ablution. Among the mothers and families who experienced incidents, near drops into the water were the most common (n = 38, 36.2%), followed by near-submersion of the face and soap suds in the mouth (n = 36, 34.3%). The most common situations in which dangers were experienced were the child moving unexpectedly (n = 55, 52.4%), washing the child by oneself (n = 51, 48.6%), and being unfamiliar with the process (n = 38, 36.2%).

The most common responses concerning the measures taken to prevent incidents were: washing when someone was available to help (n = 101, 59.4%), no measures taken (n = 36, 21.2%), and using equipment (bath seat, etc.) (n = 25, 14.7%).

c) The state of instruction (Table 6)

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

95 mothers and families (55.9%) had not received instruction regarding the possible dangers that can occur during ablution or the prevention of such dangers. Among the 75 respondents who had received instruction, the content of the instruction included what kinds of incidents can happen (n = 61, 81.3%) and prevention methods (n = 45, 60.0%). The most common settings in which instruction was received were: during the hospital stay after childbirth (n = 70, 93.3%) and in parenting classes (n = 20, 26.7%).

Table 6. State of instruction concerning possible ablution-related incidents.

		#	%
Content (n = 75) (multiple response)	What kinds of incidents can happen	61	81.3
	Prevention methods	45	60.0
	Other	3	4.0
Place of instruction (n = 75) (multiple response)	Maternity classes	13	17.3
	Parenting classes	20	26.7
	During hospital stay after childbirth	70	93.3
	Home visit	1	1.3
Source of information (n = 170) (multiple response)	Internet	30	17.6
	Maternity magazine/parenting materials	44	25.9
	Nurse, midwife, or public health nurse	114	67.1
	No information received	28	16.5
	Other	11	6.5
	No response	3	1.8

The most common sources of information concerning ablution-related dangers were: from a nurse/midwife/public health nurse (n = 114, 67.1%) and from maternity or parenting magazines (n = 44, 25.9%).

d) Comparison of experienced dangers based on number of children and presence of instruction (Table 7 and Table 8)

Table 7 compares subjects by the number of children they have while Table 8 compares subjects based on whether they received instruction or not.

When comparing situations by the number of children, more subjects with a single child selected "wasn't used to it" than those with multiple children, while significantly more subjects with multiple children selected "taking care of other children" than those with a single child. No significant differences were seen between subjects who received instruction and those who did not.

e) Comparison of prevention measures based on number of children and presence of instruction (Table 9 and Table 10)

Table 9 and Table 10 show the measures taken to prevent accidents. Table 9 compares subjects by the number of children they have while Table 10 compares subjects based on whether they received instruction or not.

When comparing measures by the number of children, significantly more subjects with multiple children selected "none" than those with a single child, while more subjects with a single child selected "give bath when people are there to help" than those with multiple children. No significant differences were seen between subjects who received instruction and those who did not.

4) Opinions and requests for nurses concerning ablution

49 subjects (28.8%) submitted freeform responses containing their opinion and requests for nursing professionals concerning ablution.

Categories of opinions and requests for nursing professionals are listed below, with specific examples of each in parentheses: ablution technique (how to wash), concrete examples of dangers ("*I want to know more about close calls*."), methods of dealing with accidents when they occur (*what to do when water or soap get in the eyes*, *ears*, *or mouth*), methods and caution points for washing an infant by oneself (*tips for washing my baby by myself*), methods and caution points for washing at home ("*When they told me how to wash my baby at the hospital they had special equipment and it went smoothly*, *but when I actually got home it didn't go well and I had trouble*."), using bathing equipment ("*I wish they told me specifically how to use bath accessories*."), and the timing/frequency of instruction ("*I watched the nurse wash my baby but I only got to try it once for myself. I would have liked at least one more chance*.").

Families with multiple children expressed opinions in the categories of ablution technique, concrete examples of dangers, methods and caution points for washing at home, and using bathing equipment.

Families with a single child expressed opinions in the categories of washing technique, concrete examples of dangers, how to deal with accidents when they occur, using bathing equipment, and the timing/frequency of instruction.

5) The state of bathing

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

		Experienced Incident	Number of Children				χ^2	Significant difference
			2nd child+		1st child			
			#	%	#	%		
Content	Experienced incident	No	30	39.0	35	37.6	0.031	n.s.
		Yes	47	61.0	55	62.4		
	Face almost submerged	No	60	77.9	74	79.6	0.069	n.s.
		Yes	17	22.1	19	20.4		
	Almost fell into water	No	55	71.4	77	82.8	3.136	n.s.
		Yes	22	28.6	16	17.2		
	Soap suds nearly got in mouth	No	64	83.1	70	75.3	1.554	n.s.
		Yes	13	16.9	23	24.7		
	Water too hot	No	74	96.1	86	92.5	1.003	n.s.
		Yes	3	3.9	7	7.5		
	Almost fell on floor	No	70	90.9	88	94.6	0.886	n.s.
		Yes	7	9.1	5	5.4		
	Almost bumped into faucet	No	70	90.9	87	93.5	0.415	n.s.
		Yes	7	9.1	6	6.5		
	Face submerged	No	71	92.2	88	94.6	0.406	n.s.
		Yes	6	7.8	5	5.4		
	Fell in water	No	76	98.7	93	100.0	1.215	n.s.
		Yes	1	1.3	0	0.0		
	Soap suds in mouth	No	70	90.9	85	91.4	0.013	n.s.
		Yes	7	9.1	8	8.6		
	Burn	No	77	100.0	93	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Fell on floor	No	77	100.0	93	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Bumped into faucet	No	75	97.4	91	97.8	0.037	n.s.
		Yes	2	2.6	2	2.2		
	Other	No	73	94.8	83	89.2	1.722	n.s.
		Yes	4	5.2	10	10.8		
Situation	Was washing alone	No	49	63.6	70	75.3	2.714	n.s.
		Yes	28	36.4	23	24.7		
	Was in a rush	No	71	92.2	89	95.7	0.927	n.s.
		Yes	6	7.8	4	4.3		

Continued

	Was taking care of other children	No	70	90.9	93	100.0	8.818	**
		Yes	7	9.1	0	0.0		
	Was distracted	No	76	98.7	93	100.0	1.215	n.s.
		Yes	1	1.3	0	0.0		
	Wasn't used to it	No	71	92.2	61	65.6	17.193	**
		Yes	6	7.8	32	34.4		
	Bath equipment wasn't ready	No	75	97.4	92	98.9	0.563	n.s.
		Yes	2	2.6	1	1.1		
	Child was in poor mood	No	74	96.1	91	97.8	0.450	n.s.
		Yes	3	3.9	2	2.2		
	Child moved unexpectedly	No	52	67.5	63	67.7	0.001	n.s.
		Yes	25	32.5	30	32.3		
	Other	No	74	96.1	85	91.4	1.542	n.s.
		Yes	3	3.9	8	8.6		

**: $p < 0.01$, n.s.: not significant.

Table 8. Comparison of incidents experienced during ablution and situations based on presence of instruction.

		Experienced Incident	Instruction given?				χ^2	Significant difference
			Yes		No			
			#	%	#	%		
Content	Experienced incident	No	51	68.0	54	56.8	2.210	n.s.
		Yes	24	32.0	41	43.2		
	Face almost submerged	No	54	72.0	80	84.2	3.744	n.s.
		Yes	21	28.0	15	15.8		
	Almost fell into water	No	57	76.0	75	78.9	0.210	n.s.
		Yes	18	24.0	20	21.1		
	Soap suds nearly got in mouth	No	58	77.3	76	80.0	0.179	n.s.
		Yes	17	22.7	19	20.0		
	Water too hot	No	73	97.3	87	91.6	2.507	n.s.
		Yes	2	2.7	8	8.4		
	Almost fell on floor	No	69	92.0	89	93.7	0.181	n.s.
		Yes	6	8.0	6	6.3		
	Almost bumped into faucet	No	70	93.3	87	91.6	0.183	n.s.
		Yes	5	6.7	8	8.4		

Continued

	Face submerged	No	67	89.3	92	96.8	3.905	n.s.
		Yes	8	10.7	3	3.2		
	Fell in water	No	74	98.7	95	100.0	1.274	n.s.
		Yes	1	1.3	0	0.0		
	Soap suds in mouth	No	67	89.3	88	92.6	0.567	n.s.
		Yes	8	10.7	7	7.4		
	Burn	No	75	100.0	95	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Fell on floor	No	75	100.0	95	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Bumped into faucet	No	73	97.3	93	97.9	0.057	n.s.
		Yes	2	2.7	2	2.1		
	Other	No	48	64.0	71	74.7	0.010	n.s.
		Yes	27	36.0	24	25.3		
Situation	Was washing alone	No	69	92.0	91	95.8	2.301	n.s.
		Yes	6	8.0	4	4.2		
	Was in a rush	No	71	94.7	92	96.8	1.087	n.s.
		Yes	4	5.3	3	3.2		
	Was taking care of other children	No	74	98.7	95	100.0	0.502	n.s.
		Yes	1	1.3	0	0.0		
	Was distracted	No	58	77.3	74	77.9	1.274	n.s.
		Yes	17	22.7	21	22.1		
	Wasn't used to it	No	74	98.7	93	97.9	0.008	n.s.
		Yes	1	1.3	2	2.1		
	Bath equipment wasn't ready	No	48	64.0	67	70.5	0.144	n.s.
		Yes	27	36.0	28	29.5		
	Child was in poor mood	No	70	93.3	89	93.7	1.215	n.s.
		Yes	5	6.7	6	6.3		
	Child moved unexpectedly	No	51	68.0	54	56.8	0.816	n.s.
		Yes	24	32.0	41	43.2		
	Other	No	54	72.0	80	84.2	0.009	n.s.
		Yes	21	28.0	15	15.8		

n.s.: not significant.

Table 9. Comparison of prevention measures taken to prevent ablution-related incidents between Primipara and Multipara.

	Experienced Incident	Number of Children				χ^2	Significant difference
		2nd child+		1st child			
		#	%	#	%		
No measures taken	No	54	70.1	80	86.0	6.373	*
	Yes	23	29.9	13	14.0		
Give bath when people are there to help	No	41	53.2	28	30.1	9.353	**
	Yes	36	46.8	65	69.9		
Make use of bathing equipment	No	64	83.1	81	87.1	0.532	n.s.
	Yes	13	16.9	12	12.9		
Request help from childcare supporter	No	76	98.7	92	98.9	0.018	n.s.
	Yes	1	1.3	1	1.1		
Other	No	68	88.3	79	84.9	0.408	n.s.
	Yes	9	11.7	14	15.1		

**: $p < 0.01$, *: $p < 0.05$, n.s.: not significant.

Table 10. Comparison of prevention measures taken to prevent ablution-related incidents based on presence of instruction.

	Experienced Incident	Instruction given?				χ^2	Significant difference
		Yes		No			
		#	%	#	%		
No measures taken	No	64	85.3	70	73.7	3.407	n.s.
	Yes	11	14.7	25	26.3		
Give bath when people are there to help	No	28	37.3	41	43.2	0.590	n.s.
	Yes	47	62.7	54	56.8		
Make use of bathing equipment	No	63	84.0	82	86.3	0.179	n.s.
	Yes	12	16.0	13	13.7		
Request help from childcare supporter	No	74	98.7	94	98.9	0.028	n.s.
	Yes	1	1.3	1	1.1		
Other	No	63	84.0	84	88.4	0.700	n.s.
	Yes	12	16.0	11	11.6		

n.s.: not significant.

a) Implementation (Table 11 and Table 12)

Table 11 shows the percentage of subjects who had transitioned from ablution to bathing in a normal bath. The conditions of bathing are shown in Table 12.

Table 11. Transition from ablution to bathing (n = 170).

	#	%
Transitioned	148	87.1
Not transitioned	22	12.9

Table 12. State of children's bathing (n = 148).

		Number	%
Primary bath giver	Mother	102	68.9
	Father	47	31.8
	Maternal grandmother	1	0.7
	No response	1	0.7
Assists with bathing (multiple response)	Mother	48	32.4
	Father	89	60.1
	Maternal grandmother	27	18.2
	Maternal grandfather	7	4.7
	Paternal grandmother	2	1.4
	Sibling	13	8.8
	None	13	8.8
	Other	3	2.0
	No response	1	0.7
Cleansers used (multiple response)	None	1	0.7
	Solid soap	23	15.5
	Liquid soap	11	7.4
	Foam soap	124	83.8
	No response	2	1.4
Washing instruments (multiple response)	Hands	134	90.5
	Gauze	94	63.5
	Towel	4	2.7
	Other	1	0.7
	No response	2	1.4
Rinsing method (multiple response)	Shower	118	79.7
	Pouring water	62	41.9
	Other	3	2.0
	No response	3	2.0

Continued

Bathing equipment (multiple response)	None	75	50.7
	Bath seat	38	25.7
	Bath mat	29	19.6
	Neck-worn flotation ring	17	11.5
	Other	8	5.4
	None	1	0.7

148 families (87.1%) had transitioned from ablution to bathing. The main bath giver was the mother for 102 families (68.9%) and the father for 47 families (31.8%), while 89 fathers (60.1%) and 48 mothers (32.4%) filled an assistive role.

The most commonly used cleanser was foaming soap (124 families, 83.8%). The most common washing implement used was the hands (134 families, 90.5%), followed by gauze (94 families, 63.5%). 118 families (79.7%) rinsed with the showerhead and 62 (41.9%) by pouring water over the infant. 75 families (50.7%) did not use any bathing equipment. The most commonly used pieces of equipment were bath seats (38 families, 25.7%), bath mats (29 families, 19.6%), and neck-worn flotation rings (17 families, 11.5%).

b) The state of bathtime dangers (Table 13, Figures 4-6)

Table 13 shows whether subjects experienced bathtime incidents or not. Figure 4 and Figure 5 show what dangers were experienced and the situations in which the incidents occurred in. Figure 6 shows the measures taken to prevent incidents.

96 subjects (64.9%) responded that they had experienced incidents. Among the subjects who had experienced incidents, the most common were, in order of frequency, getting soap in the mouth (n = 35, 36.5%), near submersion of the face (n = 33, 34.4%), and near drops onto the floor (n = 20, 20.8%). The most common situations in which incidents occurred were the child moving unexpectedly (n = 57, 59.4%), while giving a bath by oneself (n = 45, 46.9%), and being unfamiliar with the process (n = 17, 17.7%).

The most common responses concerning measures taken to prevent incidents were bathing the infant when people were around to help (n = 63, 42.6%), taking no measures (n = 49, 33.1%), and using bathing equipment such as bath seats (n = 30, 20.3%).

c) The state of instruction (Table 14)

Table 14 shows the state of instruction pertaining to the dangers that can occur during bathtime and the prevention of such dangers.

139 subjects (81.8%) had not received instruction regarding the possible dangers that can occur during bathtime or the prevention of such dangers. Among 31 subjects who did receive instruction, the content of that instruction was the types of incidents that can occur (n = 30, 96.8%) and prevention methods (n = 10, 32.3%). The most common settings in which instruction was received were

Table 13. Experienced incidents during bathing (n = 148).

	#	%
Yes	96	64.9
No	52	35.1

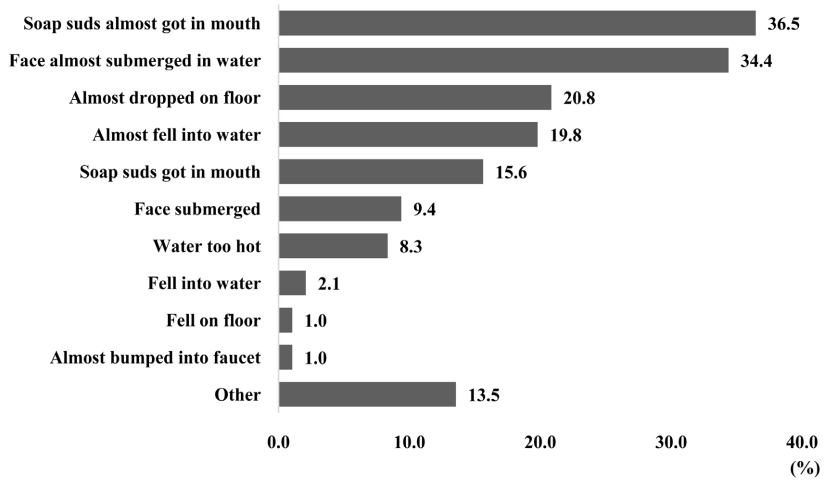

Figure 4. Incidents experienced during bathing (n = 96) (multiple response).

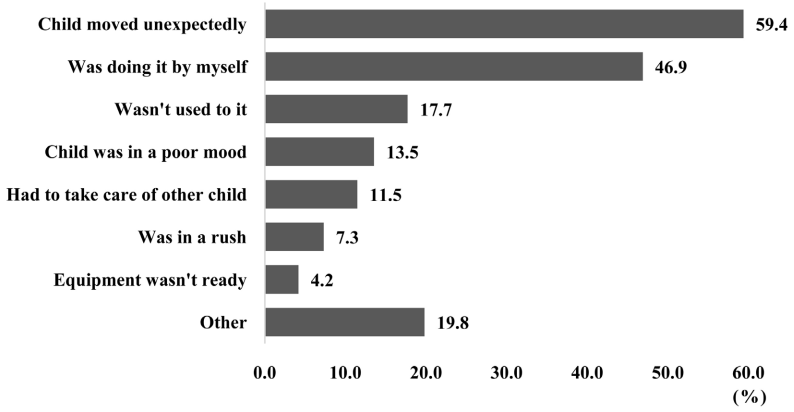

Figure 5. Situations when incidents occurred during bathing (n = 96) (Multiple response).

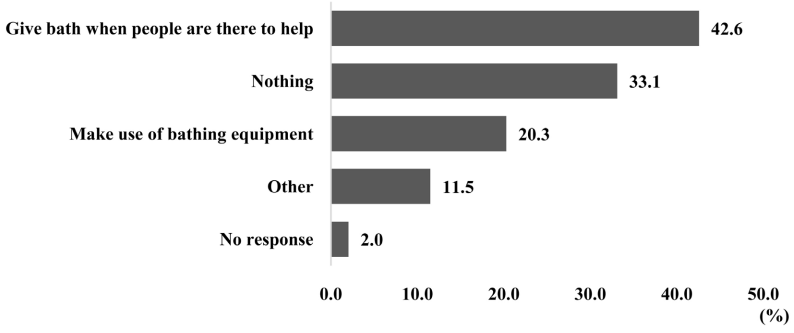

Figure 6. Measures taken to prevent incidents during bathing (n = 148) (Multiple response).

Table 14. State of instruction concerning possible bathing incidents.

		#	%
Content (n = 31) (multiple response)	What kinds of incidents can happen	30	96.8
	Prevention methods	10	32.3
	Other	1	3.2
Place of instruction (n = 31) (multiple response)	Maternity classes	7	22.6
	Parenting classes	2	6.5
	During hospital stay after childbirth	21	67.7
	Health exam	3	9.7
	Home visit	2	6.5
	Other	3	9.7
Source of information (n = 170) (multiple response)	Internet	59	34.7
	Maternity magazine/parenting materials	39	22.9
	Nurse, midwife, or public health nurse	50	29.4
	No information received	41	24.1
	Other	11	6.5
	No response	7	4.1

during the hospital stay after childbirth (n = 21, 67.7%) and in maternity classes (n = 7, 22.6%).

The most common sources of information concerning bathtime dangers were the Internet (n = 59, 34.7%) and from a nurse/midwife/public health nurse.

d) Comparison of experienced dangers based on number of children and presence of instruction (Table 15 and Table 16)

Table 15 compares subjects by the number of children they have while Table 16 compares subjects based on whether they received instruction or not.

When comparing by the number of children, more subjects with a single child selected "soap got in mouth" than those with multiple children. As for situations, more subjects with a single child selected "wasn't used to it" than those with multiple children, while significantly more subjects with multiple children selected "taking care of other children" than those with a single child. No significant differences were seen between subjects who received instruction and those who did not.

e) Comparison of prevention measures based on number of children and presence of instruction (Table 17 and Table 18)

Table 17 and Table 18 show the measures taken to prevent accidents. Table 17 compares subjects by the number of children they have while Table 18 compares subjects based on whether they received instruction or not.

No significant differences were seen between subjects when comparing them by number of children or whether they had received instruction.

Table 15. Comparison of incidents experienced during bathing and situations between Primipara and Multipara.

		Experienced Incident	Number of Children				χ^2	Significant difference
			2nd child+		1st child			
			#	%	#	%		
Content	Experienced incident	No	27	39.1	25	31.6	0.905	n.s.
		Yes	42	60.9	54	68.4		
	Face almost submerged	No	58	84.1	57	72.2	3.013	n.s.
		Yes	11	15.9	22	27.8		
	Almost fell into water	No	60	87.0	69	87.3	0.005	n.s.
		Yes	9	13.0	10	12.7		
	Soap suds nearly got in mouth	No	59	85.5	54	68.4	6.002	*
		Yes	10	14.5	25	31.6		
	Water too hot	No	65	94.2	75	94.9	0.039	n.s.
		Yes	4	5.8	4	5.1		
	Almost fell on floor	No	59	85.5	69	87.3	0.106	n.s.
		Yes	10	14.5	10	12.7		
	Almost bumped into faucet	No	69	100.0	78	98.7	0.879	n.s.
		Yes	0	0.0	1	1.3		
	Face submerged	No	65	94.2	74	93.7	0.018	n.s.
		Yes	4	5.8	5	6.3		
	Fell in water	No	69	100.0	77	97.5	1.771	n.s.
		Yes	0	0.0	2	2.5		
	Soap suds in mouth	No	61	88.4	72	91.1	0.302	n.s.
		Yes	8	11.6	7	8.9		
	Burn	No	69	100.0	79	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Fell on floor	No	68	98.6	79	100.0	1.153	n.s.
		Yes	1	1.4	0	0.0		
	Bumped into faucet	No	69	100.0	79	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Other	No	63	91.3	72	91.1	0.001	n.s.
		Yes	6	8.7	7	8.9		
Situation Content	Was giving bath alone	No	51	73.9	52	65.8	1.139	n.s.
		Yes	18	26.1	27	34.2		

Continued

	Was in a rush	No	66	95.7	75	94.9	0.042	n.s.
		Yes	3	4.3	4	5.1		
	Was taking care of other children	No	58	84.1	79	100.0	13.605	**
		Yes	11	15.9	0	0.0		
	Was distracted	No	69	100.0	79	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Wasn't used to it	No	67	97.1	64	81.0	9.377	**
		Yes	2	2.9	15	19.0		
	Wasn't prepared	No	68	98.6	76	96.2	0.772	n.s.
		Yes	1	1.4	3	3.8		
	Child was in poor mood	No	66	95.7	69	87.3	3.175	n.s.
		Yes	3	4.3	10	12.7		
	Child moved unexpectedly	No	46	66.7	45	57.0	1.465	n.s.
		Yes	23	33.3	34	43.0		
	Experienced dangerous incident	No	60	87.0	69	87.3	0.005	n.s.
		Yes	9	13.0	10	12.7		

**: $p < 0.01$, *: $p < 0.05$, n.s.: not significant.

Table 16. Comparison of incidents experienced during bathing and situations based on presence of instruction.

		Experienced Incident	Instruction given?				χ^2	Significant difference
			Yes		No			
			#	%	#	%		
Content	Experienced dangerous incident	No	7	25.0	45	37.5	1.556	n.s.
		Yes	21	75.0	75	62.5		
	Face almost submerged	No	21	75.0	94	78.3	0.146	n.s.
		Yes	7	25.0	26	21.7		
	Almost fell into water	No	24	85.7	105	87.5	0.065	n.s.
		Yes	4	14.3	15	12.5		
	Soap suds nearly got in mouth	No	21	75.0	92	76.7	0.035	n.s.
		Yes	7	25.0	28	23.3		
	Water too hot	No	26	92.9	114	95.0	0.204	n.s.
		Yes	2	7.1	6	5.0		
	Almost fell on floor	No	25	89.3	103	85.8	0.232	n.s.
		Yes	3	10.7	17	14.2		

Continued

	Almost bumped into faucet	No	28	100.0	119	99.2	0.235	n.s.
		Yes	0	0.0	1	0.8		
	Face submerged	No	27	96.4	112	93.3	0.381	n.s.
		Yes	1	3.6	8	6.7		
	Fell in water	No	27	96.4	119	99.2	1.277	n.s.
		Yes	1	3.6	1	0.8		
	Soap suds in mouth	No	23	82.1	110	91.7	2.261	n.s.
		Yes	5	17.9	10	8.3		
	Burn	No	28	100.0	120	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Fell on floor	No	28	100.0	119	99.2	0.235	n.s.
		Yes	0	0.0	1	0.8		
	Bumped into faucet	No	28	100.0	120	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Other	No	26	92.9	109	90.8	0.116	n.s.
		Yes	2	7.1	11	9.2		
Situation	Was giving bath alone	No	16	57.1	87	72.5	2.530	n.s.
		Yes	12	42.9	33	27.5		
	Was in a rush	No	25	89.3	116	96.7	2.745	n.s.
		Yes	3	10.7	4	3.3		
	Was taking care of other children	No	26	92.9	111	92.5	0.004	n.s.
		Yes	2	7.1	9	7.5		
	Was distracted	No	28	100.0	120	100.0		n.s.
		Yes	0	0.0	0	0.0		
	Wasn't used to it	No	26	92.9	105	87.5	0.641	n.s.
		Yes	2	7.1	15	12.5		
	Wasn't prepared	No	28	100.0	116	96.7	0.959	n.s.
		Yes	0	0.0	4	3.3		
	Child was in poor mood	No	26	92.9	109	90.8	0.116	n.s.
		Yes	2	7.1	11	9.2		
	Child moved unexpectedly	No	15	53.6	76	63.3	0.914	n.s.
		Yes	13	46.4	44	36.7		
	Other	No	26	92.9	103	85.8	1.001	n.s.
		Yes	2	7.1	17	14.2		

n.s.: not significant.

Table 17. Comparison of prevention measures taken to prevent bathing-related incidents between Primipara and Multipara.

	Experienced Incident	Number of Children				χ^2	Significant difference
		2nd child+		1st child			
		#	%	#	%		
No measures taken	No	48	69.6	51	64.6	0.417	n.s.
	Yes	21	30.4	28	35.4		
Give bath when people are there to help	No	39	56.5	46	58.2	0.044	n.s.
	Yes	30	43.5	33	41.8		
Make use of bathing equipment	No	54	78.3	64	81.0	0.173	n.s.
	Yes	15	21.7	15	19.0		
Request help from childcare supporter	No	69	100.0	79	100.0		n.s.
	Yes	0	0.0	0	0.0		
Other	No	64	92.8	67	84.8	2.286	n.s.
	Yes	5	7.2	12	15.2		

n.s.: not significant.

Table 18. Comparison of prevention measures taken to prevent ablution-related incidents based on presence of instruction.

	Experienced Incident	Instruction given?				χ^2	Significant difference
		Yes		No			
		#	%	#	%		
No measures taken	No	20	71.4	79	65.8	0.321	n.s.
	Yes	8	28.6	41	34.2		
Wash when people are there to help	No	14	50.0	71	59.2	0.780	n.s.
	Yes	14	50.0	49	40.8		
Make use of bathing equipment	No	22	78.6	96	80.0	0.029	n.s.
	Yes	6	21.4	24	20.0		
Request help from childcare supporter	No	28	100.0	120	100.0		n.s.
	Yes	0	0.0	0	0.0		
Other	No	25	89.3	106	88.3	0.020	n.s.
	Yes	3	10.7	14	11.7		

n.s.: not significant.

6) Opinions and requests for nurses concerning bathing

72 subjects (42.4%) submitted freeform responses containing their opinions and requests for nursing professionals concerning bathing.

Categories of opinions and requests for nursing professionals are listed below, with specific examples of each in parentheses: bathing technique ("*They told me*

how to wash my baby, but I'm on my own now that we started giving [*him*] *regular baths. I'm not sure how long I should be bathing* [*him*] *for.*"), concrete examples of dangers ("*They didn't warn me what to be careful about when giving my baby a bath, like slipping or* [*water and soap*] *getting in the baby's eyes and ears. I wish they had told me more.*"), methods of preventing accidents (*safe and efficient bathing procedures*), methods and caution points for bathing multiple children at once (*what to do when my older child is there too*), methods and caution points for giving a bath by oneself (*how to bathe my baby when I'm watching it by myself*), methods and caution points for bathing together with one's baby (*where and how the mother can safely hold the baby while she washes herself*), using bath equipment (*positive and negative points of bath seats*, *bath mats*, *bath sponges*, *etc.*), the timing/frequency of instruction ("*I wasn't sure when to ask about bathing. They should make it easier to find out.*"), and how to deal with accidents when they occur (*what to do when soap gets in the baby's eyes or mouth*).

Families with multiple children expressed opinions in the categories of methods and caution points for bathing multiple children at once, methods and caution points for giving a bath by oneself, using bathing equipment, and concrete examples of dangers.

Families with a single child expressed opinions in the categories of bathing technique, methods and caution points for giving a bath by oneself, and concrete examples of dangers.

4. Observations

1) Subject characteristics and background

According to the 2019 Comprehensive Survey of Living Conditions, [16] the breakdown of employment status of mothers whose youngest child was one year of age in 2019 was 33.6% full-time employees, 19.3% part-time/temporary workers, 41.6% unemployed. The results of this study line up with the national survey, with 60% of mothers being employed (including those on maternity leave).

About half of mothers and fathers answered that they bathe in the tub every day. Since bathing in a tub is an essential everyday custom in Japan, it is also common to use a tub of hot water when washing or bathing infants as well, which may present many opportunities for incidents to occur.

2) The state of ablution and 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, 75.3% of mothers and 20.3% of fathers identified as being in charge of washing their baby, while 68.9% of mothers and 31.8% of fathers identified as being in charge of bathing. Unlike breastfeeding and other child raising activities that only mothers take part in, ablution and bathing are activities in which fathers and other family members can participate in. However, 92.4% of fathers are employed, and in many households may be unable to help with bathing. With

the current state of working conditions in Japan it may be unreasonable to expect fathers to participate in childrearing as a measure to enable safe infant bathing. It is necessary to realize a society in which fathers are able to participate in childcare as well as to consider and spread techniques for safely bathing one's infant when by oneself.

The most common cleanser used for ablution and bathing was foaming soap. Proper lathering is an important part of the action of soap. Self-foaming soap can used without taking your eyes off the infant and is effective at reducing some of the danger associated with ablution and bathing. However, as could be seen in subjects' responses, soap can get in the baby's mouth, and can lead to slips and drops. It is important to spread the knowledge of dangers associated with the use of foaming soap.

50.7% of respondents reported to not use any bathing equipment, which was the largest group. Subjects used bath seats (25.7%), bath mats (19.6%), and neck-worn flotation rings (11.5%). There are a wide variety of washing and bathing products on the market. Proper use of these products may make bathing safer and easier, which could be effective at reducing the risk associated with infant ablution and bathing. In this study, 20.3% of subjects reported that they use bathing equipment as a way to prevent bathtime dangers. However, improper use of these products may potentially *cause* incidents. In particular, there have been reports of drownings during the use of neck-worn flotation rings. There are still mothers and families using these products. This was indicated our data: "*I didn't do this some people use neck floaties for baby swimming in the bathtub without knowing how dangerous those products can be (mostly on social media). It would be good to spread the word that those neck floaties are dangerous*." One cause of incidents with infants is the improper use of baby care products [17]. It is important to consider how we might prevent avoidable risks and protect mothers, families, and their babies from these dangerous experiences.

3) The state of experienced dangers

60.0% of subjects experienced incidents during ablution. The dangers most commonly experienced by these families were the baby nearly falling into the water (36.2%), the baby's face nearly being submerged (34.3%), and the baby nearly getting soap in its mouth (34.3%). Furthermore, 64.9% of subjects experienced incidents during bathing. The dangers most commonly experienced by these families were soap nearly getting in the baby's mouth (36.5%), the baby's face nearly being submerged (34.4%), and the baby nearly falling to the floor (20.8%).

It is common for babies to put their soapy hands in their mouths while they are being bathed. Through awareness of measures such as quick rinsing of any soap that gets on the hands, using a small amount of soap to minimize the effect it will have on the infant's health, and removing any soap that does get in the mouth, mothers and families can prevent incidents, as well as reduce unnecessary stress. Drowning and falls however are major risks to the life and health of the infant. Bathtime drownings involving infants younger than one year of age

are 143 times more common than among children ages 5 - 19 [18], and it has been reported that 5 in 8 drownings involved infants younger than one year of age [19]. In light of this, preventative measures are of utmost importance.

55.9% of subjects had not received instruction on the potential dangers which can occur during ablution, and 81.8% of subjects had not received instruction on the potential dangers that can occur during bathing. The sources of information on ablution reported were nurse/midwife/public health nurse (67.1%) and maternity magazine/childcare books (25.9%), while the sources reported for information on bathing were the Internet (34.7%) and nurse/midwife/public health nurse (29.4%).

Instruction on ablution mainly takes place during the post-delivery hospital stay. Instruction on ablution is also sometimes given as a part of health education before delivery. In our previous survey, 90% of mothers of infants aged 3 - 4 months had received instruction on ablution [3]. The content of this instruction was how to wash, how to hold the infant, required equipment, and how to rinse for over 80%. However, in this study fewer than half of subjects reported that they received instruction on ablution. The instruction on ablution currently in use in Japan focuses on ablution technique but does not adequately cover risk prevention.

Fewer than 80% of subjects in the previous survey had received instruction regarding bathing their infants in a normal-sized bathtub [3]. Those results suggested that mothers and families were obtaining information themselves through a variety of media. Bathing uses much more water than ablution, and it is common for family members to wash their own bodies while bathing their infant, which makes it difficult to keep a constant watch on the child. Furthermore, infants move more actively as they develop, which carries a major risk of injury during a bath. It is important to provide information to prevent such injuries.

It has been reported that 81.1% of mothers use the Internet to obtain childcare information [20]. Similarly, the Internet was most commonly used source for information on bathtime dangers in this study as well. The Internet is a widely used source for information on ablution and bathing for mothers and families. Querying Google, one of the leading Internet search engines, for videos on ablution produced over 1,600,000 videos. However, these videos are more often only footage of a parent washing their baby, or about the general steps of washing/bathing one's infant or preventing skin issues. Searching for videos on bathing in the same way resulted in approximately 420,000 hits, but the majority of these were introducing bath products, with the rest being videos parents took of their babies in the bath. From this situation, it is clear that the Internet is not an effective source of information on bathtime risk prevention in present-day Japan.

One major cause of accidents is the lack of awareness and knowledge mothers and families have. Instruction is needed to help counter this. The most common situations in which incidents were experienced while washing one's infant were

the child moving unexpectedly (52.4%), bathing the infant by oneself (48.6%), and being unfamiliar with the process (36.2%). Similarly, the most common situations in which incidents were experienced during everyday bathing were also the child moving unexpectedly (59.4%), bathing the infant by oneself (46.9%), and being unfamiliar with the process (17.7%). For infants ages 3 - 4 months in particular, the change in environment from the hospital to washing at home, the lack of education about infant development, the lack of experience with the process, and fatigue from the combination of childcare and household upkeep create a situation in which incidents are more likely to occur. By providing mothers and family members with information on possible dangers and how they can be prevented, we may be able to stop such incidents before they occur.

When we compared the incidents experienced between families with a single child and those with multiple children, for both ablution- and bathing-related incidents, more subjects with a single child chose "not used to it" as the situation in which they experienced an incident than those with multiple children, and significantly more subjects with multiple children chose "taking care of other children" than those with a single child. Additionally, when it came to bathing-related incidents, more families with a single child chose "soap nearly got in mouth" as a danger they had experienced than those with multiple children. Familiarity plays a major role in the safety of day-to-day childcare skills, and unfamiliarity with these skills may lead to increased risk, particularly for families dealing with their first child. It is important that mothers and families recognize the connection between inexperience and risk, as well as the role that instruction plays in making up for a lack of experience. Regarding the common incident of soap getting in mouth being more common among single-child families than multi-child families, a lack of knowledge about the movements of infants may be to blame.

Losing sight of one's baby plays a major role in potential accidents. Families with multiple children must often see to the needs of multiple children at once, and while doing so their attention is divided. This is likely the reason that subjects with multiple children so often experienced incidents in that situation. According to existing studies, 67% of drowning incidents occurred when no family member was present [18], and 15.4% of drownings of infants younger than 1 year of age happened during bathing [17].

No significant differences were found between subjects who had received instruction on either ablution or bathing and those who had not. The current instruction mothers and families receive may not be effective enough at preventing risk. Supplementing current instruction with what the dangers are, how to prevent them, and the measures families are already taking may lead to improved risk prevention. Furthermore, one common opinion/request for nursing staff seen for both ablution and bathing was how to deal with accidents. The mother is most often the one to discover the body after a drowning incident, However, it has been reported that fewer than half of the members of a given family will know first aid procedures for drowning [21], and resuscitation by the discoverer

cannot be relied upon [8]. Reacting appropriately in response to an emergency is of great importance in saving the infant's life. For this reason, the proper emergency measures must be made common knowledge.

5. Study Limitations and Future Matters

This study was limited by the narrow scope of the target locale. In the future, a wider area should be studied, comparison should be done with other countries, and the risks of ablution and bathing exposed by this study should be widely communicated. We plan to create educational materials covering risk prevention for mothers and families based on these results and to develop an intervention study.

6. Conclusions

Measures must be taken to assist mothers and their families in safely and confidently bathing their newborns. This study was conducted with the purpose of exploring the conditions in Japan regarding the dangers related to ablution and bathing experienced by 170 families with infants aged 3 - 4 months. The following points have been made clear through this study:

1) 60.0% of subjects experienced incidents during ablution. In order of frequency, the incidents most commonly experienced were the baby nearly falling into the water the baby's face nearly being submerged, and the baby nearly getting soap in its mouth.

2) 64.9% of subjects experienced incidents during bathing. In order of frequency, the incidents most commonly experienced were soap nearly getting in the baby's mouth, the baby's face nearly being submerged, and the baby nearly falling to the floor.

3) 55.9% of subjects had not received instruction on the potential dangers which can occur during ablution, and 81.8% of subjects had not received instruction on the potential dangers that can occur during bathing.

4) When comparing the incidents experienced between families with a single child and those with multiple children, for both ablution- and bathing-related incidents, more subjects with a single child chose "not used to it" as the situation in which they experienced an incident than those with multiple children, and significantly more subjects with multiple children chose "taking care of other children" than those with a single child.

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Conflicts of Interest

There are no conflicts of interest related to this study.

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