Spring 4-1-2015

# Breastfeeding Initiation and Continuation by Employment Status among Korean Women

Yeon Bai

Nam Mi Kang

Jung Eun Lee

Theo Van Achterberg

Taisun Hyun

ORIGINAL ARTICLE

ISSN (Print) 2005-3673
ISSN (Online) 2093-758X

J Korean Acad Nurs Vol.45 No.2 April 2015

*J Korean Acad Nurs Vol.45 No.2, 306-313*
http://dx.doi.org/10.4040/jkan.2015.45.2.306

# Breastfeeding Initiation and Continuation by Employment Status among Korean Women

Kang, Nam Mi[1] · Lee, Jung Eun[2] · Bai, Yeon[3] · Van Achterberg, Theo[4] · Hyun, Taisun[5]

[1]Department of Nursing, Konkuk University, Chungju
[2]Department of Food and Nutrition, Sookmyung Women's University, Seoul, Korea
[3]Department of Health and Nutrition Sciences, Montclair State University, Montclair, NJ, USA
[4]Department of Nursing Science, KU Leuven, Leuven, Belgium
[5]Department of Food and Nutrition, Chungbuk National University, Cheongju, Korea

**Purpose:** The objective of this study was to examine the factors associated with initiation and continuation of breastfeeding among Korean women in relation to their employment status. **Methods:** Data were collected using a web-based self-administered questionnaire from 1,031 Korean mothers living in Seoul with babies younger than 24 months. Demographic characteristics, education on breastfeeding, rooming in, breastfeeding during hospital stay, and breastfeeding knowledge were examined. Multivariate logistic regression analyses were performed to identify factors associated with initiation and continuation at 1, 6 and 12 months according to mothers' employment status. **Results:** Breastfeeding initiation rates were similar regardless of mothers' employment status. Continuation rates decreased for both groups of mothers, but were significantly lower among employed mothers at all duration points. Unemployed mothers who were able to keep their babies in the same room during the hospital stay were more likely to initiate breastfeeding. The factor that was consistently associated with breastfeeding continuation for all duration points among unemployed mothers was whether the mother breastfed during the hospital stay. Higher knowledge scores and having an infant with atopic dermatitis were also associated with breastfeeding continuation at 6 months and 12 months, respectively for unemployed mothers, and receiving education on breastfeeding was associated with 12-month continuation for employed mothers. **Conclusion:** These results emphasize the significant roles of hospitals for breastfeeding initiation and continuation, with rooming-in, initial breastfeeding practice and education during hospital stay as important practices. In addition, for working mothers to continue their breastfeeding, significant support from the workplace is crucial.

**Key words:** Breastfeeding, Employment, Web

## INTRODUCTION

Breastfeeding is the best nutritional choice for infants and mothers. Breast milk not only provides all of the nutrients that infants need during the first six months, but also consists of immunologic components that protect against acute illnesses during childhood. Exclusive breastfeeding and a longer continuation of breastfeeding have been demonstrated to be associated with better health outcomes for mothers as well as for infants[1,2]. The World Health Organization (WHO) and UNICEF recommend mothers to breastfeed exclusively for the first six months of life, starting complementary feeding in the sixth month, and to continue breastfeeding for two years or more[3].

The National Survey on Fertility, Family Health & Welfare in Korea reported that the breastfeeding rate in Korea was 90% in 1970, but had a

*This paper was supported by Konkuk University in 2012.

Address reprint requests to : Hyun, Taisun
Department of Food and Nutrition, Chungbuk National University, 1 Chungdae-ro, Seowon-gu, Cheongju 362-763, Korea
Tel: +82-43-261-2790 Fax: +82-43-267-2742 E-mail: taisun@chungbuk.ac.kr

Received: October 10, 2014 Revised: October 31, 2014 Accepted: January 23, 2015

continuous decrease to 10.2% in 2000, and slowly increased thereafter[4]. In 2012, the exclusive breastfeeding rates were 56.7% at 1~2 months and 36.2% at 5~6 months. However, the Korean Health Plan 2020 objectives for exclusive breastfeeding are 70% during the first month and 60% at six months[5]. In order to achieve these objectives, effective strategies need to be designed to increase the proportion of women who initiate and who continue breastfeeding for longer durations.

Previous studies have identified a number of factors that are associated with initiation and duration of breastfeeding in different countries or for different ethnic groups[6-10]. These factors can be categorized into demographic, psycho-social, health care-related, community attributes and public policy[11]. Among these various factors, maternal employment was found to be the most common barrier to breastfeeding[12,13]. Although the employment rate of married women in Korea has been increasing 53.1% in 2012[4], there are limited studies that examine the determinants of breastfeeding initiation and continuation among Korean women, especially among employed women.

### 1. Aim of the study

The purpose of this study was to examine factors associated with initiation and continuation of breastfeeding among Korean women in relation to employment status. A cross-sectional survey was performed to explore demographic and health care-related factors that influence breastfeeding initiation and continuation at selected time points of 1, 6, and 12 months.

### 2. Definition of breastfeeding initiation and continuation

Breastfeeding initiation was specified as any experience of feeding breast milk within the first two weeks postpartum. Breastfeeding continuation to specified months meant that mothers breastfed their infants until that specified months without giving any type of formula. Breastfeeding rate at 6 months, and 12 months were defined as the proportion of infants who were breastfed including additional intake of liquids or solid foods except for any type of formula, at 6 months and 12 months.

## METHODS

### 1. Study design

This study was a web-based cross-sectional study to identify factors that are associated with initiation and continuation of breastfeeding among Korean women in relation to their employment status.

### 2. Study sample and setting

The study sample was composed of mothers living in Seoul, Korea with babies younger than 24 months. The participants were recruited from an internet site providing information about infants (http://www.maeili.com/). E-mails explaining the purpose of the study were sent to 24,176 women who had agreed to receive any emails from the website. Of those, 1,055 women participated in the survey. The participants answered the questions directly in a site that was designed for such purpose, and the answers were coded and exported to an excel file. Incomplete responses were excluded, and so data from 1,031 women were analyzed. Among those, 376 women (36.5%) were employed mothers, and 655 women (63.5%) were unemployed mothers.

The subsets of 740 women who had infants aged 6 months or over and 418 women who had infants aged 12 months or over were included in an analysis of breastfeeding rates and associated factors at 6 months and 12 months, respectively. The numbers of employed mothers in the 6 month subset and 12 month subset were 278 (37.6%) and 174 women (41.6%), respectively.

This study was approved by the Institutional Review Board of the University Hospital, and informed consent was obtained from the participants via e-mail.

### 3. Measurements

The web-based questionnaire for this study was developed by modifying a breastfeeding questionnaire from our previous study[14]. The revised version was produced on the basis of a pilot study of 145 mothers with babies younger than 24 months. Information on demographic status of mother and infant, health care-related factors, and breastfeeding knowledge were collected. Most of the questions such as maternal educational level and employment status, the child's gender, birth order, presence of atopic dermatitis, delivery place and delivery type were closed-ended questions. Ages of mother and infant and the duration of breastfeeding were open-ended questions. Breastfeeding knowledge questions used in this study were originally developed by our research team[14]. The questions consisted of 12 items testing knowledge of the benefits of breastfeeding for mother (3 items), the benefits for baby (4

items), the ingredients of breast milk (3 items) and the factors influencing breast milk secretion (2 items). Questions could be answered with yes, no, or do not know, and a total knowledge score was calculated as the number of correct answers. Cronbach's α for internal consistency of a knowledge score was 0.74.

### 4. Data analysis

The data were analyzed using the SAS software (Version 9.2, SAS Institute Inc., Cary, NC, USA). The variables were described using the frequency and percentage or the means and standard deviation. Multivariate logistic regression analysis was performed to examine the factors associated with initiation and continuation of breastfeeding among employed and unemployed women. Breastfeeding experience within the first two weeks postpartum and breastfeeding at 6 and 12 months (yes, no) were considered to be the dependent variables, and the independent variables included in the models were the age (< 30, ≥ 30 years), educational level (< university, ≥ university graduate); child's gender (boy, girl), birth order (1, ≥ 2), and presence of atopic dermatitis (yes, no); delivery place (general hospital, private hospital), delivery type (vaginal, Cesarean section), rooming-in after delivery (yes, no); and breastfeeding during hospital stay (yes, no), time of planning of the infant feeding method (prior to pregnancy, after pregnancy), breastfeeding education (yes, no), and breastfeeding knowledge score. Breastfeeding during hospital stay was excluded in the logistic analysis to find factors associated with breastfeeding initiation because all the mothers who breastfed during hospital stay initiated breastfeeding. Mothers who started breastfeeding within the first two weeks postpartum even if the babies were not breastfed during hospital stay were included in the group of mothers who initiated breastfeeding. The adjusted odds ratio (OR), 95% confidence interval (CI), and the significance using a Wald chi-square statistic were reported. A two-sided *p* value of less than 0.05 was considered to be statistically significant.

## RESULTS

### 1. Characteristics of the participants

Table 1 shows the characteristics of the participants by employment status. Of the 1,031 women, 68.3% were 30 years old or older, and 70.3% were university graduates or higher. The proportions of women who had a feeding plan (breastfeeding or bottle feeding) prior to pregnancy and who had experiences in breastfeeding education were 62.9%, and 68.6% respectively. Breastfeeding knowledge score ranged from 2 to 12, and mean score was 8.89 ± 1.83.

There were significant differences in mother's age ($p < .001$), educational level ($p < .001$), time of planning of the infant feeding method ($p = .003$), mean breastfeeding knowledge score ($p < .001$), child's birth order ($p = .047$), and delivery place ($p = .022$) between the two groups. Significantly higher proportions of employed mothers were in the group of higher age (≥ 30 years old), higher education (≥ university graduate), and had infant feeding plan after pregnancy compared to unemployed mothers. In addition, the mean breastfeeding knowledge score of employed mothers (9.13 ± 1.72) was significantly higher than that of unemployed mothers (8.75 ± 1.87).

### 2. Breastfeeding rates among employed and unemployed mothers

Figure 1 shows breastfeeding rates among employed and unemployed mothers. Breastfeeding initiation rates were similar regardless of the employment status; 93.0% in unemployed mothers and 93.4% in employed mothers. At 1 month, the breastfeeding rates dramatically dropped to 78.1% in unemployed mothers and 68.9% in employed mothers. At 12 months, the breastfeeding rates were 66.4% in unemployed mothers and 39.1% in employed mothers. The continuation rates decreased for both groups of mothers, but they were significantly lower among employed mothers at 1 month ($\chi^2 = 10.9$, $p = .001$), 6 months ($\chi^2 = 40.3$, $p < .001$), and 12 months ($\chi^2 = 30.6$, $p < .001$). The gap increased as the baby's age increased, from less than 10%p at 1 month to a 27.3%p at 12 months.

The participants reported that they had difficulties in breastfeeding due to insufficient milk supply (40.6%), ineffective positioning and latch-on (20.0%), engorged breasts (15.9%), and infant sucking problems (10.8%) at the beginning of breastfeeding. The main reasons for stopping breastfeeding were insufficient milk supply (26.8%) and difficulties in breastfeeding (20.3%) in unemployed mothers, and returning to work (38.5%) and insufficient milk supply (18.2%) in employed mothers.

### 3. Factors associated with initiation and continuation of breastfeeding

Table 2 and Table 3 show the results of multivariate logistic regression

 http://dx.doi.org/10.4040/jkan.2015.45.2.306

**Table 1.** Characteristics of the Participants

| Characteristics | Variables | Categories | Total (*N*=1,031) | Unemployed mothers (n=655) | Employed mothers (n=376) | *p* |
|---|---|---|---|---|---|---|
| | | | n (%) or M±SD | n (%) or M±SD | n (%) or M±SD | |
| Mother | Age (yr) | <30 | 327 (31.7) | 235 (35.9) | 92 (24.5) | <.001 |
| | | ≥30 | 704 (68.3) | 420 (64.1) | 284 (75.5) | |
| | Education | <University | 306 (29.7) | 235 (35.9) | 71 (18.9) | <.001 |
| | | ≥University graduate | 725 (70.3) | 420 (64.1) | 305 (81.1) | |
| | Infant feeding plan | Prior to pregnancy | 648 (62.9) | 434 (66.3) | 214 (56.9) | .003 |
| | | After pregnancy | 383 (37.1) | 221 (33.7) | 162 (43.1) | |
| | BF education experience | No | 324 (31.4) | 195 (29.8) | 129 (34.3) | .131 |
| | | Yes | 707 (68.6) | 460 (70.2) | 247 (65.7) | |
| | BF knowledge score | | 8.89±1.83 | 8.75±1.87 | 9.13±1.72 | .001 |
| Infant | Gender | Boy | 529 (51.3) | 335 (51.2) | 194 (51.6) | .889 |
| | | Girl | 502 (48.7) | 320 (48.8) | 182 (48.4) | |
| | Birth order | 1 | 656 (63.6) | 402 (61.4) | 254 (67.5) | .047 |
| | | ≥2 | 375 (36.4) | 253 (38.6) | 122 (32.5) | |
| | Having atopic dermatitis | No | 785 (76.1) | 500 (76.3) | 285 (75.8) | .845 |
| | | Yes | 246 (23.9) | 155 (23.7) | 91 (24.2) | |
| Health-care | Delivery place | Private hospital | 682 (66.1) | 450 (68.7) | 232 (61.7) | .022 |
| | | General hospital | 349 (33.9) | 205 (31.3) | 144 (38.3) | |
| | Delivery type | Vaginal delivery | 676 (65.6) | 423 (64.6) | 253 (67.3) | .379 |
| | | Cesarean section | 355 (34.4) | 232 (35.4) | 123 (32.7) | |
| | Rooming-in | No | 672 (65.2) | 413 (63.0) | 259 (68.9) | .059 |
| | | Yes | 359 (34.8) | 242 (37.0) | 117 (31.1) | |
| | BF during hospital stay | No | 214 (20.8) | 135 (20.6) | 79 (21.0) | .879 |
| | | Yes | 817 (79.2) | 520 (79.4) | 297 (79.0) | |

BF=Breastfeeding.

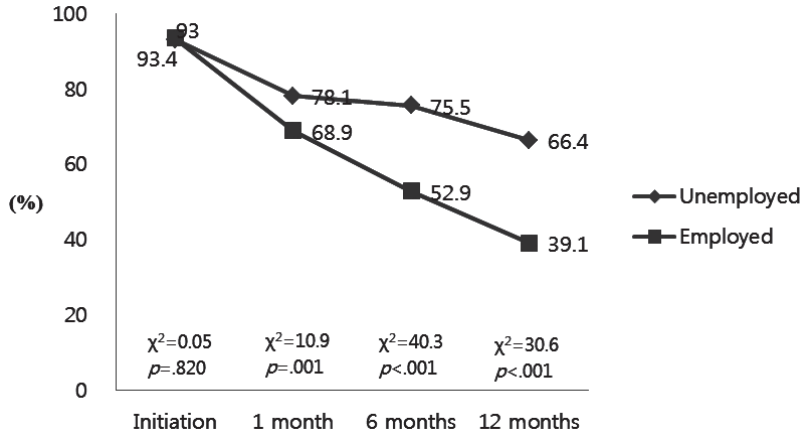


**Figure 1.** Breastfeeding rate at initiation, 1, 6 and 12 months.

for breastfeeding initiation and continuation. Only the variables identified as significant at initiation or continuation of breastfeeding are presented in the Tables when all the variables in Table 1 were included in the model. Participants who were able to keep their babies in the same room during hospital stay (rooming-in) (OR=2.68, 95% CI: 1.43~5.02, *p*=.002) or had babies with atopic dermatitis were more likely to initiate breastfeeding (OR=2.40, 95% CI: 1.16~4.99, *p*=.019). Rooming-in was found to be a factor associated with breastfeeding initiation in unemployed mothers (OR=2.67, 95% CI: 1.25~5.74, *p*=.012), but not a factor in employed mothers.

The factors that were consistently associated with breastfeeding continuation to 1, 6 and 12 months were found to be mother's employment status and breastfeeding experience during hospital stay. Employed mothers were less likely to continue breastfeeding to 1 month (OR=0.61,

**Table 2.** Adjusted Odds Ratios and Confidence Intervals for Breastfeeding Initiation by Multivariate Logistic Analysis*

| Variables | Categories | Total (*N*=1,031) | | | Unemployed mothers (n=655) | | | Employed mothers (n=376) | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | OR | 95% CI | *p* | OR | 95% CI | *p* | OR | 95% CI | *p* |
| Mothers' employment status | Not employed<br>Employed | 1.00<br>1.00 | 0.59~1.70 | .989 | | | | | | |
| Rooming-in | No<br>Yes | 1.00<br>2.68 | 1.43~5.02 | .002 | 1.00<br>2.67 | 1.25~5.74 | .012 | 1.00<br>2.51 | 0.81~7.72 | .109 |
| Atopic dermatitis of infant | No<br>Yes | 1.00<br>2.40 | 1.16~4.99 | .019 | 1.00<br>2.37 | 0.96~5.84 | .060 | 1.00<br>2.23 | 0.62~7.98 | .217 |

*All the variables in Table 1 except breastfeeding during hospital stay were included in the analysis and mothers' employment status and the selected variables with significant association are presented.

**Table 3.** Adjusted Odds Ratios and Confidence Intervals for Breastfeeding Continuation by Multivariate Logistic Analysis*

| Month | Variables | Categories | Total | | | Unemployed mothers | | | Employed mothers | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | OR | 95% CI | *p* | OR | 95% CI | *p* | OR | 95% CI | *p* |
| 1 month | Mothers' employment status | Unemployed<br>Employed | 1.00<br>0.61 | 0.45~0.83 | .001 | | | | | | |
| | BF during hospital stay | No<br>Yes | 1.00<br>1.62 | 1.14~2.30 | .007 | 1.00<br>2.10 | 1.35~3.28 | .001 | 1.00<br>1.08 | 0.61~1.93 | .795 |
| 6 month | Mothers' employment status | Unemployed<br>Employed | 1.00<br>0.33 | 0.23~0.46 | <.001 | | | | | | |
| | BF during hospital stay | No<br>Yes | 1.00<br>1.77 | 1.18~2.64 | .006 | 1.00<br>1.83 | 1.07~3.12 | .026 | 1.00<br>1.75 | 0.93~3.28 | .083 |
| | BF knowledge | | 1.13 | 1.03~1.23 | .010 | 1.19 | 1.06~1.34 | .004 | 1.04 | 0.91~1.20 | .564 |
| | Atopic dermatitis of infant | No<br>Yes | 1.00<br>1.54 | 1.04~2.28 | .031 | 1.00<br>1.55 | 0.92~2.61 | .100 | 1.00<br>1.41 | 0.76~2.64 | .276 |
| 12 month | Mothers' employment status | Unemployed<br>Employed | 1.00<br>0.28 | 0.18~0.43 | <.001 | | | | | | |
| | BF during hospital stay | No<br>Yes | 1.00<br>1.97 | 1.15~3.37 | .014 | 1.00<br>2.25 | 1.14~4.46 | .020 | 1.00<br>1.75 | 0.70~4.34 | .231 |
| | BF education experience | No<br>Yes | 1.00<br>1.36 | 0.87~2.14 | .178 | 1.00<br>1.02 | 0.56~1.86 | .951 | 1.00<br>2.43 | 1.14~5.14 | .021 |
| | Atopic dermatitis of infant | No<br>Yes | 1.00<br>2.44 | 1.45~4.12 | <.001 | 1.00<br>2.99 | 1.44~6.22 | .003 | 1.00<br>1.78 | 0.78~4.07 | .174 |

*All the variables in Table 1 were included in the analysis and the variables with significant association are presented; BF=Breastfeeding.

95% CI: 0.45~0.83 $p$=.001), 6 months (OR=0.33, 95% CI: 0.23~0.46, $p$<.001), and 12 months (OR=0.28, 95% CI: 0.18~0.43, $p$<.001). Women who had breastfed during the hospital stay were more likely to continue breastfeeding to 1 month (OR=1.62, 95% CI: 1.14~2.30, $p$=.007), 6 months (OR=1.77, 95% CI: 0.18~2.64, $p$=.006), and 12 months (OR=1.97, 95% CI: 1.15~3.37, $p$=.014).

Unemployed mothers were more likely to continue breastfeeding when they breastfed during the hospital stay at all the three time points. Having higher knowledge scores (OR=1.19, 95% CI: 1.06~1.34, $p$=.004) and having an infant with atopic dermatitis (OR=2.99, 95% CI: 1.44~6.22, $p$=.003) were also associated with breastfeeding continuation to 6 months and 12 months, respectively for unemployed mothers, while receiving education on breastfeeding (OR=2.43, 95% CI: 1.14~5.14, $p$=.021) was associated with a 12-month continuation for employed mothers.

## DISCUSSION

The results of this study demonstrate that maternal employment is the strongest barrier to breastfeeding continuation, but not for initiation. This result indicates that many working mothers start breastfeeding, but continuation is difficult after returning to work. This result is consistent with the findings of other studies[15,16]. With the increasing numbers of mothers in the workforce, it is important to create baby-friendly workplace environments so that mothers can continue to breastfeed.

Some studies have shown that maternity leave or a friendly working environment are important factors in the initiation and continuation of


http://dx.doi.org/10.4040/jkan.2015.45.2.306

breastfeeding for employed women[12,16-19]. In Korea, 12-week maternity leave is provided, but in 2014, only 31 workplaces were designated as "baby-friendly workplaces" by the WHO and UNICEF. This implies that employers generally may not care about creating working environments suitable for breastfeeding even though the employment rate of married women has been increasing.

Many women fail to continue breastfeeding at the first month postpartum. Participants in this study had difficulties in breastfeeding due to insufficient milk supply, ineffective positioning and latch-on, engorged breasts, and these reasons were similar to those found in previous studies[9,15,20]. The 2011 Surgeon General's Call to Action to Support Breastfeeding identified numerous barriers to breastfeeding, including a lack of knowledge, lactation problems, poor family and social support, and inappropriate care received from health professionals[21]. Lisien et al.[9] emphasized the role of nursing personnel in providing women with methods of breast milk production and secretion, and reminding their families to give assistance and support. Postpartum breastfeeding education during hospital stay and telephone counseling from a nurse after discharge for four times during the first month were more effective to promote breastfeeding continuation at 6 months than was postpartum education alone[22]. Therefore, in order to overcome the barriers to breastfeeding from the start, both breastfeeding education and supportive care from healthcare professionals are critically important. For the working mothers, education proved to be effective for initiating and continuing breastfeeding, hence advertisement for facilitation of pre- and postpartum education is deemed important to increase the mothers' participation in the educational classes. Breastfeeding education programs should also be offered in a variety of settings such as in schools and public health agencies, as well as in hospitals, to allow women to obtain accurate and practical information regarding breastfeeding.

Not only that, for the mothers who do not work, the result showed that rooming-in is a factor that influenced breastfeeding initiation. Therefore, health professionals in the hospital should promote change to provide rooming-in for every mother at a reasonable price and thus support breastfeeding. Such change should not be limited to certain rooms in the maternity wards, but to every room. Mothers should be able to choose rooming-in without any financial pressure, which is the case due to the price that usually demanded for rooming-in rooms. Such changes will have to include concerns about room organization within the ward, so that rooming-in will no longer be an individual room with high prices, but a communal facility to which everyone could have access.

Rooming-in is practically helpful for breastfeeding initiation because it allows mothers to feed their babies on demand. Although 79.2% of the participants breastfed during the hospital stay after delivery, only 34.8% of the mothers stayed in the same room as their infants (Table 1). Rooming-in was associated with initiation, but breastfeeding during the hospital stay was the more significant determinant of longer continuation than rooming-in. Therefore, hospitals can profoundly influence mothers to breastfeed by establishing effective breastfeeding behaviors during the hospital stay. Healthcare professionals including nurses should educate and support the benefits of mothers' rooming in with their babies from delivery until discharge. Also, normal postpartum mothers with normal babies should stay together in the same room day and night, except for periods of up to an hour for hospital procedures. It should start no later than one hour after normal vaginal deliveries. In many hospitals in Korea, newborns are kept in nurseries after delivery. When considering rooming-in vs. nursery care, the results indicate that hospitals should encourage mothers and babies to enjoy rooming-in.

More than 20,000 hospitals in 156 countries have been designated by the WHO and UNICEF as "baby-friendly hospitals" as they adhere to the "ten steps to successful breastfeeding" that include rooming-in and initiation of breastfeeding within a half hour after birth[23]. However by 2014, only 32 hospitals in Korea were designated as "baby-friendly hospitals". In order to promote breastfeeding initiation and continuation, health care professionals should recognize the impact of breastfeeding behaviors during the hospital stay and should make every effort to follow the guidelines of the WHO and UNICEF.

Mothers who had infants with atopic dermatitis were more likely to continue breastfeeding for a longer period of time. There has been considerable controversy with respect to the effects of breastfeeding on preventing or developing atopic dermatitis[24-26]. The cause-and-effect relationship between breastfeeding practice and atopic dermatitis was not clear in this study. As breastfeeding is recommended for infants who have a family history of atopic diseases, mothers who knew that their infants had or were at risk of atopic diseases were more likely to breastfeed.

Many researchers have shown that maternal age is associated with the initiation and continuation of breastfeeding, and that women aged older than 25 years are more likely to initiate or to continue breastfeeding than younger women[13,27]. However, in our sample with the exception of 12 mothers all the women were 25 years old or older. This age distribution may be the reason why there were no differences in breastfeeding practice with respect to age. While a higher educational level of the mother

has been shown to be positively associated with breastfeeding initiation and continuation in developed countries, an inverse relationship was found in developing countries[23,28,29]. Korean women who were college graduates or had a higher educational level were reported to have significantly lower breastfeeding rates compared to women with a lower educational status [14]. In this study, however, there were no differences in initiation and continuation of breastfeeding with respect to educational status, showing that such a trend might be changing since a low breastfeeding rate has been a public health concern and efforts to enhance breastfeeding rates have been made by many organizations and public health agencies during the last decade in Korea. In our study, receiving breastfeeding education or higher breastfeeding knowledge scores were found to be more important factors than mother's educational level to continue breastfeeding.

The first limitation may be a sampling bias. We recruited the women from one popular internet site that provides information on infants. Therefore, our population was limited to internet users. However, it is not of great concern because 99.7%, and 98.8% of Korean adults aged 20~29 years and 30~39 years, respectively, were reported to use the internet in 2009[30]. Another limitation was a low response rate which is common for internet recruitment. It may be difficult to convince mothers who received the email explaining the study to voluntarily visit the website in order to participate in the research. Electronic mail has become a large part of the communication system that we endorse; hence this survey method deserves special attention. In particular, the basic ethical issues discussed should be duly considered by researchers. Even though e-mail surveys tend to have greater response rates, researchers still do not fully grasp the data as who responded is not necessarily known. This issue challenges the external validity of the study. An electronic response is never truly anonymous, however, as researchers know the respondents' e-mail addresses. Not only that, the research and scientific integrity itself must be consciously considered.

The other limitation was that the breastfeeding rate was calculated from cross-sectional data, so the rate could be different in a longitudinal study, and also our data do not allow for conclusions on causal relationships.

Despite these limitations, as far as we understand, this is the first large study that has examined the potential factors associated with the initiation and continuation of breastfeeding in Korean mothers for 6 and 12 months postpartum in relation to the employed status of the mothers. In order to increase the breastfeeding rate of Korean women, intervention programs and policies should be developed to practically support women and promote breastfeeding in hospitals and in workplaces.

## CONCLUSION

Breastfeeding initiation rates were similar regardless of the employment status of the mothers. The continuation rates decreased for both groups of mothers, but they were significantly lower among employed mothers at 1, 6 and 12 months. Mothers who were able to keep their babies in the same room during the hospital stay were more likely to initiate breastfeeding. Breastfeeding practice during the hospital stay was consistently associated with breastfeeding continuation at 1, 6 and 12 months among unemployed mothers. Having higher knowledge scores and having an infant with atopic dermatitis were also associated with breastfeeding continuation for unemployed mothers, and receiving education on breastfeeding was associated with a longer continuation for employed mothers.

The results of this study reinforce the significant roles that hospitals play in placing infants with their mothers in the same room and helping the mothers feed breast milk during the hospital stay after delivery to facilitate breastfeeding initiation and continuation. Breastfeeding education is also found to be essential to prolong the continuation of breastfeeding. Therefore, supports in baby-friendly hospitals and workplaces can be effective strategies to increase the proportion of women who initiate and continue breastfeeding. In addition, as data on the types of maternal jobs, timing of return to work, time of rooming-in, and breastfeeding practices during the hospital stay were not collected in this study, further research to determine factors associated with initiation and continuation considering those various factors is needed.

## REFERENCES

1. Ip S, Chung M, Raman G, Chew P, Magula N, DeVine D, et al. Breastfeeding and maternal and infant health outcomes in developed countries. Evidence Report Technology Assessment. 2007;153:1-186.
2. U.S. Department of Health & Human Services. The surgeon general's call to action to support breastfeeding [Internet]. Washington, DC: Author; 2011 [cited 2014 April 15]. Available from: http://www.surgeongeneral.gov/library/calls/breastfeeding/.
3. World Health Organization. Global strategy for infant and young child feeding [Internet]. Geneva, CH: Author; 2003 [cited 2014 March 15]. Available from: http://whqlibdoc.who.int/publications/2003/9241562218.pdf.
4. Kim SG, Kim YK, Kim HR, Park JS, Son CK, Choi YJ, et al. The 2012 national survey on fertility, family health & welfare in Korea. Seoul: Korea Institute for Health and Social Affairs, 2012. Report No.: Research

 http://dx.doi.org/10.4040/jkan.2015.45.2.306

Report 2012-54.
5. Shin YS, Jeong HS, Lim WS, Jeong JY. The vision and policy direction of Korea's health care 2020: The activity report of the future health care committe. Seoul: Ministry of Health & Welfare, 2011. Report No.: Policy Paper 2011-91.
6. Al-Sahab B, Lanes A, Feldman M, Tamim H. Prevalence and predictors of 6-month exclusive breastfeeding among Canadian women: A national survey. BMC Pediatrics. 2010;10:20. http://dx.doi.org/10.1186/1471-2431-10-20
7. Meedya S, Fahy K, Kable A. Factors that positively influence breastfeeding duration to 6 months: A literature review. Women and Birth. 2010;23(4):135-145. http://dx.doi.org/10.1016/j.wombi.2010.02.002
8. Bai Y, Wunderlich SM, Fly AD. Predicting intentions to continue exclusive breastfeeding for 6 months: A comparison among racial/ethnic groups. Maternal and Child Health Journal. 2011;15(8):1257-1264. http://dx.doi.org/10.1007/s10995-010-0703-7
9. Lisien CF, Fu JC, Long CY, Lin HS. Factors influencing breast symptoms in breastfeeding women after cesarean section delivery. Asian Nursing Research. 2011;5(2):88-98. http://dx.doi.org/10.1016/s1976-1317(11)60017-0
10. Abuidhail J, Al-Modallal H, Yousif R, Almresi N. Exclusive breast feeding (EBF) in Jordan: Prevalence, duration, practices, and barriers. Midwifery. 2014;30(3):331-337. http://dx.doi.org/10.1016/j.midw.2013.01.005
11. Yngve A, Sjöström M. Breastfeeding determinants and a suggested framework for action in Europe. Public Health Nutrition. 2001;4(2B): 729-739.
12. Chuang CH, Chang PJ, Chen YC, Hsieh WS, Hurng BS, Lin SJ, et al. Maternal return to work and breastfeeding: A population-based cohort study. International Journal of Nursing Studies. 2010;47(4):461-474. http://dx.doi.org/10.1016/j.ijnurstu.2009.09.003
13. Dennis CL. Breastfeeding initiation and duration: A 1990-2000 literature review. Journal of Obstetric Gynecologic and Neonatal Nursing. 2002;31(1):12-32.
14. Kim KN, Hyun T, Kang NM. A survey on the feeding practices of women for the development of a breastfeeding education program: Breastfeeding knowledge and breastfeeding rates. Korean Journal of Community Nutrition. 2002;7(3):345-353.
15. Xu F, Qiu L, Binns CW, Liu X. Breastfeeding in China: A review. International Breastfeeding Journal. 2009;4:6. http://dx.doi.org/10.1186/1746-4358-4-6
16. Visness CM, Kennedy KI. Maternal employment and breast-feeding: Findings from the 1988 national maternal and infant health survey. American Journal of Public Health. 1997;87(6):945-950.
17. Chen YC, Wu YC, Chie WC. Effects of work-related factors on the breastfeeding behavior of working mothers in a Taiwanese semiconductor manufacturer: A cross-sectional survey. BMC Public Health. 2006;6:160. http://dx.doi.org/10.1186/1471-2458-6-160
18. Kimbro RT. On-the-job moms: Work and breastfeeding initiation and duration for a sample of low-income women. Maternal and Child Health Journal. 2006;10(1):19-26. http://dx.doi.org/10.1007/s10995-005-0058-7
19. Skafida V. Juggling work and motherhood: The impact of employment and maternity leave on breastfeeding duration: A survival analysis on growing up in Scotland data. Maternal and Child Health Journal. 2012;16(2):519-527. http://dx.doi.org/10.1007/s10995-011-0743-7
20. Avery M, Duckett L, Dodgson J, Savik K, Henly SJ. Factors associated with very early weaning among primiparas intending to breastfeed. Maternal and Child Health Journal. 1998;2(3):167-179.
21. Jang GJ, Kim SH. Effects of breast-feeding education and support services on breast-feeding rates and infant's growth. Journal of Korean Academy of Nursing. 2010;40(2):277-286. http://dx.doi.org/10.4040/jkan.2010.40.2.277
22. Pound CM, Unger SL. The baby-friendly initiative: Protecting, promoting and supporting breastfeeding. Paediatrics & Child Health. 2012; 17(6):317-327.
23. Li R, Ogden C, Ballew C, Gillespie C, Grummer-Strawn L. Prevalence of exclusive breastfeeding among US infants: The third national health and nutrition examination survey (Phase II, 1991-1994). American Journal of Public Health. 2002;92(7):1107-1110.
24. Gdalevich M, Mimouni D, David M, Mimouni M. Breast-feeding and the onset of atopic dermatitis in childhood: A systematic review and meta-analysis of prospective studies. Journal of the American Academy of Dermatology. 2001;45(4):520-527. http://dx.doi.org/10.1067/mjd.2001.114741
25. Kusunoki T, Morimoto T, Nishikomori R, Yasumi T, Heike T, Mukaida K, et al. Breastfeeding and the prevalence of allergic diseases in schoolchildren: Does reverse causation matter? Pediatric Allergy and Immunology. 2010;21(1 Pt 1):60-66. http://dx.doi.org/10.1111/j.1399-3038.2009.00982.x
26. Mišak Z. Infant nutrition and allergy. The Proceedings of the Nutrition Society. 2011;70(4):465-471. http://dx.doi.org/10.1017/s0029665111003089
27. Kehler HL, Chaput KH, Tough SC. Risk factors for cessation of breastfeeding prior to six months postpartum among a community sample of women in Calgary, Alberta. Canadian Journal of Public Health. 2009; 100(5):376-380.
28. Khassawneh M, Khader Y, Amarin Z, Alkafajei A. Knowledge, attitude and practice of breastfeeding in the north of Jordan: A cross-sectional study. International Breastfeeding Journal. 2006;1:17. http://dx.doi.org/10.1186/1746-4358-1-17
29. Senarath U, Dibley MJ, Agho KE. Breastfeeding practices and associated factors among children under 24 months of age in Timor-Leste. European Journal of Clinical Nutrition. 2007;61(3):387-397. http://dx.doi.org/10.1038/sj.ejcn.1602536
30. Korea Internet & Security Agency. 2009 survey on the internet usage executive summary [Internet]. Seoul: Author; 2010 [cited 2014 April 20]. Available from: http://www.kisa.or.kr/eng/usefulreport/isr.jsp.