



ELSEVIER

Contents lists available at ScienceDirect

## Early Human Development

journal homepage: [www.elsevier.com/locate/earlhumdev](http://www.elsevier.com/locate/earlhumdev)

# The relationship between exclusive breastfeeding and infant development: A 6- and 12-month follow-up study

Hye Jeong Choi<sup>a</sup>, Su Kyoung Kang<sup>b</sup>, Mi Ra Chung<sup>a,b,\*</sup>

<sup>a</sup> *Sesalmaul Research Institute, Gachon University, Gyeonggi-do, South Korea*

<sup>b</sup> *Department of Early Childhood Education, Gachon University, Gyeonggi-do, South Korea*

## ARTICLE INFO

## Keywords:

Cognitive development  
Communication development  
Exclusive breastfeeding duration  
Formula feeding  
Social development  
6–12 months

## ABSTRACT

**Background:** Breastfeeding offers several advantages for infants with research suggesting that it benefits development, including cognitive and language development. However, limited research has examined the benefits in infants under one year.

**Aims:** To investigate the association between breastfeeding duration and infant development.

**Study design:** A longitudinal study conducted over 12 months.

**Subjects:** Two hundred fifty-five mothers and their infants living in South Korea were seen at three time-points based on infants' age (4, 6, and 12 months).

**Outcome measures:** Breastfeeding data were collected at 4 and 6 months. The Korea-Developmental Screening Test for Infants & Children was administered at 6 and 12 months to measure developmental milestones. We analyzed the relationship between breastfeeding duration in the first 6 months and infant development at 6 and 12 months using logistic regression analysis.

**Results:** Compared to infants who did not breastfeed at all, infants who were exclusively breastfed until 4 months of age followed by mixed breastfeeding had a better communication and social interaction at 6 months, and better cognition, communication, and social interaction at 12 months. Exclusive breastfeeding until 6 months of age had no apparent impact on the outcomes at 6 and 12 months.

**Conclusions:** Exclusive breastfeeding up to 4 months of age followed by mixed breastfeeding might maximize the effects of infant development in their first year after birth. Breastfeeding programs should effectively communicate that exclusive breastfeeding for at least 4 months benefits infant development.

## 1. Introduction

According to the National Survey on Fertility, Family Health and Welfare in Korea [1] between 2000 and 2012 in South Korea, from 9.5% to 32.3% infants aged 5–6 months were receiving their nutrition from breastfeeding only<sup>1</sup>, which may reflect increasing interest in breastfeeding. The World Health Organization (WHO) recommends that mothers worldwide exclusively breastfeed (i.e., not using any formula or food) for the infant's first 6 months to achieve optimal growth, development, and health. According to data released by the Korea Committee for UNICEF in 2016 [2], the exclusive breastfeeding rate in South Korea is high immediately after birth but gradually decreases as

the child ages, being just 55.8% at 4 weeks of age, 38.1% at 4 months, and 18.3% at 6 months of age. The exclusive breastfeeding rate for 6 months of age in South Korea is about half of the global average.

Breastfeeding offers several advantages for infants. In particular, breast milk is known to strengthen infants' immune system and help in the development of their brain and cognitive function. Attempts to empirically understand the effects of breastfeeding duration in general are ongoing. Recent studies on the effects of breastfeeding have noted declines in infantile infection rates [3,4], improvements in cranial nerve development [5,6], and enhanced physical and mental development [7–10] and cognitive and language development [11–15]. Breastfed infants develop language and process language stimuli during the

**Abbreviations:** K-DST, Korea-Developmental Screening Test for Infants & Children; SES, socioeconomic status; ANOVA, one-way analyses of variance; aOR, adjusted odds ratio; LCPUFA, long chain polyunsaturated fatty acids; DHA, docosahexaenoic acid

\* Corresponding author at: Department of Early Childhood Education, Gachon University, 1342 Seongnam-daero, Sujeong-gu, Seongnam-si, Gyeonggi-do, South Korea.

E-mail address: [mrchung@gachon.ac.kr](mailto:mrchung@gachon.ac.kr) (M.R. Chung).

<sup>1</sup> Family Health and Welfare in Korea [1] investigated the rate of infants aged 5–6 months who were more breast fed than formula fed, including infants who were exclusively breastfed.

<https://doi.org/10.1016/j.earlhumdev.2018.08.011>

Received 30 May 2018; Received in revised form 15 August 2018; Accepted 28 August 2018

0378-3782/ © 2018 Elsevier B.V. All rights reserved.

first 6 months of life better than formula-fed infants [16] and may also have higher IQ score during the first year than those fed with formula [17]. In addition, children breastfed for < 4 months showed an increased risk of delayed development in the adaptive, language, and fine motor domains during their first three years compared to infants who were breastfed for > 4 months [14], while continuing breastfeeding for at least 4 months was associated with increased child cognitive development [13]. However, Fewtrell, Wilson, Booth, Lucas [18] have suggested that exclusive breastfeeding to 6 months leaves infants lacking in iron, which is of concern given the potential for long-term adverse effects on motor, mental, and social development [19,20]. On the other hand, exclusive breastfeeding until at least 6 months has also been reported to be positive for development [21,22]. Thus, studies have had inconsistent results with respect to the optimal duration of exclusive breastfeeding.

However, most studies have been limited to specific areas of development, such as cognition and language. Of the few studies have examined the effects of exclusive breastfeeding on infants, most focused on diseases or nutrition [3,4,19,20]. Thus, there is still debate over how long exclusive breastfeeding should be continued to maximize its benefits for infant development. The combination of breast milk, formula, and supplementary foods from 4 months after birth is both less burdensome for the mother and nutritionally sufficient [18]. Recently, in South Korea, the Academy of Breastfeeding Medicine Korea released a report encouraging 6 months of exclusive breastfeeding as recommended by the WHO, but in Korea, studies have focused on breastfeeding itself; its present status [2,23,24], the factors affecting its duration [25], and the nutrient composition of human milk [26–28]. Korean studies related to effect of breastfeeding and especially to infant health and development aspects remain insufficient. Therefore, it would be meaningful to explore the effects of exclusive breastfeeding duration on infant development for the first year after birth.

Thus, the purpose of this study is to examine the relationships of exclusive breastfeeding duration with the physical, cognitive, communicative, and social development of infants at 6 and 12 months of age compared with those infants under formula. For this purpose, a research design to track infants throughout the first year of life was developed. We measured the overall development of infants using the Korea-Developmental Screening Test for Infants & Children (K-DST), an effective, reliable, and accredited tool in South Korea for measuring infants' physical, cognitive, communicative, and social development [29]. Our study addresses the prominent gaps in past literature, which has largely focused on cognitive functioning, and did not gather follow-up results on early infant development from 6 to 12 months after birth. In addition, we adjusted for the sociodemographic characteristics of infants and mothers to maximize the statistical explanatory power of the results.

## 2. Methods

### 2.1. Participants

The participants were 255 unemployed mothers and their infants were recruited between August 2015 and May 2017 through the Sesalmaal Research Institute, Gachon University. The participants were followed up three times according to infants' age: 4, 6, and 12 months (Times 1, 2, and 3, respectively). All mothers were briefed about research participation and research ethics, and signed a written consent form at each follow-up point. The study was approved by the IRB of Gachon University (Approval number: 1044396-201705-HR-079-01). Mothers answered a question about breastfeeding at Times 1 and 2, and completed the K-DST at Times 2 and 3. The breastfeeding information was collected online. The K-DST was disseminated to participants by a skilled clinician through home visits; the mothers completed it themselves. Among research participants, only those who satisfied the following criteria were included in this study: born at term ( $\geq 37$  weeks),

single birth (i.e., no multiples), and who were not attending childcare. No infants participating in the study had chronic diseases, such as cardiovascular diseases or asthma.

Of the original sample of 510, a total of 431 mothers completed the survey at Time 1 (18.3% dropout rate), 363 at Time 2 (18.6% dropout rate), and 298 at Time 3 (21.8% dropout rate). Participants who did not have a completed breastfeeding survey or did not respond to one or more question on the K-DST were eliminated using listwise deletion. The final sample size was 255. No statistically significant differences were found between respondents that dropped out after 4 months ( $n = 176$ ) and those that remained in the study for all 12 months ( $n = 255$ ) in terms of sociodemographic variables, including maternal age, maternal education, paternal education, and household income.

### 2.2. Measures

#### 2.2.1. Breastfeeding duration

Breastfeeding information was collected using one question: “How have you been feeding your infant until now? (breastfeeding only; formula only; breastfeeding and formula together).” Participants were categorized according to their infants' breastfeeding type at 4 and 6 months of age, as follows: *never breastfed*, *mixed breastfeeding until 6 months of age*, *exclusive breastfeeding until 4 months of age followed by mixed breastfeeding*, *exclusive breastfeeding until 6 months of age*. Here, “mixed” means that the infant was both breastfed and fed with formula and mother's milk, while “exclusive” meant that the infant was only breastfed during that period without any formula. Other breastfeeding categories were not represented in the data, and were not presented. All infants in the four categories of breastfeeding consumed other liquids or solids food at 6 months, as the 11 infants who did not have other liquids or solids food were excluded at the sampling stage for homogeneity of the nutritional environment. In Korea, infants generally begin to consume other liquids or solid food at 4–6 months [30].

Breastfeeding was measured at 4 and 6 months for the following reasons. In 2011, the WHO released a statement asserting the beneficial effects of exclusive breastfeeding for 6 months, changing their existing recommendation of at least 4 months. We chose time points of 4 months, at which the breastfeeding rate dropped sharply to < 40% [2], and 6 months recommended by the WHO for exclusive breastfeeding.

#### 2.2.2. Infant development

Infant development was assessed using the K-DST [29] at 6 and 12 months. The K-DST is a screening test designed by the Ministry of Health and Welfare to assist in monitoring the development of Korean children aged 4 months to 6 years. It contains 5 dimensions, each with 8 items, as follows: gross motor (e.g., “Can turn over while lying down”), fine motor (e.g., “Shakes toy when a toy is placed in hand”), cognition (e.g., “Follows a rolling ball with eyes”), communication (e.g., “Speaks babbling like ‘ooh’ and ‘ah’”), and social interaction development (e.g., “Tries to approach familiar people such as family members”). Each item is scored on a 4-point Likert-type scale ranging from 0 (*cannot perform at all*) to 3 (*can perform well*). Mothers were asked to assess their infants' behavior. The K-DST score is calculated by summing the scores of each dimension, and based on these dimension scores, infants' level of development is categorized into two groups: *delayed* and *normal*. Infants who scored above  $-1$  standard deviation from the mean were classified as being in the *normal* group, and those who scored below this level were classified as being in the *delayed* group.

This scale has been validated against the Korean-Bayley Scale of Infant Development [31] and the Korean-Wechsler Preschool and Primary Scales of Intelligence [32] with Korean children. In this study, the internal consistency reliability (the Cronbach's alpha) was good for the whole K-DST, ranging between 0.82 and 0.85. The internal consistency of subscales ranged from 0.45 to 0.84. A coefficient of at least 0.80 shows good consistency, and a coefficient of < 0.70 shows low

Download English Version:

<https://daneshyari.com/en/article/11028733>

Download Persian Version:

<https://daneshyari.com/article/11028733>

[Daneshyari.com](https://daneshyari.com)