

# Mothers' experiences of expressing breast milk for neonates in the NICU

## -Difference between hand and electric breast pump expression-

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キーワード (Key words) : 1. expressing breast milk 2. electric breast pump  
3. neonates in the NICU

The purpose of this study was to describe the differences between the experiences of women who obtained breast milk by hand or by using electric breast pumps.

Participants were 20 mothers whose babies were in the NICU, they were not able to breastfeed for more than four weeks. Ten mothers used electric breast pumps while 10 mothers expressed by hand. Data were collected by telephone interview. The questionnaire contained areas such as: the existence of fatigue, pain, other difficulties, and their impression or feelings experienced until they started to breastfeed. Data were analyzed descriptively.

In both groups, lactation could be maintained until breastfeeding. The percentages of pain and fatigue in the group who expressed by hand were more than that in the group who used electric breast pumps. Mothers who expressed by hand felt difficulty with the expression process. Mothers who used electric breast pumps did not.

### Introduction

Mothers' own breast milk is the most adequate nutrition for the neonate. It protects against disease and infection, and promotes growth and maturation of the neonate. Breastfeeding is important in terms of bonding. When a neonate is in the Neonatal Intensive Care Unit (NICU), its mother's own breast milk is valuable for growth and prevention of infection. Therefore, it is important to maintain lactation by expression until the baby is able to be breastfed.

While mothers are in the hospital, it is possible to express frequently with help from the medical staff. But after they leave the hospital, the frequency is easily reduced because of housework and caring for other children. In the event of extremely low birth weight infants, it is difficult to maintain lactation for periods of two or three months or more, without a suckling stimulus. Methods of expressing lactation were: 1) hand expression 2) using pumps -- hand pumps, battery pumps, and electric pumps. If mothers

express for a long period of time, consideration may be given to using an electric breast pump. In Japan many types of electric breast pumps were used for expressing breast milk in the 1960s and 1970s; however nipple soreness or mastitis was found in some mothers using these pumps. Since then many nurse-midwives concluded that electric breast pumps are not a suitable way of expressing breast milk for any mother<sup>1,2)</sup>.

In the 1990s the performance of electric breast pumps improved so that they correspond to the infant's suckling rhythm. Therefore, in the west, it is said that an electric breast pump is usually her best choice if the mother anticipates having to wait for more than four weeks before putting the baby to the breast<sup>3-5)</sup>.

This study describes the differences between the experiences of breast milk expression by hand or by using electric breast pumps in women whose babies were in the NICU and were not able to be breastfed for more than four weeks.

・ NICU 入院児の母親の搾乳体験 —搾乳方法の違いによる検討—  
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## Methods

Participants were 20 mothers at 2 NICUs. They were not able to breastfeed for more than four weeks. Ten mothers used electric breast pumps while 10 mothers expressed by hand.

Mothers expressed their breast milk according to the hospital's recommended method. In both NICUs, expression started from the first day post-partum. Mothers chose an electric breast pump after they heard its use explained by nurses and nurse-midwives. Mothers used the Symphony® (Medela) pump while they were in the hospital. After they left the hospital, they rented either a Symphony® or Lactina™ (Medela) pump (Fig. 1). Symphony®, the newest electric breast pump, is able to extract a reasonable milk volume with no pain because of the combination of various vacuum levels and the number of cycles per minute.

Data were retrospectively collected by telephone interview from February to June 2005. The questionnaire contained areas such as: the existence of fatigue, pain, other difficulties, and their impression or feelings

experienced until they started to breastfeed. Mothers were asked to answer freely about their impression or feelings experienced. The remaining questions were structured questions. During the interviews we took notes with their consent. Data were then analyzed and descriptive statistics were calculated for the structured questions. As to their impression or feelings experienced, we extracted categories using the method of content analysis.

Before the study, we requested permission and gave written information about the study to the directors of hospitals. The contents included the purpose, methods, meaning, voluntary involvement, freedom to discontinue, protection of their privacy, and publication of the results. We informed the participants of the same contents by telephone and obtained oral consent.

## Results

### Background of the participants

Table 1 displays the background of 20 deliveries and infants. There were no significant differences between the groups. The mean post-natal age at first breastfeeding was  $65.8 \pm 28.7$  (30 to 124) days for hand expression. In the group using electric breast pumps, it was  $63.7 \pm 21.6$  (31 to 92) days. One mother who expressed by hand was not able to maintain lactation until her baby was able to suckle. Three mothers who were able to maintain lactation by hand expression were massaged by a midwife.



Fig.1. Electric breast pumps

Table 1. Background of the participants

	Hand expression (n = 10)	Electric breast pump (n = 10)
Primipara / Multiparae	7 / 3	6 / 4
Cesarean section / Transvaginal delivery	9 / 1	9 / 1
Singleton / Twin	8 / 2	10 / 0
Gestational age (weeks)	$29.0 \pm 2.4$	$28.6 \pm 2.4$
Birth weight ( g )	$933 \pm 339$	$958 \pm 209$
First breastfeeding		
Post natal age (days)	$65.8 \pm 28.7$	$63.7 \pm 21.6$
Gestational age (weeks)	$39.1 \pm 3.1$	$37.7 \pm 1.8$
Enough secretion on the first breastfeeding	9	10
Breast massage to maintain secretion	3	0
Data collection point after birth (months)	$8.2 \pm 4.0$	$7.6 \pm 3.9$

Data are n or mean  $\pm$  SD

**Existence and reasons for fatigue, pain, and difficulty of performing expression**

Table 2 shows the difficulty of performing and the existence of fatigue, pain about the neck, nipples, breasts, and arm during expression. The percentages of pain and fatigue in the group who expressed by hand were more than that in the group who used electric breast pumps. In using electric breast pumps no mother felt it was hard to express, or that it took much time. The number of mothers who did not have any problems was 1 for hand expression, and 5 for electric breast pumps.

Table 3 displays reasons for fatigue, pain, and difficulty of performing. In hand expression, fatigue resulted from the need to express anywhere, even outside the home, to maintain lactation or prevent mastitis. In both groups, fatigue was a problem because of expressing during the night, and caring for other children during expression. These reasons were also experienced by breast-feeding mothers. During hand expression a stiff neck occurred when there was engorgement of the breasts. When using electric breast pumps, the reason for a stiff neck was bad posture due to bowing their head, while arm pain resulted

from the need to hold the breasts for a long period of time. With hand expression, painful nipples and breasts were due to engorgement. And in both groups, mothers expressed incorrectly. In hand expression, mothers expressed only the nipple or expressed from the same area of the breast. In using electric breast pumps, mothers expressed with high pressure to reduce time, or did not check the pressure at the beginning. Mothers had difficulty perfecting the technique of hand expression and narrow milk ducts perhaps prolonged the expression process. When using electric breast pumps, mothers did not experience this difficulty. They reported that they could express easily, comfortably, and automatically.

**Experiences of breast milk expression by hand or by using electric breast pump**

Table 4 shows common and different experiences in the two groups. The common experience was “depression or sadness that mothers were not able to breastfeed”. The situation was as follows: “because my baby is in NICU the only thing I can do is express, since I cannot breastfeed”.

As for different experiences, in the group who expressed by hand, there were three categories: 1)

**Table 2. Existence of fatigue, pain during expression, and difficulty of performing**

Hand expression Case										Electric breast pump Case										
1*	2*	3	4	5*	6	7	8	9	10	1**	2	3	4	5	6	7	8**	9	10	
				○	○	○	○	○	○	Fatigue	○	○	○							
		○	○			○	○	○	○	Stiff neck	○	○	○							
	○				○	○		○	○	Painful nipples and breasts				○	○					
				○			○	○	○	Arm-pain	○									
				○				○	○	Hard to express										
			○	○					○	Time consuming										

\*breast massage

○ : YES □ : NO

\*\* Lactina

**Table 3. Reasons for fatigue, pain, difficulty of performing**

	Hand expression	Electric breast pumps
Fatigue	<ul style="list-style-type: none"> <li>Have to express anywhere to maintain lactation or prevent mastitis</li> </ul>	
Stiff neck and Arm-pain	<ul style="list-style-type: none"> <li>Engorgement of the breasts</li> <li>Wrist-pain with expression</li> </ul>	<ul style="list-style-type: none"> <li>Bad posture (bow their head)</li> <li>Arm-pain to hold the breasts</li> </ul>
Painful nipples and breasts	<ul style="list-style-type: none"> <li>Incorrect way to express</li> <li>Express only nipple</li> <li>Express from one breast area</li> <li>Engorgement</li> </ul>	<ul style="list-style-type: none"> <li>Incorrect way to express</li> <li>High pressure (to reduce time)</li> <li>Pressure not checked</li> </ul>
Difficulty of performing	<ul style="list-style-type: none"> <li>Takes time due to narrow milk ducts</li> <li>Takes time to get used to the technique</li> </ul>	<ul style="list-style-type: none"> <li>Easy and comfortable</li> <li>Automatic</li> </ul>

Table 4. Experiences of breast milk expression

	Categories	Situation
Common experience	Depression/sadness that mothers were not able to breastfeed	“The only thing I can do is expressing, and I cannot breastfeed because my baby is in NICU.”
Different experiences	<b>Hand expression</b> 1) Worried that lactation would stop 2) Felt a conflict to stop the expression or not 3) Desire to stop the expression	“I expressed my breast milk but the secretions were decreased, I worried that secretions would stop.” “Performing expression when secretions decreased was difficult. I worried about whether or when I should stop.” “Expressing with pain and fatigue was a difficult task. I was happy that I did not need to continue expression.”
	<b>Electric breast pump</b> Easy and comfortable to continue secretion production	“I was able to express breast milk in a short time comfortably and there was no pain as in hand expression.” “It was really good that secretions could be maintained until my baby was discharged home.” “Expression was easy because the electric breast pump expressed automatically.”

“worried that lactation would stop”, 2) “felt a conflict to stop expression or not”, 3) “desire to stop the expression”. Those that “worried that lactation would stop” felt that - - “I expressed my breast milk but the milk decreased-then I worried that it would stop”. Others who “felt a conflict to stop the expression or not” were concerned because as secretions decreased it was becoming harder to express and they worried about whether or when they should stop. Those with the “desire to escape from expression” complained that it was a hard task due to pain and fatigue, and they felt happy because they did not need to express breast milk any longer.

On the other hand, in the group using electric breast pumps, it was “easy and comfortable to continue secretion production”. Some comments were as follows: “I was able to express breast milk in a short time, comfortably, and there was no pain as in hand expression”, “It was really good that secretions could be maintained until the baby was discharged home”, “Expression was easy because the electric breast pump expressed automatically”.

## Discussion

In this study, we analyzed descriptively, differences between the experiences of breast milk expression by hand, or by using an electric breast pump. There were similarities and differences between

the two groups.

In both groups, their secretions were maintained until breastfeeding. However, doing a retrospective study, we could not discern whether the secretions were adequate for neonates or not. In this study, all mothers pumped breasts sequentially by alternating breasts (single pumping system). It is reported that prolactin levels are higher with pumping both breasts simultaneously (double pumping system)<sup>6, 7</sup>. So it is expected that further secretions would be attained with the use of a double pumping system. Further study is needed to compare lactation using a double pumping system.

The percentages of pain and fatigue in the group who expressed by hand were greater than in the group who used electric breast pumps. It is considered that the effort required for expression may be decreased by using electric breast pumps. In the group who expressed by hand, the reason for pain was the limited range of motion of the hand. It is thought that if they do not change the method of expression, it is difficult to reduce the pain. Some participants used the electric breast pumps incorrectly because they did not understand how to adjust the pressure. It is thought that the medical staff did not instruct mothers as to the best method of expressing. Therefore, it is important to teach mothers how to use electric breast pumps to avoid pain. Medical staff should have complete knowledge of the pump’s function: 1) individually

adjustable vacuum for comfort, 2) adjustable preset combination of vacuum and cycles per minute. The reason for stiff necks was bad posture, while arm pain was due to holding breasts. It is also important to guide mothers in maintaining good posture. Mothers are able to express comfortably, and not spill milk from the cup if they sit upright in a comfortable position, and put the cup over the center of the nipple. Furthermore, in using electric breast pumps, all mothers who showed a stiff neck or arm pain felt fatigue. It is thought that good posture during expression reduces fatigue. In Japan, there are some nurses and nurse-midwives who have a negative perception about using electric breast pumps, and do not fully realize the performance of electric breast pumps<sup>1, 2)</sup>. Since mothers whose babies were in the NICU are able to express their breast milk comfortably and maintain secretions, the medical staff should understand the use of electric breast pumps so they may be able to guide mothers adequately.

Mothers who expressed by hand took two or three months to become skilled, and felt it was difficult. They expressed their breast milk only little by little, feeling that it took a long time. In using electric breast pumps, no mothers felt it was difficult, and all felt that they were able to express in a short time. Therefore, it is thought that electric breast pumps are easily used by any mother. But in this study all mothers expressed with a single pumping system because they felt it was difficult to support two cups at the same time. The problem can be solved by using a double pumping bra<sup>8)</sup> and guidance in placing the two cups. Therefore, the medical staff should introduce the products and their use so that mothers may express breast milk more comfortably.

In the west, information about the selection of various types of breast pumps, methods of expression, and electric breast pumps is available from the NICU, and breast pumps may be rented by mothers and fathers whose babies are in the NICU<sup>9-11)</sup>. On the other hand, it is mentioned that hand expression has some advantages, in that it is more natural, convenient, and portable<sup>12)</sup>. Therefore, using electric breast pumps should not be compulsory. Instead, it is important to support mothers in the selection of the best method of expression for them.

As mentioned above, in order to express more comfortably, and maintain lactation until breast feeding can begin, medical staff should provide mothers with

information about expressing methods and support them so that breastfeeding can be performed at a later time.

## Conclusion

1. In both groups, lactation could be maintained until breastfeeding.
2. The percentages of pain and fatigue in the group who expressed by hand were more than that in the group who used electric breast pumps.
3. Mothers who expressed by hand felt difficulty with the expression process. Mothers who used electric breast pumps did not.

## Acknowledgements

We thank the mothers and institutions which cooperated in this research. This research was supported by the Grant-in-Aid for Young Scientists (B) from The Ministry of Education, Culture, Sports, Science and Technology (MEXT) (2004 - 2005).

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