Factors Influencing Exclusive Breastfeeding among Urban Employed Mothers: A Case-Control Study

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Abstract : Promoting exclusive breastfeeding among urban employed mothers is a complex phenomenon. Understanding the multiple level factors related to this and how they influence employed mothers' regarding exclusive breastfeeding could help identify strategies to support mothers continuing exclusive breastfeeding. This study aimed to identify maternal, social, and workplace level factors and the interaction effects among those factors that influence exclusive breastfeeding for six months among urban employed mothers. This case-control study investigated among 57 cases (exclusive breastfeeding for six months) and 228 controls (non-exclusive breastfeeding for six months) in six purposively-selected hospital settings in Bangkok, Thailand between September 2015 and June 2016. Data were collected through six self-administered questionnaires; Demographic Questionnaire, Iowa Infant Feeding Attitude Scale, Perceived Self-efficacy in Breastfeeding Questionnaire, Breastfeeding Knowledge Questionnaire, Perceived Breastfeeding Support Assessment Tool, and Infant Feeding Form, and were analyzed by descriptive statistics, univariate and multivariate logistic regression.

The results revealed that maternal factors (family income, attitudes, intention, confidence, and knowledge) and workplace factors (maternity leave and working times) co-predicted exclusive breastfeeding six months. In the interaction effect model, the interaction effect between workplace policy on maternity leave and attitudes toward breastfeeding also exerted significant influence. The findings suggest that multiple level interventions to promote exclusive breastfeeding in employed women are needed. In clinical practice, nurses and midwives should implement antepartum interventions including assessment of maternal attitudes and intentions to breastfeed, providing breastfeeding knowledge to increase mothers' confidence, and advice about planning to combine breastfeeding and employment. Of great concern was a finding that more than 75% of the non-EBF mothers reported not having sufficient breastfeeding facility support in the workplace. Workplace policies should be reviewed in terms of sufficient paid maternity leave, workplace breastfeeding support, and an appropriate number of working hours, and this has implications for governments and multiple workplaces across the country. Nurses have a significant role to play in advocating for and contributing to such policies to increase the numbers of women successfully breastfeeding longer whilst employed.

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Introduction

Exclusive breastfeeding (EBF) reduces child mortality and morbidity in addition to promoting child development.[1, 2] The child health benefits of breastfeeding depend on the duration of exclusive breastfeeding.[2] Therefore, the United Nations Children's

Fund/World Health Organization/ (UNICEF/WHO) recommends mothers to breastfeed their children exclusively for six months with a target of getting at least 50% of mothers doing this by 2025.[3] However, only 41% worldwide and 23.1% of Thai mothers provide EBF for six months.[4] Returning to work is a significant obstacle for mothers in continuing their EBF,[5-7] particularly among employed full-time mothers who reside in urban areas.[8] Employed mothers practicing EBF for six months was only 0-20%.[8, 9]

Research evidence has demonstrated that EBF is influenced by numerous factors, including maternal, social and workplace level factors.[6, 7, 10, 11] Studies reveal that positive maternal characteristics such as positive breastfeeding attitudes and intention to breastfeed are associated with EBF for six months.[5,6,12] Social support from health professionals and family members, particularly husband and peer support, enables mothers to continue breastfeeding,[5,6,7,12] while workplace factors can be either barriers to or enablers of breastfeeding.[12] Workplace facilities and supportive work environments, such as flexibility of work and support from supervisors, can diminish stress related to breastfeeding and increase breastfeeding duration, while early return to work at 10 weeks postpartum is significantly related to breastfeeding discontinuation.[5, 7, 12]

The Ecological Model explains the relationship between people and their environment as it focuses on the influences of intrapersonal, interpersonal, community, organizational, and public policy level factors on health behaviors. It provides a comprehensive framework to explain health behaviors beyond the influence of single level factors and examine the interaction of multiple factors within the social environment.[13] EBF experience among employed mothers is complex and influenced by multiple factors, including maternal, social and workplace level factors.[6, 7, 10, 11, 14] For example, the qualitative study conducted by Sulaiman and colleagues[15] revealed that time of return to work influenced exclusive breastfeeding with different impact on different mothers, depending on maternal attitudes, confidence and intention to breastfeed.

To date, research focusing on EBF predictors among employed mothers remains limited. The majority of previous studies investigated the associations within one level of factors and were more likely to focus on the influences of workplace factors, e.g. work characteristics, breastfeeding facilities, flexibility at work, maternity leave length and number of working hours.[7, 10, 16, 17] EBF practice needs to be understood beyond the influence of each single factor and importantly investigate the interaction of multiple factors.

Review of Literature

Over the past two decades, mothers worldwide practicing EBF for six months have slowly increased from 38% in 1995 to 41% in 2018, with the lowest percentage (22%) in the East Asia-Pacific region (EAPr).[4] Among employed mothers, the practice of EBF for six months is very low, below 20%,[8, 9] and presents as 3-5 times lower than in non-employed mothers.[6, 18] Regarding female participation in the labor force, the EAPr and sub-Saharan regions were the first two regions having the highest proportion of females in the labor force.[19] However, EAPr was the lowest in providing maternity protection, including the length of maternity leave and cash benefits during this, as well as government organizations who are responsible for cash benefits.[20]

To protect employed mothers, the International Labour Organization (ILO) recommends that all nations provide a minimum of 14 weeks of maternity leave and pay two-thirds of past earnings during maternity leave through government funding.[20] In Thailand, maternity protection is not up to compliance with these recommendations. Thai mothers are provided with no more than 90 days of maternity leave, and not all employers comply with breastfeeding support policy for employed mothers.[20] Less paid maternity leave is found, especially among private employment.

In urban areas, mothers tend to work in the services sector and formal employment at small and medium enterprises (SMEs).[21] In addition, compared with very large sized companies, compliance with maternity leave laws, provision of flexible work schedules and breastfeeding amenities, as well as replacement of lactating mothers, are more difficult to find among SMEs.[22] Due to the limited maternity protection policy, privately employed mothers may return to work before 90 days and discontinue breastfeeding.

The Ecological Model[23] was used to guide this study. This model theoretically explains the relationships among multiple factors at the intrapersonal, interpersonal, organizational and policy levels and their influence on health behavior.[13] The Ecological Model of health behaviors consist of the five core principles: (1) multiple levels of influence on health behaviors; (2) environmental contexts as significant determinants of health behaviors; (3) interactions across levels influences on health behaviors; (4) that ecological models should be behavior-specific; and (5) effective interventions should be at multilevels.[13] EBF among employed mothers is a complex behavior and is, therefore, influenced by not only the factors in each level but the interaction among multiple levels of factors.[14, 15] Intrapersonal level factors influencing EBF are maternal characteristics (age, education, family income) and cognitive factors (knowledge about breastfeeding, attitudes, confidence and intention to breastfeed).[6, 7, 15, 18] Evidence indicates that each of these maternal factors can directly influence the initiation and duration of EBF.[6, 7, 15, 17, 18] High rates of EBF are associated with higher incomes, education, and maternal age.[5] Moreover, findings from prior research suggest that breastfeeding practice is influenced by social cognitive factors such as breastfeeding attitudes, knowledge, and confidence, as well as intention to breastfeed.[5, 6, 9, 14, 15] Mothers who have positive breastfeeding attitudes, good breastfeeding knowledge, high breastfeeding confidence and intention to EBF are more likely to EBF for six months and breastfeeding for a longer duration.[5, 6, 9, 14, 15] EBF mothers tend to agree that breastfeeding is more convenient than formula feeding, and breastfed infants are healthier than those with non-EBF.[9, 24] Regarding breastfeeding knowledge, mothers who understand breastfeeding benefits to health tend to EBF.[15, 24] On the other hand, lack of practical knowledge such as proper latching and managing breastfeeding difficulties can lead them to discontinue breastfeeding.[6, 15] The findings also suggest that mothers with lower levels of breastfeeding confidence or intention to EBF are more likely to discontinue breastfeeding before six months.[15, 18, 25] Nevertheless, the influences of attitudes, knowledge, confidence, and intention to EBF among employed mothers have been investigated less.[9]

The interpersonal level factors focus on social support systems such as family and health care providers.[6, 7, 11] Social norm, social support and family support can influence breastfeeding intention and practice.[5] Studies have shown that breastfeeding support from both family and health care providers affects mothers' decisions to initiate and continue breastfeeding.[6, 7, 18, 26] Having family support as well as receiving antenatal care or professional support enable mothers to continue EBF.[5] Regarding professional support, the interventions of breastfeeding education benefits, practicing breast milk expression, periodic follow-up and counseling significantly increase EBF practices by 15%-40%.[27, 28] However, the interventions seem to be more effective where the maternity protection as the International Labor Organization's recommendation exists[28] but less effective where less protection is provided.[27] The differences in effect size might also be influenced by workplace factors.

Organizational factors refer to workplace factors, including work characteristics, maternity leave length, flexibility at work, emotional support, informational support, and breastfeeding facilities.[14, 16] Maternal employment and return to work have been found to be the most frequently reported barriers to EBF.[5] A number of studies focusing on employed mothers

have expanded the scope to find the influences of workplace factors on breastfeeding practices such as employment status, job characteristics, working hours, maternity leave length and breastfeeding support in the workplace.[6-8, 17, 18] The results indicate that more breastfeeding practices have been found among those who are employed as part-time, professional, informal or self-employed workers.[7, 8] Furthermore, mothers who return to work before 12 weeks are at the highest risk for cessation of breastfeeding.[17] Regarding number of working hours, mothers who work for longer hours (≥ 20 hours per week) and return to work before six months are significantly less likely to practice breastfeeding for six months than mothers who do not return to work. It has also been found that working ≤19 hours per week is associated with breastfeeding continuation, regardless of the timing of return to work.[17] For mothers who return to work, breastfeeding support from family and workplace includes flexibility in work schedules and access to breastfeeding facilities, both of which significantly influence breastfeeding duration.[11, 14]

Many of the previous studies have some limitations since most examined single level factors, while other research has investigated the interaction effects among factors, but focused on single level factors, particularly workplace level factors such as associations between the hours of work and timing of return to work.[17] Moreover, the influence of work environment and nature of work on EBF practice depends on maternal attitudes and intention about breastfeeding.[14] Mothers who have a strong belief that breastfeeding is better than formula feeding tend to EBF their babies for six months and do not rely on workplace facility support, while mothers who have ambivalent attitudes towards EBF have to rely on workplace facilities.[14] When these mothers experience any difficulties such as deficit of space and time for milk expression, they may decide to discontinue breastfeeding.[14] The findings suggest that these multiple factors may interact within each level or with different level to influence EBF.[14]

However, there is little research assessing the interaction effect of these multiple level factors influencing EBF for six months, especially in full-time urban employed mothers in Thailand. Therefore, the aim of this study was to investigate the predictability of education level, family income, attitudes, knowledge, confidence, intention, health professional support, family support, workplace policy on maternity leave, access to facilities, flexibility, information support, and emotional support as well as the interaction effect among these factors to predict EBF for six months among urban employed mothers.

Methods

Design: A retrospective case-control design was used.

Sample and Setting: The study was conducted September 2015-June 2016 in Bangkok, Thailand. Inclusion criteria were full-time employed mothers with singleton birth children aged between 6-18 months, living with their children, and who provided breastfeeding during the first six months. Children aged 6-18 months were selected due to the low prevalence of EBF for six months in Thai urban employed mothers (2%).[29] Exclusion criteria were a mother with multiple births, and stopping breastfeeding before one-month postpartum due to illnesses contradicted to breastfeeding in both mother and infant. As breast milk is normally established within one month, and this study aimed to investigate influencing factors related to their employment explicitly rather than their illnesses that are significant causes of breastfeeding discontinuation in the early postpartum period.

The sample size was estimated with the method of Kelsey,[30] considering a Type I error of 5%, a power of 80%, a ratio of 1:4 for cases and controls, an odds ratio of three and exposure to job-flexibility (0.35 in cases and 0.17 in controls).[31] The sample size required 57 cases (EBF for six months;

EBF 6 M) and 228 controls (non-EBF for six months; non-EBF 6 M).

Multi-stage purposive sampling was employed to recruit potential participants using the following steps: First, approximately 30% of hospitals from all four organizations affiliated with public hospitals in Bangkok (i.e., Bangkok Metropolitan, Ministry of Public Health [MOPH], Ministry of Defense [MOD], and Ministry of Education[MOE]) were purposively selected based on the proportion of hospitals in each organization. Upon consideration the number of employed mothers who breastfed exclusively for six months was low (2%).[29] Hospitals were purposively selected based on high numbers of children receiving vaccinations in pediatric outpatient departments affiliated with all four of the above organizations. Six hospitals participated in the study, including one MOE hospital, one MOPH hospital, one MOD hospital, and three Bangkok Metropolitan hospitals, as shown in **Figure 1.**

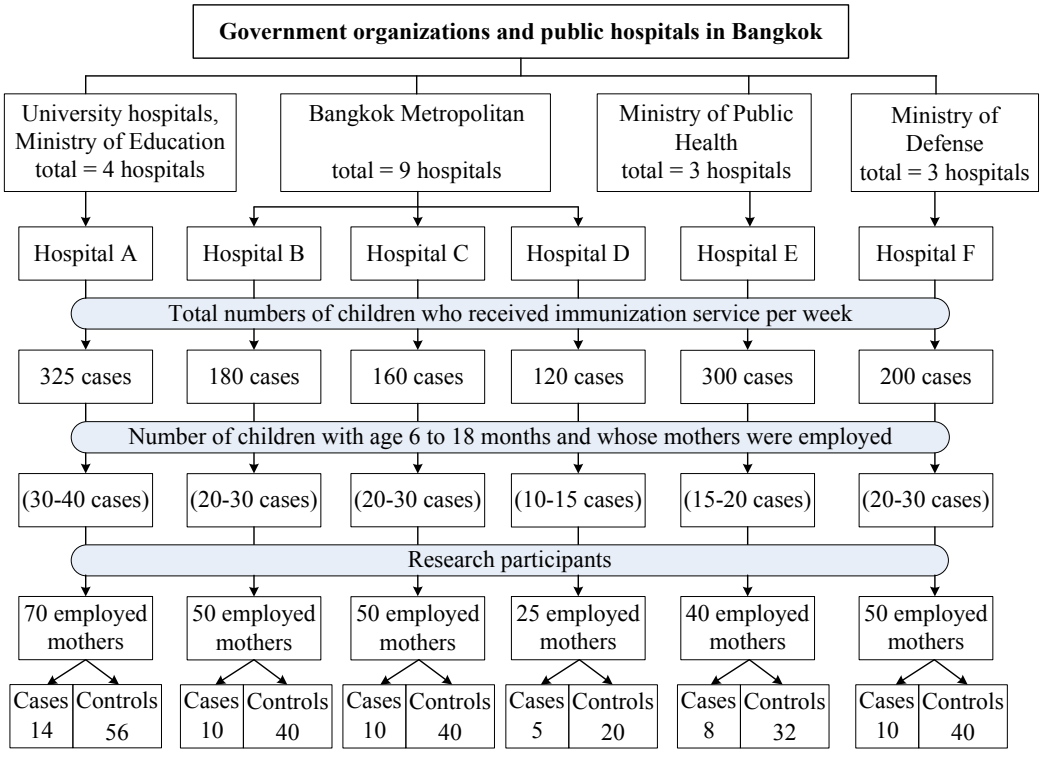

Figure 1 - Research settings and number of research participants.

Ethical Considerations

This study obtained ethical approval from the ethical committee, Faculty of Siriraj Hospital, Mahidol University, Bangkok, Thailand, (SI507/2015). All potential participants received written and verbal explanations about the study purposes, data collection procedures, the right to refuse to participate and withdraw from the study at any time without consequences, and confidentiality issues. Data collection was conducted after signed informed consent forms had been obtained from all participants.

Instruments

Data were collected with the six instruments: Demographic Questionnaire; Breastfeeding Knowledge Questionnaire (BKQ); Iowa Infant Feeding Attitude Scale (IIFAS); Perceived Self-efficacy in Breastfeeding Questionnaire (PSBQ); Perceive Breastfeeding Support Assessment Tool (PBSAT) and Infant Feeding Form. With the authors' permission, the IIFAS and PBSAT were translated into Thai by the primary investigator (PI) and a co-researcher. Then, these instruments were blind back-translated into English for translation accuracy by a bilingual expert using the technique suggested by Maneesriwongkul and Dixon (2004).[32] The quality of all six instruments was reviewed by three breastfeeding experts (one pediatric nursing instructor and two obstetric nursing instructors). Examples of items, Content validity index and Cronbach alpha reliability are shown in **Table 1**.

Table 1 – Item examples, content validity index, and Cronbach alpha reliability of measurements

	CVI	KR-20	Cronbach alpha reliability		Example item
		Pilot Study*	Pilot study*	Actual study	
Demographic Questionnaire					Intention: During the prenatal period, what kind of feeding choice did you plan to provide for your baby during the first six months postpartum? Information support: Did you receive any breastfeeding information from your boss or supervisor?
BKQ	1.00	0.84			Expressing breast milk at least 2-3 times during working hours will help maintain breast milk production.
IIFAS	1.00		0.73	0.76	Breast-feeding is more convenient than formula feeding.
PSBQ	0.93		0.94	0.85	I am sure that I can handle any problem occurring with breastfeeding and continue my breastfeeding.
PBSAT	0.91		0.87	0.62	Does your work permit you to avail break to breastfeed baby or pump breast milk during working hours?
Infant feeding Form					How long did you feed your child with only breast milk?"

BKQ = The Breastfeeding Knowledge Questionnaire

IIFAS = The Iowa Infant Feeding Attitude Scale

PSBQ = The Perceived Self-efficacy in Breastfeeding Questionnaire

PBSAT = The Perceived Breastfeeding Support Assessment Tool

CVI = Content validity index; KR-20 = the Kuder-Richardson reliability

* = A pilot study was conducted among 30 employed mothers to examine the instruments' quality.

The Demographic Questionnaire was developed by the PI and consisted of 15 items to obtain information on: 1) age, education level, family income, occupation, working days and hours, maternity leave, child's age, child's birth order, breastfeeding experience, family type, children's caregivers, breastfeeding supporter in family and source of breastfeeding knowledge; 2) breastfeeding intention and 3) information support.

The Breastfeeding Knowledge Questionnaire (BKQ) was developed by the PI based on a literature review due to limited appropriate tools for breastfeeding knowledge for employed mothers. The BKQ is a 12-item questionnaire used to assess maternal breastfeeding knowledge on four aspects, namely, breastfeeding benefits, exclusive breastfeeding, breastfeeding management, and maternity leave entitlements. Possible responses are incorrect (0) or correct (1). Total scores range from 0 to 12, and higher scores indicate higher breastfeeding knowledge.

The Iowa Infant Feeding Attitude Scale (IIFAS) was developed by De La Mora and colleagues (1999)[33] to assess maternal breastfeeding attitudes. The IIFAS contains 17 items, with 5-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree). Total scores range from 17-85, with higher scores indicating more positive breastfeeding attitudes.

The Perceived Self-efficacy in Breastfeeding Questionnaire (PSBQ) was developed by Poungkaew (2005).[34] This consists of 23 items assessing breastfeeding confidence in managing breastfeed, as well as combining breastfeeding and work. The responses to each item rank on 10-point scales ranging from 0-100%. The 0-% level indicates no confidence, and the 100-% level indicates definite confidence.

The Perceived Breastfeeding Support Assessment Tool (PBSAT) was developed by Hirani and colleagues (2012).[35] It consists of 27 questions assessing health professional support, family support, emotional support, flexibility at work, workplace policy on maternity leave, and breastfeeding facilities. With the authors' permission, the PBSAT was slightly modified to increase convenience in responding. The four groups of response were modified to the following three groups: (1) 4-point Likert scales: 1 (strongly disagree) to 4 (strongly agree) (2) four possible responses as: Yes, and I can use it; Yes, but I cannot use it; I do not know; and No; and (3) three possible responses: Yes; No; and I do not know. Total scores range from 7-28 points for health professional support; 8-32 points for family support and 5-20 points for emotional support. The higher the score, the higher the support. Flexibility at work, physical facilities and workplace policy on maternity leave are categorized into two groups including "Sufficient" for the responses, "Yes, and I can use it" and "Yes" and "Insufficient" for the responses, "Yes, but I cannot use it," "I do not know" or "No".

The Infant Feeding Form contains eight open-ended questions developed by the PI to obtain breastfeeding practices during the first six months postpartum. The outcome variable, EBF, was defined as the proportion of infants at six months of age who had been fed only breast milk and no other solids or liquids, with the exception of medications during the first six months postpartum.

Data Collection

Eligible mothers who had taken their children for immunizations at the pediatric outpatient departments of the six selected hospitals described above were asked by the PI about their interest to participate in the present study. The PI introduced herself to the interested mothers and described the research purposes, detail of data collection procedures, and human right protections. All participants completed the informed consent and self-administered questionnaires. The majority of the participants took approximately 30-40 minutes to complete the questionnaires.

Data Analysis

Data analysis were performed using the Statistical Package for the Social Sciences for Windows Program (SPSS/FW) (Version 18.0) and STATA (Version 10). Descriptive statistics was used to describe the participants' socio-demographic characteristics. Differences between the cases and controls were analyzed by using independent t-tests for differences in means and contingency tables with Pearson χ^2 tests or Fisher's exact test to assess the categorical variables. The cut-off points for attitudes and confidence variables were set at the standard scoring level (80% of the total scores). Furthermore, the average scores of other variables were likely to be high; and the cut-off points were set at the mean plus half of the upper bound of standard deviation ($\overline{x}$ + ½ S.D.) for all participants.[36] Therefore, the cut-off points of knowledge, emotional support, health professional support, family support were scores of 12, 16, 24, and 27 points, respectively.

Univariate logistic regression analysis was employed to examine the 13 factors potentially influencing EBF with significance set at .10. Also, four work characteristics (types of employment, maternity leave length, working times, and working closing 'days') were examined for potential influence on EBF. All potential influencing factors were entered into a multivariate logistic regression analysis to estimate the odds ratio(OR) and 95% confidence interval (95% CI) to determine the predictors of EBF among participants at a significance level of .05. Multivariate logistic regression analysis with the backward method was employed to estimate the direct effects among the potential factors (Model 1). Univariate logistic regression analysis was employed to calculate the odds ratio with 95% CI to estimate the interaction effect among the influencing and potentially influencing factors (family support) from Model 1. Next, each significant interaction effect was entered into the multivariate logistic regression analysis with the forward method to estimate the interaction effect of the model (Model 2).

Results

Of 321 employed mothers approached, 285 (88.78 %) agreed to participate in the study, so 285 were included in the main analysis, with 57 cases (EBF 6 M) and 228 controls (non-EBF 6 M). The mean age of cases was higher than that of the controls, but most participants were aged 20-34 years. The mean age of children was < 1 year in both groups. The mothers in the case group had fewer working hours and days than the mothers in the control group. Maternity leave length for the cases were significantly longer than those of the controls (**Table 2**). Univariate logistic regression analysis revealed factors associated with EBF for six months, including having bachelor degree level or higher education, family income >30,000 baht (US$865.55), positive attitudes toward breastfeeding, intention to provide EBF for six months, high breastfeeding knowledge, high breastfeeding confidence, available health professional support, sufficient family support, sufficient workplace policy on maternity leave, having access to workplace breastfeeding facilities, having work flexibility, available emotional support from employers and, working in government organizations, maternity leave lengths of more than three months, working 4-5 days per week and working no more than 42 hours per week (**Table 3**). In the sub-items analysis of the IIFAS and the BKQ, the findings indicated that the mothers in the non-EBF group had favorable attitudes toward formula feeding as it was more convenient and a better choice for employed mothers than breastfeeding, while offering health benefits equal to breastfeeding for their children. Furthermore, mothers with significantly lower scores on knowledge about breastfeeding benefits for a child's intelligence and storing and using expressed breast milk tended to lean toward formula feeding.

Table 2 - Percentage, mean and standard deviation of participants' characteristics

Characteristics	EBF 6 M	non-EBF 6 M	p-value
Age (years)	33.53 ± 3.36	31.81 ± 5.11	.003
Age Group			.535[ns]
20-34 years	35 (61.4)	150 (65.8)	
≥ 35 years	22 (38.6)	78 (34.2)	
Education Level	15.93 ± 1.46	14.23 ± 2.87	<.001
Family Income[a]	53,789.47 ± 21,525.51	42,190.79 ± 23,412.50	.001
Working Days (days/week)	5.21 ± 0.41	5.44 ± 0.59	.001
Working Times (hours/week)	42.21 ± 6.94	46.58 ± 11.17	<.001
Maternity Leave Entitlement (days)	87.63 ± 13.23	88.16 ± 9.78)	.737[ns]
Length of Maternity Leave (days)	89.82 ± 42.86	76.53 ± 24.07	.006
Child's Age (months)	11.53 ± 4.30	9.88 ± 4.14	.008
Child's Birth Order¥			.472[ns]
1	38 (66.7)	128 (56.1)	
2	16 (28.1)	79 (34.7)	
3 or more	3 (5.2)	21 (9.2)	
BF Experiences			.272[ns]
Yes	18 (31.6)	90 (39.5)	
No	39 (68.4)	138 (60.5)	
Family Type			.952[ns]
Single	22(38.6)	89(39.0)	
Extended	35(61.4)	139(61.0)	
Children's Caregivers[¥]			.150[ns]
Husband	7 (12.3)	17 (7.4)	
Grandmother	29 (50.9)	126 (55.3)	
Babysitter	3 (5.2)	30 (13.2)	
Day Care	5 (8.8)	8 (3.5)	
Other	13 (22.8)	47 (20.6)	
First BF Supporter in Family[¥]			.010
Husband	34 (59.7)	82 (36.0)	
Grandmothers	21 (36.8)	124 (54.4)	
Other	2 (3.5)	18 (7.9)	
Not receiving	0 (0.0)	4 (1.7)	
Source of BF Knowledge[¥]			.453[ns]
Nurses	30 (52.6)	120 (52.6)	
Others HCP	4 (7.0)	27 (11.8)	
Internet	21 (36.9)	66 (29.0)	
Other	2 (3.5)	15 (6.6)	

Note ns = No statistical significance; [¥] = Fisher's exact test; [a] US$1 = 34.66 Baht

EBF 6 M = employed mothers who provided exclusive breastfeeding for six months

non-EBF 6 M = employed mothers who provided exclusive breastfeeding for less than six months

Table 3 : Univariate logistic regression examining potential influencing factors associated with EBF for 6 months among participants.

Factors	EBF 6 M n(%)	non-EBF 6 M n(%)	OR	95%CI	p-value
Maternal Factors:					
Education Level					
Bachelor or Higher	49(86.0)	128(56.1)	4.78	2.17-10.56	<.001
High School or Lower#	8(14.0)	100(43.9)			
Family Income (baht per month)					
> 30,000 (US$865.55)[a]	50(87.7)	125(54.8)	5.89	2.56-13.54	<.001
≤ 30,000 (US$865.55)#	7(12.3)	103(45.2)			
Attitudes					
Positive	49(86.0)	92(40.4)	9.05	4.10-20.01	<.001
Negative#	8(14.0)	136(59.6)			
Intention					
EBF 6 months	56(98.2)	121(53.1)	49.52	6.74-363.87	<.001
EBF < 6 months#	1(1.8)	107(46.9)			
Confidence					
High	40(70.2)	72(31.6)	5.10	2.71-9.60	<.001
Low#	17(29.8)	156(68.4)			
Knowledge					
High	40(70.2)	75(32.9)	4.80	2.55-9.02	<.001
Low#	17(29.8)	153(67.1)			
Social Factors					
Health Professional Support					
Available	24(42.1)	62(27.2)	1.95	1.07-3.55	.030
Unavailable#	33(57.9)	166(72.8)			
Family Support					
Sufficient	36(63.2)	62(27.2)	4.59	2.49-8.47	<.001
Insufficient#	21(36.8)	166(72.8)			

Table 3 : Univariate logistic regression examining potential influencing factors associated with EBF for six months among participants (Cont.)

Factors	EBF 6M n (%)	non-EBF 6M n (%)	OR	95%CI	p-value
Workplace Factors					
Workplace Policy on Maternity Leave					
Sufficient	41(71.9)	126(55.3)	2.07	1.10-3.91	.024
Insufficient#	16(28.1)	102(44.7)			
Access to Facilities					
Yes	25(43.9)	57(25.0)	2.34	1.28-4.28	.006
No#	32(56.1)	171(75.0)			
Flexibility					
Yes	34(59.6)	96(42.1)	2.03	1.13-3.67	.019
No#	23(40.4)	132(57.9)			
Information Support					
Available	27(47.4)	109(47.8)	0.98	0.55-1.76	.953ns
Unavailable#	30(52.6)	119(52.2)			
Emotional Support					
Available	34(59.6)	64(28.1)	3.79	2.07-6.92	<.001
Unavailable#	23(40.4)	164(71.9)			
Type of Employment					
Government	23(40.3)	55(24.1)	6.69	0.84-53.45	.073
Private	33(57.9)	157(68.9)	3.36	0.43-26.25	.247ns
Waged#	1(1.8)	16(7.0)			
Maternity Leave Length (months)					
> 3.0	6(10.5)	6(2.6)	6.43	1.61-25.65	.008
> 1.5 to 3.0	44(77.2)	177(77.7)	1.60	0.68-3.78	.286ns
≤ 1.5#	7(12.3)	45(19.7)			
Working Days (days per week)					
4 - 5	45(78.9)	135(59.2)	2.58	1.30-5.15	.007
6 - 7#	12(21.1)	93(40.8)			
Working Times (hours per week)					
≤ 42.0	37(64.9)	98(43.0)	2.45	1.34-4.49	.004
> 42.0#	20(35.1)	130(57.0)			

Note OR = Odds ratio; CI = Confidence Interval; ns = No statistical significance

Reference group; [a] US$1 = 34.66 Baht

EBF 6M = employed mothers who provided exclusive breastfeeding for 6 months

non-EBF 6M = employed mothers who provided exclusive breastfeeding for <6 months

Multivariate logistic regression analysis (Model 1) revealed that seven of 16 factors (family income, knowledge, attitudes, confidence, intention, workplace policy on maternity leave and working times) co-predicted EBF for six months with an overall percentage of predicted EBF for six months of 56.3% **(Table 4)**. The mothers who had monthly family incomes >30,000 baht (US$865.55), high breastfeeding knowledge, high breastfeeding confidence, positive breastfeeding attitudes, intention to EBF for six months, sufficient workplace policy on maternity leave and working times of no more than 42 hours per week were more likely to EBF for six months when controlling for other variables **(Table 4)**.

The interaction effect model (Model 2) revealed five predictive factors, including family income, knowledge, confidence, intention, and the interaction effect between workplace policy on maternity leave and attitudes predicted EBF for six months. Mothers who had family incomes >30,000 baht (US$865.55) per month, intention to EBF for six months, high breastfeeding knowledge and confidence, and were more likely to continue EBF for six months. Moreover, the combined effect of sufficient workplace policy on maternity leave and positive breastfeeding attitudes enhanced mothers to continue EBF for six months, 9.56 times than the other three groups. The other groups included 1) sufficient workplace policy and negative attitudes; 2) insufficient workplace policy and positive attitudes; and 3) insufficient workplace policy and negative attitudes **(Table 4)**. The model explained 56% of the variance of EBF for six months among urban employed mothers when controlling other variables.

Discussion

This study investigated the influences of maternal, social, and workplace level factors and whether there was any interaction effect among levels on EBF for six months among urban employed mothers in Bangkok. Results revealed that EBF for six months was influenced by all three levels of factors; intrapersonal, interpersonal, and organizational levels and also the interaction effect between levels as explained in the Ecological Model. The multivariate logistical model includes the interaction terms between maternal factors and workplace factors— attitudes toward breastfeeding and sufficient policy on maternity leave— and showed that family income, maternal breastfeeding knowledge, confidence, intention, and the interaction effect were significantly associated with EBF for six months. This finding emphasized the significance of the across-level interactions between maternal level and workplace level factors influencing EBF for six months. The findings supported evidence from previous studies that explored only interactions within the same workplace level, the number of working hours and return to work. The synergizing influence was much more significant than that of either sufficient maternity leave policy or attitudes alone. This finding is also congruent with ecological theory in that human behavior arises through a process of reciprocal interactions between an individual and their environment.[23] Thus, successfully continuing EBF for six months is not only the result of maternal factors but also the support of policy for sufficient maternity leave.

Using the framework of the Ecological Model enabled the intrapersonal level exploration of maternal characteristics and cognitive factors. The results revealed that family income, breastfeeding knowledge and confidence, attitude toward breastfeeding, and intention to practice EBF for six months was associated with the EBF duration. In the significant interaction model that included three-level factors, it was found that among cognitive factors, intention to practice EBF for six months was the most influential factor. This finding was congruent with a prior study by Thomas and colleagues,[25] who found the maternal intention to breastfeed to be a significant predictor of feeding choices. This result is similar to findings from prior studies[6, 9, 15, 25] that positive breastfeeding attitude, correct breastfeeding knowledge, and high

Table 4 Multivariate logistic regression examining factors predicting EBF among the participants.

Factors	Model 1: Additive Model			Model 2: Interaction Effect Model		
	OR	95%CI	p-value	OR	95%CI	p-value
Family Income (baht per month)						
> 30,000 (US$865.55)[a]	4.80	1.64-14.07	.004	4.23	1.50-11.90	.006
≤ 30,000 (US$865.55)[#]						
Attitudes						
Positive	3.62	1.37-9.55	.009	1.02	0.26-4.02	.979[ns]
Negative[#]						
Intention						
EBF 6 months	60.68	5.90-624.09	.001	37.25	4.40-315.51	.001
EBF <6 months[#]						
Confidence						
High	3.99	1.74-9.15	.001	4.30	1.90-9.72	<.001
Low[#]						
Knowledge						
High	2.77	1.23-6.24	.014	2.59	1.16-5.79	.020
Low[#]						
Family Support						
Sufficient	2.10	0.92-4.76	.077[ns]	2.12	0.94-4.79	.072[ns]
Insufficient[#]						
Workplace Policy on Maternity Leave						
Sufficient	2.57	1.07-6.14	.034	0.48	0.09-2.63	.398[ns]
Insufficient[#]						
Working Times (hours per week)						
≤ 42.0	3.45	1.22-9.72	.019	2.08	0.91-4.77	.082[ns]
> 42.0[#]						
Policy [*] Attitudes						
Sufficient PO and positive AT[b]				9.56	1.34-68.39	.025
Others[#,c]						
-2LL			159.86			142.61
AIC			183.86			180.61
BIC			227.69			217.13
Nagelkerke R^2			0.563			0.56

Note OR = Odd ratio; CI = Confidence Interval; ns = No statistical significance

[#] Reference group; [a]US$1 = 34.66 Baht; * = interaction

[b] PO = workplace policy on maternity leave; AT = attitudes toward breastfeeding

[c] Others include:

1) sufficient workplace policy on maternity leave and negative attitudes toward breastfeeding;

2) insufficient workplace policy on maternity leave and positive attitudes toward breastfeeding; and

3) insufficient workplace policy on maternity leave and negative attitudes toward breastfeeding

breastfeeding confidence of mothers increased mothers' intention to breastfeed.[15] Maternal attitudes or beliefs are influential factors in a woman's decision to initiate and continue breastfeeding.[37] Mothers who agreed that breastfeeding babies are healthier and that breastfeeding is convenient were more likely to practice EBF for six months. Mothers with higher breastfeeding confidence are more likely to develop strategies for combining breastfeeding with work,[38] thereby leading to the practice of EBF for a longer duration.[39] Regarding breastfeeding knowledge, the non-EBF mothers in the present study lacked knowledge about breastfeeding benefits on a child's intelligence and the meaning of EBF practice. Also, the mothers lacked confidence in integrating breastfeeding and work as well as solving breastfeeding difficulties. These findings are also consistent with previous studies in which mothers who were unaware that breast milk was the best food for babies and insufficient knowledge about EBF meaning and duration were less likely to continue EBF.[9]

When the characteristics of the mothers were considered, it was found that non-EBF mothers had less education and lower family income with > 42 work hours per week. More than 75% of the non-EBF mothers reported not having sufficient breastfeeding facility support in the workplace. Mothers faced more constraints concerning both economic and work-related conditions. Furthermore, low income employed mothers were more likely to have greater difficulty negotiating maternity leave and the number of working hours.[39] Therefore, integrating breastfeeding and work was challenging, and infant formula may become the preferred choice, even before returning to work. This finding shared similarities with a study conducted by Sulaiman and colleagues[15] who found that Malaysian mothers who perceived infant formula as the standard infant feeding and a practical option for working women would introduce formula feeding within one month postpartum.

The interpersonal level of ecological study focuses on informal and formal social support systems such as health care providers and family members who have an impact on health decision and practice.[7, 11, 14] Our data showed that family support and health professional support were not a significant predictive factor for six-months of EBF. This finding was incongruent with some prior studies that adequate family support from grandmothers and spouses was associated with fewer formula feeding and longer breastfeeding duration.[11] The previous finding also explained family support could encourage and discourage breastfeeding.[6] Furthermore, although nurses were the first resource for breastfeeding knowledge, it may not be sufficient. And mothers in the EBF group may seek more knowledge on another source such as the internet.

Additionally, our results found that there were influences of workplace factors at the organizational level of the ecological model on EBF for six months. The employed mothers who had insufficient workplace policies on maternity leave and worked for >42 hours per week were less likely to practice EBF for six months. In this study, nearly half of the non-EBF mothers perceived their maternity leave policy as insufficient to practice EBF for six months. Evidence from previous studies has reported that mothers who were permitted maternity leave for <3 months had the highest risk for breastfeeding discontinuation.[16, 17] Also, with long working hours and inflexible work conditions, mothers decided to discontinue EBF after returning to work. Congruent with previous studies, mothers who worked 9-14 hours per day were more likely to stop breastfeeding than those who worked less than or equal to 8 hours per day.[31] Due to the long hours the mothers worked, they had fewer expressions of milk. Our research reveals that other workplace factors, including work flexibility, breastfeeding facilities, and emotional support, were unable to predict EBF for six months, even though

the aforementioned were well-known significant factors in other studies.[16, 31] This might be the result of the less availability of these supports in Thai context. Promoting breastfeeding corners, breaks, and facilities remain a new practice in Thailand, and very few companies (0.05%) have addressed this policy.[40] In our study, only 28.8% and 34.4% of the participants had access to breastfeeding facilities and received emotional support from co-workers/ supervisors, respectively. Similarly, low support from employers has also been found in other countries such as the United States and Egypt.[8, 39] Due to the lack of support from employers, employed mothers may need to limit their working hours to maintain breastfeeding, particularly when they have to return to work, causing socio-economic difficulty in a country where family incomes are generally low.

Limitations

This study had some limitations. First, the data were collected from full-time employed mothers with singleton birth children aged between 6-18 months. There might be a chance of recall bias from retrospective data collection. Second, we excluded the mothers who had an illness and ceased breastfeeding before one month since the aim was to investigate influencing factors explicitly related to the mothers' employment. Nevertheless, the reason for EBF discontinuation might have been due to illness or other conditions existing in the early postpartum period rather than workplace factors. Thus, the participants of this study may not represent all employed mothers, and that resulted in limited generalizability.

Conclusions and Implications for Nursing Practice

In conclusion, this study elaborates the influences of the multi-level factors, namely, intrapersonal, interpersonal, and organizational and across-level factors on EBF among employed mothers, as explained in the Ecological Model. The findings revealed the significance of the across-level interaction between the influence of the maternal level and workplace level on EBF for six months. The findings also highlight the importance of multiple level interventions to promote EBF in employed mothers. First, at the intrapersonal level during the antenatal period, health care providers, especially nurses, should discuss with employed mothers concerning breastfeeding plans after returning to work. Nurses should prepare mothers to have breastfeeding knowledge, positive breastfeeding attitudes, and confidence to increase their intention to practice EBF. Breastfeeding knowledge should be focused on a child's intelligence benefit and how to manage breastfeeding and employment. To increase mothers' confidence, they should be equipped with strategies for integrating breastfeeding and employment, e.g., time and methods for breast milk expression and preparing childcare providers. Mothers' perceptions that breastfeeding is more convenient with superior benefits on a child's health than formula feeding need to be enhanced. Lastly, at the organizational level, sufficient maternity leave should be established with positive attitudes toward breastfeeding. Furthermore, the total working hours should be properly specified with sufficient support, while the cash benefits during maternity leave should be considered. The aforementioned interventions must give particular attention to lower-income mothers. In addition, future research should investigate the intervention research designed at multiple levels of intrapersonal, interpersonal, and organizational levels is recommended to improve exclusive breastfeeding rates and duration among employed mothers. Clearly, government and workplaces need to pay attention to implementing and monitoring policies that support women to continue to breastfeed for at least six months, and nurses have an important role to advocate for policies about this.

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ปัจจัยที่มีอิทธิพลต่อการเลี้ยงลูกด้วยนมแม่อย่างเดียวของมารดาทำงานในเขตเมือง: การศึกษาแบบกลุ่มศึกษา-กลุ่มควบคุม

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บทคัดย่อ: การส่งเสริมการเลี้ยงลูกด้วยนมแม่อย่างเดียวในแม่ที่ทำงานในเขตเมืองเป็นเรื่องที่ซับซ้อน ความเข้าใจถึงปัจจัยหลายระดับที่มีอิทธิพลต่อการเลี้ยงลูกด้วยนมแม่อย่างเดียวของมารดาทำงานจะช่วยให้สามารถทราบถึงกลยุทธ์ที่จะส่งเสริมให้มารดาเลี้ยงลูกด้วยนมแม่อย่างเดียวอย่างต่อเนื่องมากขึ้น การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาปัจจัยระดับมารดา สังคม และที่ทำงาน และปฏิสัมพันธ์ระหว่างปัจจัยที่มีอิทธิพลต่อการเลี้ยงลูกด้วยนมแม่อย่างเดียว 6 เดือนของมารดาทำงานที่อาศัยในเขตเมือง เป็นการศึกษาแบบกลุ่มศึกษา-กลุ่มควบคุมในโรงพยาบาลที่เลือกอย่างเจาะจงจำนวน 6 แห่งในกรุงเทพมหานคร ประเทศไทย ระหว่างกันยายน 2558 ถึง มิถุนายน 2559 กลุ่มศึกษาเป็นมารดาที่เลี้ยงลูกด้วยนมแม่อย่างเดียว 6 เดือน จำนวน 57 ราย กลุ่มควบคุมเป็นมารดาที่ไม่ได้เลี้ยงลูกด้วยนมแม่อย่างเดียว 6 เดือน จำนวน 228 ราย เก็บข้อมูลโดยใช้แบบสอบถาม 6 ชุดได้แก่ แบบสอบถามข้อมูลส่วนบุคคล, แบบประเมินทัศนคติต่อการให้อาหารทารก, แบบสอบถามการรับรู้สมรรถนะของตนเองในการเลี้ยงลูกด้วยนมแม่, แบบสอบถามความรู้เกี่ยวกับการเลี้ยงลูกด้วยนมแม่, แบบสอบถามการรับรู้การสนับสนุนการเลี้ยงลูกด้วยนมแม่, และแบบสอบถามการให้อาหารทารก วิเคราะห์ข้อมูลด้วยสถิติบรรยาย การวิเคราะห์การถดถอยโลจิสติก และ การวิเคราะห์การถดถอยพหุโลจิสติก

โมเดลการถดถอยโลจิสติกแสดงให้เห็นว่า ตัวแปรระดับมารดา (ได้แก่ รายได้ครอบครัว ทัศนคติความตั้งใจ ความมั่นใจ และความรู้) และตัวแปรระดับที่ทำงาน (ได้แก่ นโยบายเกี่ยวกับระยะเวลาในการลาคลอด และจำนวนชั่วโมงการทำงาน) สามารถร่วมกันทำนายการเลี้ยงลูกด้วยนมแม่อย่างเดียว 6 เดือน โมเดลปฏิสัมพันธ์พบว่า ปฏิสัมพันธ์ระหว่างนโยบายเกี่ยวกับระยะเวลาในการลาคลอดกับทัศนคติต่อการเลี้ยงลูกด้วยนมแม่มีอิทธิพลต่อการเลี้ยงลูกด้วยนมแม่อย่างเดียว 6 เดือนเพิ่มมากขึ้น ผลการศึกษามีข้อแนะนำว่าการส่งเสริมการเลี้ยงลูกด้วยนมแม่อย่างเดียวในแม่ทำงานควรเป็นการจัดกระทำที่ครอบคลุมในหลายระดับ ในการปฏิบัติทางคลินิกพยาบาลและผดุงครรภ์ควรดำเนินการการจัดกระทำในระยะตั้งครรภ์ด้วยการประเมินทัศนคติและความตั้งใจต่อการเลี้ยงลูกด้วยนมแม่ การให้ความรู้เพื่อเพิ่มความมั่นใจต่อการเลี้ยงลูกด้วยนมแม่ และการวางแผนผสมผสานการเลี้ยงลูกด้วยนมแม่กับการทำงาน และควรมีการทบทวนนโยบายเกี่ยวกับความเพียงพอของการลาคลอด การสนับสนุนการเลี้ยงลูกด้วยนมแม่ในที่ทำงาน และจำนวนชั่วโมงการทำงานของแม่ทำงานที่เหมาะสม

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คำสำคัญ: ปัจจัยที่มีอิทธิพล การเลี้ยงลูกด้วยนมแม่อย่างเดียว มารดาทำงาน การศึกษาแบบกลุ่มศึกษา-กลุ่มควบคุม

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