The combined effect of employment status and transcultural marriage on breast feeding: a population-based survey in Taiwan

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Summary

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In recent decades there has been a marked rise in both the labour market participation of women with infants and transcultural marriage in Taiwan. The objectives of this study were to explore the combined effect of employment status and transcultural marriage on the prevalence and factors relating to initiation and continuation of breast feeding in Taiwan. We used multistage stratified systematic sampling to recruit 2048 postpartum women from the Taiwan National Birth Registration database for the period November to December 2003. They were interviewed at home within 6 months of delivery using a structured questionnaire; 87% of the sampled population completed the interview. We used logistic regression analysis to estimate the odds ratio (OR) of breast-feeding initiation and Cox regression (survival) analysis to predict continued breast feeding.

The prevalences of initial breast feeding for employed Taiwanese mothers, unemployed Taiwanese mothers, employed foreign-born mothers and unemployed foreign-born mothers were 84.4%, 83.7%, 79.1% and 79.7%, respectively. Among the four groups of mothers who initiated breast feeding, 12.9%, 27.2%, 14.7% and 39.7% of their infants, respectively, were still breast feeding at the age of 6 months. Factors associated with initiation of breast feeding were high maternal education (OR 3.80; 95% confidence interval [CI] 1.81, 7.98) and normal spontaneous delivery (OR 1.36; 95% CI 1.04, 1.78). The main reason for not breast feeding in 52% of the mothers was insufficient or no milk. There existed a combined effect of employment status and transcultural marriage on the continuation of breast feeding. Employed Taiwanese mothers were earlier than others at weaning. Unemployed foreign-born mothers breast fed the longest [hazard ratio (HR) 0.54; 95% CI 0.42, 0.70]. Other factors related to late weaning were high maternal education (HR 0.67; 95% CI 0.47, 0.96), older maternal age (HR 0.76; 95% CI 0.61, 0.94), mother sleeping with baby at night (HR 0.68; 95% CI 0.59, 0.78), and no supplemental baby food before the age of 6 months (HR 0.78; 95% CI 0.68, 0.90).

The initiation of breast feeding was high but it decreased dramatically after the postpartum period in Taiwan. There was a significant combined effect of employment status and transcultural marriage on the continuation of breast feeding. Employment is a persistent barrier to continued breast feeding.

Keywords: *breast feeding*, *maternal employment*, *transcultural marriage*.

Introduction

Breast feeding has been recognised worldwide for its health benefits such as a reduced risk of use of health services,[1] postnatal death,[2] acute respiratory infection and diarrhoeal deaths,[3] child asthma and atopy,[4] overweight children[5] and atherosclerosis.[6] Successful breast feeding depends on multiple factors relating to the parents, infants and the supporting environment. They include socio-demographic (ethnicity, maternal age, education, employment), biomedical (maternal overweight and obesity, type of delivery and infant diseases), related health system services (rooming-in facilities, feeding on demand and prenatal classes), psychosocial and cultural determinants, and the pattern of breast feeding (the quantity of milk, early introduction of mixed or supplemental feeding).[7–12]

In recent decades there has been a marked rise in the labour market participation of women with infants in many countries. The Taiwanese female labour force participation in 1978 was 39%; by 2002 it had risen to 51%.[13] Breast feeding has been consistently associated with physical, psychological, social, economic and nutritional benefits to mothers and infants, but return to work represents a substantial hurdle for working mothers to continue to breast feed.[14,15] Growing research literature highlights the negative effect of employment status on breast-feeding initiation[16] and duration.[17]

Recently in Taiwan the prevalence of transcultural marriage has been steadily increasing. In the 2003 marriage statistics, about 28% of brides were not born in Taiwan.[18] At the same time, about 13% of infants were born to foreign-born women. Different race or ethnicity may affect patterns of breast feeding,[19,20] so analysis of differences in the prevalence of breast-feeding initiation and continuation in transcultural marriages may provide information about practices that encourage breast feeding. The purpose of this study was to explore the combined effect of employment status and transcultural marriage on the prevalence and risk factors for the initiation and continuation of breast feeding in Taiwan.

Methods

Study population and sampling strategy

This research is based upon a prospective longitudinal cohort study design. We used the multistage stratified systematic sampling design to obtain the samples from the Taiwan national birth registration data for the period November to December 2003. A total of 369 towns in Taiwan were ranked into 12 strata according to the administrative division (four strata) and the total fertility rate (three strata). Using the principle of proportion probability to size, we randomly sampled 29 towns from the 12 strata (Fig. 1). All postpartum women and newborns, a total of 2048 pairs, from these 29 towns were recruited. All study participants provided informed consent previously as approved by the Ethics Review Board of the National Taiwan University College of Public Health.

Data collection

The parents' and infants' basic demographic information was abstracted from the Taiwan national birth registration data. We then conducted a home interview with the 2048 postpartum women within 6 months after delivery using a structured questionnaire in the period from April to June 2004. There were 265 cases of loss of follow-up because of refusal to participate ($n = 144$), moving home ($n = 42$), incorrect addresses ($n = 35$), going abroad ($n = 20$), infant deaths ($n = 14$), adopted infants ($n = 3$) and other miscellaneous reasons ($n = 7$). A total of 1783 postpartum women were interviewed, giving a completed interview rate of 87%.

Variables

Data were obtained from the Taiwan national birth registry and the interview questionnaire. Variables related to breast feeding included the initiation and duration. Breast feeding was defined as including mixed and exclusive breast feeding. The duration of breast feeding was stratified into seven groups: <1; 1 to <2; 2 to <3; 3 to <4; 4 to <5; 5 to <6; and 6+ months. The major reason for never breast feeding was also asked by one open question and then grouped into the reasons as shown in Table 6.

Information on maternal occupation was collected including 1 year before the current pregnancy, and during the pregnancy and postpartum periods. Maternal employment was defined either as mothers returning to work after maternity leave, or they did not work during pregnancy but worked after delivery. The classification of maternal occupation was based on the Taiwan version of the International Classification of

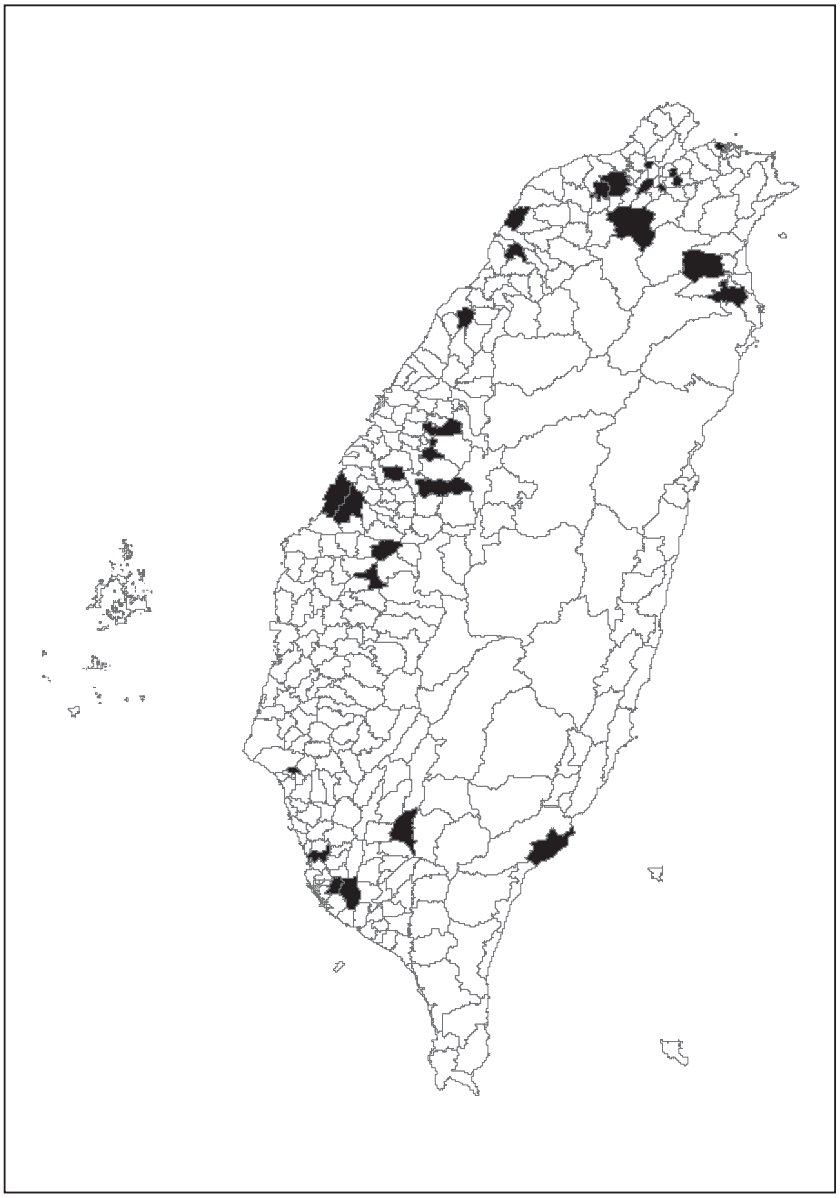

Figure 1. Random sampling of 29 towns (in black) out of 369 in Taiwan.

Occupations, which was later summarised into two groups: employed and unemployed. Mothers were grouped into Taiwanese mothers and foreign-born mothers whose home country was not Taiwan (e.g. Vietnam, China, Indonesia, Cambodia, Thailand, Malaysia, Myanmar). The classification of a combined effect of employment status and transcultural marriage was stratified into four groups: employed Taiwanese mothers, unemployed Taiwanese mothers, employed foreign-born mothers and unemployed foreign-born mothers.

The population of mothers was grouped by age: ≤19, 20–34 and 35+ years. Their educational levels were stratified into four groups: university and college or above, senior high school, junior high school and elementary or below. Family income per year was defined as the total parental income per year within four categories in new Taiwan dollars (NT$, 1 US$ ≈ 32 NT$, in 2005): ≤390 k, 400 k–590 k, 600 k–990 k and 1000 k or more. Place of residence was classified as urban areas, town centres in rural areas and rural areas. Parity was grouped into 0, 1 and 2. There were three groups of maternal weight gain during pregnancy: <10, 10–19 and 20+ kg. The types of delivery were normal spontaneous delivery and caesarean section. Variables relating to infants included gender,

preterm delivery, neonatal jaundice and allergic dermatitis. The pattern of nurturing included supplemental baby-food feeding before age 6 months, mother sleeping with the baby at night, mother living with the baby (days per week) and major caregivers. There were three groups of number of days per week that mothers lived with the baby (≤3, 4–6 and 7 days) and four groups (parents, grandparents, parents and grandparents and babysitters) of major caregivers.

Statistical analysis

Chi-square was performed to test the difference of basic characteristics and potential risk factors within four groups. Multiple logistic regressions were performed to estimate odds ratios (OR) and their 95% confidence intervals [CI] of the dichotomous initial breast-feeding outcomes in four groups after adjusting for potential confounding of demographics (maternal age, education, family income per year, place of residence, parity, gender of infant) and other factors (maternal weight gain in pregnancy, type of delivery, neonatal jaundice, preterm delivery, mother sleeping with the baby at night). To predict continuation of breast feeding in four groups, Cox regression analysis was used to estimate hazard ratios (HR) and their 95% CI after adjusting for potential confounders listed above. Potential confounders included in the final model of the multiple logistic regression and the Cox regression included information from previous studies and the 10% change-in-estimate method.[21] This method selects a variable for control only if its inclusion produces more than a 10% change in the ratio estimate of interest. The statistical analyses were performed using SPSS for Windows, Release 11.0.

Results

The characteristics of 265 non-responders and 1783 responders are compared in Table 1. The mean maternal and paternal ages were 28.4 and 32.4 years, respectively, in the non-respondent group, similar to that of the respondents. The mean infant birthweight and gestational week were 3046.8 g and 38.0 weeks in the non-responders, and 3096.9 g and 38.4 weeks in the respondents, respectively. There were no significant differences in the characteristics between the non-responders and the responders, concerning parents' age, birthweight, gender, or low birthweight of newborns. The prevalence of preterm births was, however, slightly higher in non-responders (12.1%) than in responders (8.3%).

The characteristics of the subjects are summarised in Tables 2 and 3. Most of the subjects were aged 20–34 years old (87.6%). Those with a senior high school education (60.9%) predominated, half resided in urban areas (50.5%) and 34.4% of the families had an annual income of 600 k–990 k NT$. About half of the mothers were primiparous (51.1%) and 55.3% of the infants were male. Comparison of Taiwanese and foreign-born mothers showed the latter to be less likely to be aged 35+ years, to be more likely to be multiparae, to have lower education level and family income and be more likely to live in rural areas.

Most women increased 10–19 kg during pregnancy (70.2%), and had normal spontaneous delivery (66.0%). Most infants were not delivered preterm (91.7%), had no neonatal jaundice (53.5%) and no allergic dermatitis (86.7%). Over 80% of mothers slept (80.l) and lived (87.0%) with their babies 7 days per week, and parents were the major caregivers (50.4%); 75.3% of babies had been fed supplemental baby food before

Table 1. Comparison of characteristics between lost to follow-up ($n = 265$) and follow-up group ($n = 1783$)

Characteristics	Lost to follow-up (non-responders)	Follow-up (responders)	*P*-value
Parents			
Mean maternal ages (years)	28.4	28.4	0.99
Mean paternal ages (years)	32.4	32.4	0.95
Infants			
Mean birthweight (g)	3046.8	3096.9	0.19
Mean gestation (weeks)	38.0	38.4	0.01
Male gender of infants	52.8%	55.0%	0.50
Singleton	97.7%	96.8%	0.60
Low birthweight	9.1%	7.0%	0.23
Preterm delivery	12.1%	8.3%	0.04

Table 2. Characteristics of study subjects

Characteristics	Total	Taiwanese mothers		Foreign-born mothers		*P*-value
		Employed	Unemployed	Employed	Unemployed	
Total (=100%)	1783	972	566	43	202	
Maternal age (years)						
<20	60 (3.4)	15 (1.5)	36 (6.4)	2 (4.7)	7 (3.5)	<0.001
20–34	1562 (87.6)	856 (88.1)	478 (84.5)	41 (95.3)	187 (92.6)	
35+	161 (9.0)	101 (1.4)	52 (9.2)	0 (0.0)	8 (4.0)	
Maternal education						
Elementary school –	105 (5.9)	5 (0.5)	12 (2.1)	20 (46.5)	68 (33.7)	<0.001
Junior high school	259 (14.5)	76 (7.8)	93 (16.4)	16 (37.2)	74 (36.6)	
Senior high school	1085 (60.9)	622 (64.0)	403 (71.2)	6 (14.0)	54 (26.7)	
University +	334 (18.7)	269 (27.7)	58 (10.2)	1 (2.3)	6 (3.0)	
Family income per year (NT$)						
≤390 k	377 (21.1)	86 (8.8)	176 (31.1)	22 (51.2)	93 (46.0)	<0.001
400 k–590 k	374 (21.0)	132 (13.6)	168 (29.7)	9 (20.9)	65 (32.2)	
600 k–990 k	613 (34.4)	393 (40.4)	171 (30.2)	10 (23.3)	39 (19.3)	
1000+ k	419 (23.5)	361 (37.1)	51 (9.0)	2 (4.7)	5 (2.5)	
Place of residence						
Urban area	901 (50.5)	527 (54.2)	273 (48.2)	14 (32.6)	87 (43.1)	0.001
Town of rural area	365 (20.5)	200 (20.6)	116 (20.5)	12 (27.9)	37 (18.3)	
Rural area	517 (29.0)	245 (25.2)	177 (31.3)	17 (39.5)	78 (38.6)	
Parity						
0	912 (51.1)	521 (53.6)	258 (45.6)	21 (48.8)	112 (55.4)	<0.001
1	670 (37.6)	349 (35.9)	219 (38.7)	18 (41.9)	84 (41.6)	
2+	201 (11.3)	102 (10.5)	89 (15.7)	4 (9.3)	6 (3.0)	
Gender of infant						
Male	986 (55.3)	540 (55.6)	314 (55.5)	20 (46.5)	112 (55.4)	0.711
Female	797 (44.7)	432 (44.4)	252 (44.5)	23 (53.5)	90 (44.6)	

Values in parentheses are percentages.

6 months old. Comparison of the two groups shows that foreign-born mothers had lower weight gain during pregnancy, were more likely to have a spontaneous delivery, and to sleep with their babies than Taiwanese-born mothers.

Prevalence rates of breast feeding are shown in Table 4. The overall prevalence rate of initial breast feeding was 83.5%. There was no significant difference among employed Taiwanese mothers (84.4%), unemployed Taiwanese mothers (83.7%), employed foreign-born mothers (79.1%) and unemployed foreign-born mothers (79.7%). Overall, of the mothers who had initiated breast feeding 50.2% and 20.4% still breast fed their infants at the ages of 1 and 6 months, respectively. There was a significant difference in the prevalence of continued breast feeding among the four groups: 12.9%, 27.2%, 14.7% and 39.7% of employed Taiwanese mothers, unemployed Taiwanese mothers, employed foreign-born mothers and unemployed foreign-born mothers who initially breast fed their infants were still breast feeding at the age of 6 months, respectively. The monthly prevalence of continued breast feeding for mothers who initiated breast feeding is shown in Fig. 2.

Factors significantly related to breast-feeding initiation are shown in Table 5. After adjustment for maternal education, type of delivery and preterm delivery the ORs of initial breast feeding still showed no significant difference between the four groups of mothers.

Reasons for never breast feeding are shown in Table 6. The major reason for most mothers who never initiated breast feeding was insufficient or no milk (52.0%). Secondary reasons were that breast feeding was inconvenient for returning to work and that formula was more convenient than breast feeding (15.3%).

Factors affecting the continuation of breast feeding are shown in Table 7. After adjustment for maternal

Table 3. Factors related to breast feeding

Factors	Total	Taiwanese mothers		Foreign-born mothers		*P*-value
		Employed	Unemployed	Employed	Unemployed	
Total (=100%)	1783	972	566	43	202	
Maternal factors						
Weight gain during pregnancy (kg)						
<10	256 (14.4)	122 (12.6)	87 (15.4)	9 (20.9)	38 (18.8)	0.003
10–19	1252 (70.2)	694 (71.4)	379 (67.0)	32 (74.4)	147 (72.8)	
20+	275 (15.4)	156 (16.0)	100 (17.7)	2 (4.7)	17 (8.4)	
Type of delivery						
Normal spontaneous delivery	1176 (66.0)	613 (63.1)	379 (67.0)	36 (83.7)	148 (73.3)	0.002
Caesarean section	607 (34.0)	359 (36.9)	187 (33.0)	7 (16.3)	54 (26.7)	
Infant factors						
Preterm delivery						
No	1635 (91.7)	894 (92.0)	511 (90.3)	43 (100.0)	187 (92.6)	0.128
Yes	148 (8.3)	78 (8.0)	55 (9.7)	–	15 (7.4)	
Neonatal jaundice						
No	954 (53.5)	534 (54.9)	296 (52.3)	18 (41.9)	106 (52.5)	0.312
Yes	829 (46.5)	438 (45.1)	270 (47.7)	25 (58.1)	96 (47.5)	
Allergic dermatitis						
No	1545 (86.7)	830 (85.4)	486 (85.9)	43 (100.0)	186 (92.1)	0.004
Yes	238 (13.3)	142 (14.6)	80 (14.1)	–	16 (7.9)	
Nursery patterns						
Supplemental baby-food feeding before age of 6 months						
No	441 (24.7)	228 (23.5)	132 (23.3)	15 (34.9)	66 (32.7)	0.014
Yes	1342 (75.3)	744 (76.5)	434 (76.7)	28 (65.1)	136 (67.3)	
Mother sleeping with the baby						
No	354 (19.9)	307 (31.6)	33 (5.8)	6 (14.0)	8 (4.0)	<0.001
Yes	1429 (80.1)	665 (68.4)	533 (94.2)	37 (86.0)	194 (96.0)	
Mother living with the baby (days per week)						
<4	206 (11.6)	190 (19.5)	12 (2.1)	4 (9.3)	–	<0.001
4–6	25 (1.4)	21 (2.2)	3 (0.5)	1 (2.3)	–	
7	1554 (87.0)	761 (78.3)	551 (97.3)	38 (88.4)	202 (100.0)	
Major caregiver						
Parents	898 (50.4)	249 (25.6)	462 (81.6)	19 (44.2)	168 (83.2)	<0.001
Grandparents	366 (20.5)	340 (35.0)	14 (2.5)	9 (20.9)	3 (1.5)	
Parents and grandparents	382 (21.4)	253 (26.0)	87 (15.4)	13 (30.2)	29 (14.4)	
Babysitter	137 (7.7)	130 (13.4)	3 (0.5)	2 (4.7)	2 (1.0)	

Values in parentheses are percentages.

education, maternal age, mother sleeping with baby at night and supplemental baby-food feeding before the age of 6 months, employed Taiwanese mothers were significantly earlier in weaning than the other groups (unemployed Taiwanese mothers: HR 0.76; 95% CI 0.66, 0.88; employed foreign-born mothers: HR 0.91; 95% CI 0.60, 1.37; unemployed foreign-born mothers: HR 0.54; 95% CI 0.42, 0.70, compared with employed Taiwanese mothers).

Discussion

Our study has shown that the initiation of breast feeding was common but the continuation of breast feeding was low in Taiwan. There was a significant combined effect of employment status and transcultural marriage on the continuation of breast feeding. Employment is a persistent barrier to continued breast feeding. However, the representativeness of the sam-

Table 4. Prevalence of breast feeding

Breast feeding	Total	Taiwanese mothers		Foreign-born mothers		*P*-value
		Employed	Unemployed	Employed	Unemployed	
Total (=100%)	1783	972	566	43	202	
Breast-feeding initiation[a]						
Never	294 (16.5)	152 (15.6)	92 (16.3)	9 (20.9)	41 (20.3)	0.351
Ever	1489 (83.5)	820 (84.4)	474 (83.7)	34 (79.1)	161 (79.7)	
Breast-feeding duration (months)[b]						
<1	748 (50.2)	441 (53.8)	233 (49.2)	18 (52.9)	56 (34.8)	<0.001
1 to <2	239 (16.1)	152 (18.6)	64 (13.5)	3 (8.8)	20 (12.4)	
2 to <3	88 (5.9)	48 (5.9)	25 (5.3)	5 (14.7)	10 (6.2)	
3 to <4	60 (4.0)	43 (5.2)	13 (2.7)	–	4 (2.5)	
4 to <5	37 (2.5)	24 (2.9)	7 (1.5)	2 (5.9)	4 (2.5)	
5 to <6	13 (0.9)	6 (0.7)	3 (0.6)	1 (3.0)	3 (1.9)	
6+	304 (20.4)	106 (12.9)	129 (27.2)	5 (14.7)	64 (39.7)	

[a]Values in parentheses are percentages of total.
[b]Values in parentheses are percentages of those who ever breast fed.

pling and the validity of measurement in our study must be considered before reaching any conclusion.

Little documentation of the breast-feeding situation in Asia has been published,[22] especially of population-based statistics. Our population-based survey provides some information about developing countries in Asia. This study was designed to obtain the samples that would be representative of all pregnant women in Taiwan; however, further investigation using the 2003 Taiwan National Birth Registration database is warranted to obtain a fuller representative sample. Despite incomplete data for 13% of subjects and borderline significant differences of preterm deliveries, there was no significant difference of the basic characteristics between the respondents and the non-respondents, such as parents' age, infants' gender, birthweight, or low birthweight. The reason for non-response appeared to be unrelated to our measurement outcomes. In order to reduce recall bias, we only recruited subjects with a completed interview within 6 months after delivery. We measured whether or not they ever breast fed and the duration until they were interviewed. The home interviews using a structured questionnaire by well-trained interviewers were effective in our study to minimise recall bias. Although we chose the women who gave birth from November to December 2003, we believe that the effect of seasonal variation on breast feeding is likely to be minimal.

In general, the South-east Asia region such as Thailand, Singapore and Vietnam; South America such as Chile, Colombia, Ecuador and Jamaica; Australia; the European region such as Sweden and Denmark, and Austria report a high prevalence rate of breast feeding. Canada, the US, the UK and France show lower initiation of breast feeding compared with the above-mentioned countries. The exclusive breast-feeding rate (no food or drink other than breast milk for at least 4 months) was low in most countries, except for Sweden, Australia, Denmark, Egypt, Saudi Arabia and Bolivia.[22–25]

Our study results showed the prevalence of breast-feeding initiation was between 79.1% and 84.4%. Com-

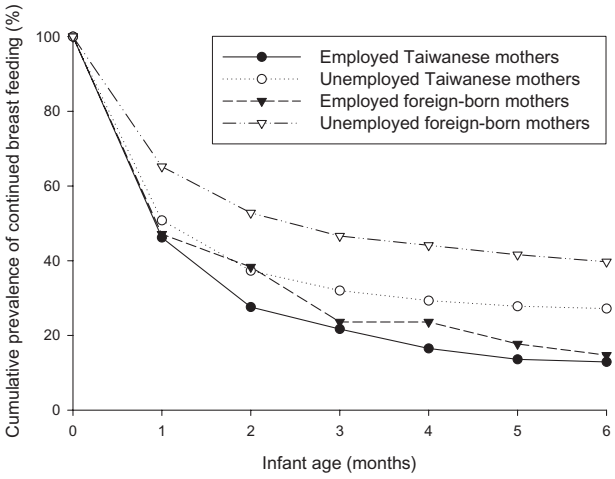

Figure 2. Prevalence of continued breast feeding among the four groups.

Table 5. Factors related to the initiation of breast feeding in logistic regression models

Factors	*n* (%)	Crude odds ratio [95% CI]	Adjusted odds ratio[a] [95% CI]	*P*-value
Combined effect of employment status and transcultural marriage				
Employed Taiwanese mothers	972 (54.6)	1.00 Reference	1.00 Reference	0.637
Unemployed Taiwanese mothers	566 (31.7)	0.96 [0.72, 1.27]	1.19 [0.89, 1.60]	
Employed foreign-born mothers	43 (2.4)	0.70 [0.33, 1.49]	1.17 [0.51, 2.68]	
Unemployed foreign-born mothers	202 (11.3)	0.73 [0.50, 1.07]	1.24 [0.78, 1.98]	
Maternal education				
Elementary school –	105 (5.9)	1.00 Reference	1.00 Reference	<0.001
Junior high school	259 (14.5)	0.56 [0.32, 0.97]	0.59 [0.33, 1.08]	
Senior high school	1085 (60.9)	1.23 [0.74, 2.06]	1.43 [0.77, 1.98]	
University +	334 (18.7)	3.18 [1.67, 6.07]	3.80 [1.81, 7.98]	
Type of delivery				
Caesarean section	607 (34.0)	1.00 Reference	1.00 Reference	0.023
Normal spontaneous delivery	1176 (66.0)	1.35 [1.04, 1.74]	1.36 [1.04, 1.78]	
Preterm delivery				
Yes	148 (8.3)	1.00 Reference	1.00 Reference	0.066
No	1635 (91.7)	1.58 [1.05, 2.37]	1.48 [0.98, 2.24]	

[a]A 10% change-in-estimate method was used to assess potential confounders. Final model was adjusted for maternal education, type of delivery and preterm delivery.

pared with other countries, it is moderate.[22] There was no significant difference within the four groups, although the Taiwanese mothers appeared to have a slightly higher rate of breast feeding than foreign-born mothers. The rate of employment by the time they were interviewed was similar for Taiwanese and foreign-born mothers. According to one study in Taiwan[26] pregnant women had a high tendency to choose breast feeding (88.7% including mixed feeding). This is consistent with the prevalence rate of breast-feeding initiation in Taiwan mothers.

The most common reason for bottle feeding was related to insufficient or no milk (Table 6), similar to results found in another study.[27] The reason for insuf-

Table 6. Reasons for never breast feeding

		Taiwanese mothers		Foreign-born mothers	
Reasons	Total	Employed	Unemployed	Employed	Unemployed
Total (=100%)	294	152	92	9	41
Maternal factors					
Insufficient or no milk	153 (52.0)	79 (52.0)	42 (45.7)	5 (55.6)	27 (65.9)
Maternal physical or psychological problems	28 (9.5)	13 (8.6)	14 (15.2)	–	1 (2.4)
Drugs used during caesarean section	16 (5.4)	7 (4.6)	7 (7.6)	–	2 (4.9)
Breast problems	5 (1.7)	1 (0.7)	3 (3.3)	–	1 (2.4)
For convenience (e.g. return to work, formula milk is more convenient)	45 (15.3)	31 (20.4)	10 (10.9)	3 (33.3)	1 (2.4)
Previous breast-feeding experience	2 (0.7)	–	2 (2.2)	–	–
Infant factors					
Baby refusing the breast	25 (8.5)	12 (7.9)	5 (5.4)	1 (11.1)	7 (17.1)
Mother discharged and baby staying in hospital	14 (4.7)	5 (3.3)	7 (7.6)	–	2 (4.9)
Baby adopted	2 (0.7)	2 (1.3)	–	–	–
Others	4 (1.4)	2 (1.3)	2 (2.2)	–	–

Values in parentheses are percentages.

Table 7. Factors related to the continuation of breast feeding in multiple Cox regression models

Factors	*n* (%)	Crude hazard ratio [95% CI]	Adjusted hazard ratio[a] [95% CI]	*P*-value
Combined effect of employment status and transcultural marriage				
Employed Taiwanese mothers	820 (55.1)	1.00 Reference	1.00 Reference	<0.001
Unemployed Taiwanese mothers	474 (31.8)	0.77 [0.67, 0.87]	0.76 [0.66, 0.88]	
Employed foreign-born mothers	34 (2.3)	0.94 [0.65, 1.36]	0.91 [0.60, 1.37]	
Unemployed foreign-born mothers	161 (10.8)	0.55 [0.45, 0.69]	0.54 [0.42, 0.70]	
Maternal education				
Elementary school –	85 (5.7)	1.00 Reference	1.00 Reference	<0.001
Junior high school	182 (12.2)	1.30 [0.96, 1.78]	1.12 [0.80, 1.57]	
Senior high school	911 (61.2)	1.56 [1.19, 2.04]	1.06 [0.76, 1.49]	
University +	311 (20.9)	1.06 [0.79, 1.43]	0.67 [0.47, 0.96]	
Maternal age (years)				
<20	43 (2.9)	1.09 [0.78, 1.54]	1.12 [0.80, 1.57]	0.032
20–34	1313 (88.2)	1.00 Reference	1.00 Reference	
35+	133 (8.9)	0.75 [0.60, 0.93]	0.76 [0.61, 0.94]	
Mother sleeping with baby at night				
No	289 (19.4)	1.00 Reference	1.00 Reference	<0.001
Yes	1200 (80.6)	0.62 [0.54, 0.71]	0.68 [0.59, 0.78]	
Supplemental baby-food feeding before 6 months of age				
Yes	1123 (75.4)	1.00 Reference	1.00 Reference	0.001
No	366 (24.6)	0.76 [0.66, 0.88]	0.78 [0.68, 0.90]	

[a]A 10% change-in-estimate method was used to assess potential confounders. Final model was adjusted for maternal education and age, mother sleeping with baby at night and supplemental baby-food feeding.

ficient or no milk may be related to mothers never establishing breast feeding in the first place. Secondary important reasons for never breast feeding were that it was inconvenient for returning to work and that formula was convenient, especially for mothers employed after delivery. In our data, 90.8% of women employed in pregnancy returned to work after maternity leave, and just 9.2% started to work after their delivery. The study showed that employment status was important in the decision of mothers to choose breast feeding.[27]

Mothers commonly initiated breast feeding in our study, but the rate of continuation was low. According to World Health Organization guidelines, the recommended feeding practices for infants are exclusive breast feeding for the first 6 months.[28] The overall proportion of mothers who breast fed initially and who continued for at least 6 months was only 20.4%, and only 10% were exclusively breast feeding; this is far less than the breast-feeding goal of the World Health Organisation. The duration of breast feeding for mothers of Taiwan was lower than most Western countries[22] and Thailand,[14] similar to Singapore,[23] but higher than Hong Kong.[29] Similar to much of the Asian region, we had a high rate of breast-feeding initiation and a dramatic decrease after the postpartum period.[14,23] Our results showed that the employed mother ceased breast feeding earlier than those unemployed, whether in Taiwanese or foreign-born mothers. Employment status was associated with early weaning, a situation that also has been reported from other Asian countries such as Thailand[14] and Singapore.[23]

Our data showed that there seemed to be a significant combined effect of breast-feeding maintenance by employment status and transcultural marriage (Table 7). Overall, unemployed foreign-born mothers seemed to breast feed longer than unemployed Taiwanese mothers; however, there was no significant difference between employed foreign-born and Taiwanese mothers, which is partly due to the small number of employed foreign-born mothers. Planning employment after delivery appeared not to influence the percentage of mothers initiating breast feeding, but it did influence the percentage continuing to breast feed.[30]

In our subjects, foreign-born mothers represented 13.7% of the total subjects. Most of them were from

Vietnam (39.6%), China (35.9%), Indonesia (13.1%), Thailand (1.2%) and elsewhere (10.2%). These figures are similar to national Taiwan statistics.[18] Overall, the prevalence of breast feeding in most of these countries was higher than Taiwan.[31] However, we could not explore whether mothers from one particular country account for any of these differences due to small numbers from each country. Nevertheless, the prevalence rate of breast feeding in the first month for mothers born in Taiwan was similar to others.

There are several probable reasons to explain the phenomenon. In traditional Taiwanese custom, women must have 1 month to take a complete rest for postpartum recuperation, known as the traditional Chinese one-month postpartum period (Zuo yuezi). This may be helpful for women to breast feed during the early postpartum period. Other reasons such as maternity leave and the policy of the baby-friendly hospital developed in recent years may contribute to breast-feeding initiation in the early postpartum period. In Taiwan, the mandated maternity leave is 8 weeks;[32] it is shorter than Ireland (18 weeks), Sweden (14 weeks) and the US (12 weeks).[33] Though maternal employment status in this study included returning to work after maternity leave or starting to work after delivery, 90.8% of employed mothers had returned to work after maternity leave. The shortness of maternity leave may be of benefit for initiation but not for continued breast feeding. Furthermore, other policies such as maternity leave to nourish and bring up a baby, and breast-feeding facility in the workplace seem not to increase the continuation of breast feeding for mothers returning to work.

Except for employment status and transcultural effects, high maternal education, normal spontaneous delivery and term delivery (borderline non-significant) were the risk factors related to breast-feeding initiation in our results. On the other hand, higher maternal education, older age, sleeping with the baby and no supplemental baby food before 6 months were the factors related to continued breast feeding, consistent with some other studies.[8,16,19,25]

Although breast feeding is common in Taiwan, it is rarely exclusive and usually takes place for a relatively short duration. Returning to work posed a barrier to mothers for maintaining breast feeding. How to overcome the obstacle is an important issue in Taiwan and also in some Western countries.[33] Not only should we explore how statutory provisions may best be expanded to address the needs of breast-feeding workers, but we should also focus on ways in which workplaces can become more 'breast feeding-friendly' by offering employees flexible work programmes. These include part-time work, job-sharing, phase-back, flexitime, on-site and near-site day care, breast-feeding breaks and facilities. So far, there are some supportive polices for breast feeding for working women, such as maternity leave, to nourish and bring up a baby, and breast-feeding facilities in some workplaces in Taiwan, but it is not common. Educational and promotional strategies for breast feeding must be continued.

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