BREAST-FEEDING AND BOTTLE-FEEDING OF TWINS, TRIPLETS AND HIGHER ORDER MULTIPLE BIRTHS

Yoshie YOKOYAMA¹* and Syuichi OOKI²

Objective This study was performed to determine the rates of breast-feeding and/or bottle-feeding in mothers of twins, triplets and higher order multiple births compared to those in mothers of singletons, and identify factors associated with decision as to breast-feed or bottle-feed.

Methods The subjects were 1,529 mothers of twins aged 6 months–6 years and 258 mothers of triplets and higher order multiple births (higher multiples) aged 6 months–6 years (234 mothers of triplets, 20 mothers of quadruplets, 4 mothers of quintuplets). Also, 1,300 subjects were recruited as a control group from mothers of singletons aged 6 months–6 years. Information regarding feeding methods, including exclusive breast-feeding, mixed-feeding and bottle-feeding with formula milk only, and duration of breast-feeding (in months) was collected.

Results There were significantly higher rates of bottle-feeding in mothers of twins and higher multiples than in mothers of singletons. Duration of breast-feeding in mothers who chose exclusive breast-feeding or mixed-feeding for twins and higher multiples was significantly shorter than those for the singletons. The feeding methods for the twins or higher multiples were not associated with prematurity or low birth weight. However, after adjusting for each associated factor using logistic regression analysis, the decision to bottle-feed was significantly associated with non-cooperation of the husband in childrearing and degree of anxiety that mothers felt when informed of a multiple pregnancy. The odds ratio indicated that mothers who received no cooperation from the husband for childrearing were 1.83 times more likely to choose bottle-feeding as those who received cooperation. Further, the odds ratio indicated that mothers who felt greater anxiety when informed of a multiple pregnancy were 1.73 times more likely to choose bottle-feeding as those who did not feel much anxiety.

Conclusion This study found that establishment and continuation of breast-feeding for twins, triplets and higher order multiple births are much more difficult than for singletons. Further, cooperation of the husband in childrearing and the degree of maternal anxiety when informed of a multiple pregnancy are significant factors affecting the decision to breast-feed or bottle-feed for twins, triplets or higher order multiple births.

Key words: twin, triplets, mothers, breast-feeding, bottle-feeding

I. Introduction

Numerous studies¹–⁴ have indicated the importance of breast milk as the ideal nutrient for infants in the first 4–6 months after birth. Breastfed infants have fewer respiratory tract infections, diarrheal illnesses, and atopic skin disorders. Increased mother-infant bonding and an overall decrease in infant morbidity and hospitalization rates have also been reported⁵.

Approximately 50% of twins⁶ and 96% of triplets⁷ are born as preterm infants with low birth weight. Infants who are born prematurely have greater need for the nutritional, antiinfective and immunologic advantages of breast milk. However, many preterm infants have poor sucking ability even when they are well, and it was reported that the rate of breastfeeding is low⁸. Furthermore, Ford et al.⁹ reported that even mothers of twins born at term were less likely to breast-feed compared to those experiencing singleton births.

Little research exists documenting the rate of breast-feeding in triplets and higher order multiple
undertaken to determine rates of breast-feeding and singletons in Japan. This present study was therefore and higher multiple births compared to mothers of singletons. Moreover, for these births, data on infertility was established by the Maternal and Child Health Law that all infants receive medical examinations at 1.5 and 3 years of age. These medical examinations thus are given to almost 100% of children in Japan. In addition, mothers were asked to indicate maternal age at delivery, delight and anxiety felt when they were informed of pregnancy, and cooperation from the husband for childrearing.

With regard to statistical analyses, the independence of qualitative variables was examined using Chi-square analysis. Analysis of variance (ANOVA) was conducted, with maternal age at delivery, birth weight and duration of breast-feeding as dependent, and groups (singleton group, twin group and higher multiple group) as independent variables. Further, logistic regression analysis was used to adjust for each factor associated with bottle-feeding. The SPSS statistical package v10.0 for Windows was used for statistical analyses.

II. Subjects and Methods

The subjects of this study were 1529 mothers of twins aged 6 months–6 years and 258 mothers of triplets and higher order multiple births aged 6 months–6 years (234 mothers of triplets, 20 mothers of quadruplets, 4 mothers of quintuplets), who consented to the aim of this study—the clarification of childrearing issues—and were explained that data would be used only for the aim of this study. They were recruited from the Okayama University Twin and Higher Order Multiple Births Registry. Participants were also enrolled from several other sources, including mothers who responded to newspaper advertisements and magazine articles featuring nursing guidance for families with multiple births, the Japanese Mother’s Organization for Twins and Higher Order Multiple Births and referrals from midwives and public health nurses. Furthermore, 1300 subjects were recruited as a control group from mothers of singletons aged 6 months–6 years. The control group were recruited through the help of public health nurses and were matched for the distribution of age of the multiple children.

The survey was conducted between June 1998 and March 2001 by means of a mailed questionnaire. Information regarding feeding methods including breast-feeding only, mixed-feeding (mainly breast with some bottle or mainly bottle with some breast) and bottle-feeding with formula milk only, as well as duration of breast-feeding (in months) was collected. The definition used for exclusive breast feeding was that the baby had been given breast milk only.

Moreover, for these births, data on infertility treatment, gestation number, gestational age, birth weight, length of hospital stay after birth and the presence of disabled infants were obtained from records in the Maternal and Child Health Handbook. This latter was established by the Maternal and Child Health Law in Japan and is provided by the governor after a report of pregnancy. Further, it was evidenced that the baby had been given breast milk only for those who breast-fed exclusively in the twin group and the higher multiple group than in the singleton group. Moreover, the duration of breast-feeding of mothers who used mixed-feeding in the twin group and the higher multiple group was significantly shorter than in the singleton group.

Table 3 shows maternal factors associated with

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breast-feeding and bottle-feeding in the twin group and the higher multiple group. The feeding methods did not significantly differ according to maternal delight when informed of a multiple pregnancy, and infertility treatment. However, a significantly higher proportion of mothers who felt greater anxiety when informed of a multiple pregnancy chose bottle-feeding than their counterpart who chose exclusive breast-feeding or mixed-feeding. Maternal age at delivery in mothers who chose bottle-feeding was significantly older than in mothers who chose exclusive breast-feeding or mixed-feeding. There was a significantly higher rate of mothers who received no cooperation from the husband for childrearing in

\[ \chi^2 = 415.6, 4, P < 0.001 \]

\[ F = 1,439.0, 2, P < 0.001 \]

\[ F = 60.0, 2, P < 0.001 \]

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\[ \chi^2 = 797.9, 4, P < 0.001 \]

\[ \chi^2 = 2.17, 2, \text{n.s.} \]

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\[ F = 11.6, 2, P < 0.001 \]

\[ F = 27.7, 2, P < 0.001 \]
Table 3. Maternal Factors Associated with Breast-Feeding and Bottle-Feeding in the Twin Group and Higher Multiple Group

<table>
<thead>
<tr>
<th>Maternal Factors</th>
<th>Bottle-feeding n (%)</th>
<th>Exclusive breast-feeding or mixed-feeding n (%)</th>
<th>$\chi^2$ df P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maternal age at delivery&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>0 (0.0)</td>
<td>4 (0.3)</td>
<td>11.6, 1, P&lt;0.01</td>
</tr>
<tr>
<td>20–29</td>
<td>148 (51.0)</td>
<td>877 (38.7)</td>
<td></td>
</tr>
<tr>
<td>30–39</td>
<td>139 (47.9)</td>
<td>611 (40.9)</td>
<td></td>
</tr>
<tr>
<td>≥40</td>
<td>3 (1.1)</td>
<td>2 (0.1)</td>
<td></td>
</tr>
<tr>
<td>Feeling when they were informed of multiple pregnancy&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very delighted-fairly delighted</td>
<td>224 (79.2)</td>
<td>1,209 (83.1)</td>
<td>2.54, 1, n.s.</td>
</tr>
<tr>
<td>Not very delighted-not delighted</td>
<td>59 (20.8)</td>
<td>246 (16.9)</td>
<td></td>
</tr>
<tr>
<td>Anxiety that they felt when they were informed of multiple pregnancy&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Very anxious-fairly anxious</td>
<td>259 (91.2)</td>
<td>1,268 (86.4)</td>
<td>4.83, 1, P&lt;0.05</td>
</tr>
<tr>
<td>Not very anxious-not anxious</td>
<td>25 (8.8)</td>
<td>199 (13.6)</td>
<td></td>
</tr>
<tr>
<td>Cooperation of husband for childrearing&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-cooperative</td>
<td>88 (31.0)</td>
<td>290 (19.8)</td>
<td>17.7, 1, P&lt;0.001</td>
</tr>
<tr>
<td>Cooperative</td>
<td>196 (69.0)</td>
<td>1,177 (80.2)</td>
<td></td>
</tr>
<tr>
<td>Infertility treatment&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-infertility treatment</td>
<td>112 (60.9)</td>
<td>496 (64.0)</td>
<td>6.24, 1, n.s.</td>
</tr>
<tr>
<td>Infertility treatment</td>
<td>72 (39.1)</td>
<td>279 (36.0)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Excluding cases where information regarding maternal age at delivery, delight and anxiety that mothers felt when they were informed of multiple pregnancy, cooperation of husband for childrearing and infertility treatment was incomplete. df = degree of freedom

Table 4. Infant Factors Associated with Breast-Feeding and Bottle-Feeding in the Twin Group and Higher Multiple Group

<table>
<thead>
<tr>
<th>Infant Factors</th>
<th>Bottle-feeding n (%)</th>
<th>Exclusive breast-feeding and mixed-feeding n (%)</th>
<th>t or $\chi^2$ df P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational age (weeks)&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;32</td>
<td>22 (7.6)</td>
<td>119 (8.0)</td>
<td>$\chi^2=0.85$, 1, n.s.</td>
</tr>
<tr>
<td>32–35</td>
<td>63 (21.6)</td>
<td>315 (21.2)</td>
<td></td>
</tr>
<tr>
<td>≥36</td>
<td>206 (70.8)</td>
<td>1,054 (70.8)</td>
<td></td>
</tr>
<tr>
<td>Length of hospital stay (days)&lt;sup&gt;b&lt;/sup&gt;</td>
<td>22.1 ± 20.2</td>
<td>23.7 ± 27.4</td>
<td>t = 0.94, 1,718, n.s.</td>
</tr>
<tr>
<td>Low birth weight&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No low birth weight newborn in the set</td>
<td>48 (22.6)</td>
<td>204 (21.3)</td>
<td>$\chi^2=0.17$, 1, n.s.</td>
</tr>
<tr>
<td>At least one low birth weight newborn in the set</td>
<td>164 (77.4)</td>
<td>752 (78.7)</td>
<td></td>
</tr>
<tr>
<td>Very low birth weight&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No very low birth weight newborn in the set</td>
<td>190 (89.6)</td>
<td>820 (85.8)</td>
<td>$\chi^2=2.33$, 1, n.s.</td>
</tr>
<tr>
<td>At least one very low birth weight newborn in the set</td>
<td>22 (10.4)</td>
<td>136 (14.2)</td>
<td></td>
</tr>
<tr>
<td>Disabled children&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No disabled children in the set</td>
<td>242 (86.1)</td>
<td>1,257 (90.7)</td>
<td>$\chi^2=4.99$, 1, P&lt;0.05</td>
</tr>
<tr>
<td>At least one disabled child in the set</td>
<td>39 (13.9)</td>
<td>129 (9.3)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> Excluding cases where information regarding gestational age, low birth weight, very low birth weight, and disabled children was incomplete.

<sup>b</sup> Mean ± SD

df = degree of freedom
mothers who chose bottle-feeding than in those who chose exclusive breast-feeding or mixed-feeding.

Table 4 shows infant factors associated with breast-feeding and bottle-feeding in the twin group and the higher multiple group. The feeding methods did not significantly differ according to gestational age, length of hospital stay after birth, low birth weight (<2500 g) and very low birth weight (<1500 g). However, there was a significantly higher rate for mothers who had at least one disabled child in mothers who chose bottle-feeding than in those who chose exclusive breast-feeding or mixed-feeding.

Table 5 shows the results of logistic regression analysis of bottle-feeding with associated factors as independent variables. Non-cooperation of the husband for childrearing was independently associated with a risk of bottle-feeding: the odds ratio indicated that mothers who received no cooperation from the husband for childrearing were 1.83 times more likely to choose bottle-feeding than those who experienced cooperation. Furthermore, anxiety that mothers felt when informed of a multiple pregnancy was associated with a risk of bottle-feeding: the odds ratio indicated that mothers who felt greater anxiety were 1.73 times more likely to choose bottle-feeding as those who did not feel great anxiety or anxiety.

### IV. Discussion

The documented benefits of breast-feeding compared with artificial feeding are numerous. The advantages include nutritional, immunological and psychological effects, as well as protection from disease, for infants. In this study, the rates of exclusive breast-feeding among mothers of twins and triplets or higher order multiple births were lower than among those with singleton babies: 5.4% for twins and 3.6% for triplets or higher order multiple births. These rates are similar to the 4.9% for mothers of twins or triplets reported in Poland. Further, the duration of breast-feeding among the mothers of twins, triplets or higher order multiple births was shorter than that for singletons. In addition, this study revealed that feeding methods for twins, triplets or higher order multiple births were not associated with prematurity or low birth weight. These results suggest that irrespective of prematurity or low birth weight, establishment and continuation of breast-feeding after multiple births is difficult.

Concerning factors associated with the decision to breast-feed or bottle-feed for twins, triplets and higher order multiple births, this study showed that cooperation of the husband for childrearing was the most significant factor. Several studies have indicated mothers to be influenced by the father’s attitude towards breast-feeding or bottle-feeding. Accordingly, the father should be involved in discussions regarding the type of feeding that the twins, triplets or higher order multiple births will receive, and be provided with the information that mothers who receive no cooperation from their husbands for childrearing are more likely to choose bottle-feeding with formula milk only.

Foster et al. found that pregnant women intending to breastfeed had higher levels of maternal fetal attachment. In this study, the women who felt greater anxiety when informed of a multiple pregnancy were more likely to choose bottle-feeding with formula milk only, although maternal delight when informed of a multiple pregnancy was not associated with the feeding decision. Further, this study revealed that mothers with twins, triplets or higher order multiple births felt greater anxiety when informed of a multiple pregnancy than those of singletons, and approximately 60% of mothers with twins, and 70% of mothers with triplets or more, were very anxious or anxious when so informed. These results indicated that women pregnant with twins and triplets need special support in order to lower their anxiety.

Ford and Lablook indicated that congenital problems can shorten the duration of breastfeeding. In the earlier present study, there was a higher rate
of mothers who had at least one disabled multiple child in mothers who chose bottle-feeding. Thus, there is a possibility that disabilities in children influence infant feeding. While several studies provided evidence that mothers of singletons who breastfed were older, maternal age at delivery was not a factor associated with the decision to breastfeed or bottle-feed for multiple births in our subjects.

Data on cigarette smoking of mothers, quantity of maternal lactation and the use of a dummy were lacking in this study, and it has been suggested that these factors are associated with the initiation and duration of breastfeeding. Other studies have attempted to assess the rate of breast-feeding at discharge and establish a program to initiate breastfeeding. These factors and other aspects will be investigated in the future.

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References

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