

【 外 国 語 要 旨 】

Study on breast- and bottle-feeding: child-care support through promoting healthy feeding practice

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In the weaning period, infants take solid foods that help develop their eating functions and provide them with energy and nutrients that are deficient when they consume milk only. The intake of solid foods is affected by milk consumption; however, continuation of milk feeding after the weaning period and the background factors of feeding practice have not been clear. This study focused on knowledge about the nutritional value of breast milk and self-demand feeding after weaning. These were not included in the infant feeding guidelines for Japanese (hereafter, Japanese guidelines). Therefore we have considered as factor of the continuation of milk feeding after the weaning period and feeding practice. The purpose of this study was to support breast-and bottle-feeding for optimal solid food intake according to the individuality of the mother and infant. In addition, this study intended to contribute to childcare support through the promotion of healthy feeding practice by examining the relations of breast-feeding and its background factors with eating problems among infants.

In Study 1, we performed a systematic review of studies for Japanese infants. This review aimed to reveal the relation between milk consumption among infants who are given weaning foods in accordance with Japanese guidelines and their oral conditions and functions. This review also revealed the relation between milk consumption and anthropometric measurements and nutrient intake. Oral conditions and functions were related to the amount and method of milk intake after the weaning period. A large consumption of breast milk or of beverages other than formula milk using baby bottles was presumed to indicate a shortage of oral function training for solid food. As such, the development of oral function may be hindered by the intake of milk. Nutrient intake and its adequacy proportion in formula-fed infants aged under 1 year were more than those in breastfed and breastfed/formula-fed infants. Formula-fed infants had the highest intake and satisfaction rate compared with breastfed and mixed-fed infants. However, after age 1 year, the satisfaction rates of iron and vitamin D decreased significantly. Anthropometric measurements in breastfed infants tended to be slightly smaller than those in formula-fed infants, but it was guessed that anthropometric measurements was influenced by individual differences and the components

of formula milk.

In studies 2 to 4 we conducted a questionnaire survey for 581 guardians who infants aged 18 months took to a dental examination. The number of valid responses to the survey was 555. Study 2 examined the relation between continuation of milk feeding and the purpose of feeding and night feeding. The results clarified that about one-third of 18-month-old infants continued milk feeding, according to the dental examination. In addition, breast milk was consumed significantly more across all types of milk feeding. The proportion of breast-feeding in the continuation group was significantly higher, at more than 80%, indicating an extension of the breast-feeding period. The following points were considered for these factors. First, the Maternal and Child Health Handbook was revised in 2002. Second, the Japanese guidelines that have been used since 2009 are to determine when a mother will end breast-feeding. The WHO guidelines, the global standard, recommend breast-feeding up to two years of age. Therefore, we think that the termination of breast-feeding in this study is not necessarily late. As breast milk also contains substances related to immunity, breast-feeding can be said to protect infants from secondary health damage owing to infections during disasters. Therefore, a proactive approach to elucidating long-term breast-feeding in Japan is important. Meanwhile, the continuation group reported significantly more breast-feeding practices, such as “nursing to sleep and so on” and “night feeding” (hereinafter, milk feeding practice), compared with the graduated group. These practices are considered to trigger low appetite. However, no significant association was found between in the infant anthropometric measurements and continuation of milk feeding. Therefore, the continuing group was found to have low appetite but consume energy.

Study 3, which was based on Study 2, aimed to examine the related factors of breast-feeding practice, which are considered to trigger low appetite. First, we examined the relation between guardians' knowledge on the nutritional value of breast milk, milk feeding practice, and continuation of milk feeding. The nutritional value of breast milk remains almost unchanged after the weaning period. However, the correct answer rate for the nutritional value of breast milk in this study was 20%, indicating low awareness. Nonetheless, no significant association was observed between knowledge of breast milk nutritional value and continuation of milk feeding. The percentage of correct answers for the nutritional value of breast milk among guardians who gave breast milk or mixed milk, or guardians who accounted

for more than 90% of the continuing group, was less than 20%. Thus, guardians were breast-feeding without sufficient knowledge of the nutritional value of breast milk. Therefore, it is necessary to disseminate correct knowledge on the nutritional value of breast milk after the weaning period. Next, we were to clarify the relation between the regularity of self-demand feeding after weaning, continuation of breast-feeding, and breast-feeding practice. For infants aged older than 18 months, 43% of guardians answered “regular breast-feeding” where the time for feeding had been determined. This rate was significantly higher in the breast-feeding termination group. Meanwhile, 57% reported “irregular breast-feeding” where the time for breast-feeding had not been determined, and the number of breast-feeding instances was significantly higher compared with “regular breast-feeding.” Therefore, there was a possibility of breast-feeding other than when hungry. As a result of this practice, the rhythm of self-demand feeding that had been formed after 6 to 8 weeks of age could be disturbed in the post-weaning period; if a hungry rhythm was not formed, then low appetite could occur. This finding suggests the necessity of highlighting that “regular breast-feeding,” the rhythm of milk feeding, is optimal to ensure the intake of solid food that is essential for infant growth and development. In doing so that, we should take into account that guardians do not know the correct nutritional value of breast milk. To ensure “regular breast-feeding,” breast-feeding other than when the infant is hungry should be avoided. Thus, guardians need to be informed that infants cry to convey emotional situations other than hunger, such as anxiety and discomfort.

Study 4 was conducted to contribute to childcare support through the promotion of healthy feeding practice. We examined the relation between factors revealed in studies 2 and 3 (e.g., guardians’ knowledge on the nutritional value of breast milk, regularity of self-demand feeding, and continuation of breast-feeding) and the 12 problems of eating behavior of infants. No significant correlation was found between understanding the nutritional value of breast milk and concerns over infants’ problematic eating behavior. However, guardians who had correct knowledge on the nutritional value of breast milk were more worried over the item “not chewing too much” compared with guardians with low knowledge of the same. Inappropriate feeding practices were considered to result in less solid food intake and insufficient practice of mastication. These trends reflect the results of Study 1. Even with correct knowledge of the nutritional value of breast milk, guardians could still be unaware that

oral and mastication functions were trained through eating solid food. Significant associations were found among four items in the relation between regularity of self-demand feeding and problems in eating behavior. Three items may not have been due to infants not being hungry, whereas one item was due to eating habits formed by irregular eating and snack content. Moreover, significant associations were seen between eight items regarding continuation of breast-feeding and infants' eating behavior problems. Termination in the breast-feeding group only had items attributed to oral function; all items could be presumed to be due to not being hungry in the continuation of breast-feeding group. As such, the characteristics of eating behavior problems were shown in the difference in the continuation of breast-feeding. Correct knowledge on the nutritional value of breast milk and enlightenment on the regularity of self-demand feeding related to the continuation of breast-feeding would contribute to childcare support by promoting healthy feeding practice.

As mentioned above, we gained new knowledge that should be provided to mothers of infants. Thus, dissemination of the new knowledge we have gained will help support breast- and bottle-feeding for optimal solid food intake according to the mother and child's individuality such as milk-feeding practice.