Impact of Baby-Friendly Hospital Practices on Breastfeeding in Hong Kong

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ABSTRACT: Background: *The World Health Organization (WHO) developed the Baby-Friendly Hospital Initiative to improve hospital maternity care practices that support breastfeeding. In Hong Kong, although no hospitals have yet received the Baby-Friendly status, efforts have been made to improve breastfeeding support. The aim of this study was to examine the impact of Baby-Friendly hospital practices on breastfeeding duration.* **Methods:** *A sample of 1,242 breastfeeding mother-infant pairs was recruited from four public hospitals in Hong Kong and followed up prospectively for up to 12 months. The primary outcome variable was defined as breastfeeding for 8 weeks or less. Predictor variables included six Baby-Friendly practices: breastfeeding initiation within 1 hour of birth, exclusive breastfeeding while in hospital, rooming-in, breastfeeding on demand, no pacifiers or artificial nipples, and information on breastfeeding support groups provided on discharge.* **Results:** *Only 46.6 percent of women breastfed for more than 8 weeks, and only 4.8 percent of mothers experienced all six Baby-Friendly practices. After controlling for all other Baby-Friendly practices and possible confounding variables, exclusive breastfeeding while in hospital was protective against early breastfeeding cessation (OR: 0.61; 95% CI: 0.42–0.88). Compared with mothers who experienced all six Baby-Friendly practices, those who experienced one or fewer Baby-Friendly practices were almost three times more likely to discontinue breastfeeding (OR: 3.13; 95% CI: 1.41–6.95).* **Conclusions:** *Greater exposure to Baby-Friendly practices would substantially increase new mothers' chances of breastfeeding beyond 8 weeks postpartum. To further improve maternity care practices in hospitals, institutional and administrative support are required to ensure all mothers receive adequate breastfeeding support in accordance with WHO guidelines. (BIRTH 38:3 September 2011)*

Key words: *Baby-Friendly Hospital Initiative, breastfeeding, exclusive breastfeeding, Hong Kong*

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Breastfeeding is both a key public health and public policy issue. The health and psychological benefits of breastfeeding to both the infant and the mother have been recognized widely (1). Women in Hong Kong, like those in many other industrialized countries, are increasingly choosing to breastfeed their infants. Although approximately 70 percent of all new mothers now initiate breastfeeding, up from 19 percent in 1981 (2) and 37 percent in 1997 (3), Hong Kong still has some of the lowest breastfeeding rates in the developed world (4,5). Despite recommendations for exclusive breastfeeding up to 6 months of age (1,6), few Hong Kong women exclusively breastfeed and most stop breastfeeding within the first few months (7). The high breastfeeding attrition rate in Hong Kong has been attributed to sociocultural variables such as lack of family, community, and workplace support for breastfeeding (3,7–11). As in many Western societies, cultural values have made formula feeding the norm. Although the sociocultural impacts on breastfeeding have been well documented in Hong Kong (9,12–15), few researchers have investigated the impact of hospital practices on breastfeeding.

In 1991, the World Health Organization (WHO) and UNICEF launched the Baby-Friendly Hospital Initiative (BFHI) to promote quality breastfeeding care and to increase breastfeeding rates worldwide (16). The BFHI outlined Ten Steps that hospitals must follow to be awarded Baby-Friendly status, and the initiative is the gold standard for breastfeeding care in hospitals. To date, approximately 15,000 hospitals worldwide have received the Baby-Friendly designation, over 6,000 of which are in Mainland China (17). No hospital in Hong Kong has yet received this designation. Over the past decade, however, public hospitals in Hong Kong have taken steps toward meeting this gold standard. Baby-Friendly policies have been written, health care staff have been provided training, pregnant women are informed of the benefits of breastfeeding, rooming-in and breastfeeding on demand are encouraged, and breastfeeding support groups have been initiated. Undoubtedly, these steps have contributed to the increasing breastfeeding initiation rates in Hong Kong. Further attention, however, needs to be paid to increasing breastfeeding duration and exclusivity among those who do breastfeed.

Researchers have shown that the implementation of the Baby-Friendly steps in hospitals increases both breastfeeding duration and exclusivity (18–21). Exclusive breastfeeding rates in U.S. Baby-Friendly hospitals are 78.4 percent versus the national average of 46.3 percent (22). In Switzerland, the proportion of exclusively breastfed infants at 5 months of age is 42 percent in Baby-Friendly hospitals and 34 percent among infants born elsewhere; breastfeeding duration is 35 weeks versus 29 weeks elsewhere (23). A randomized trial in the Republic of Belarus found that adopting Baby-Friendly practices significantly increased exclusive breastfeeding at 3 months (43.3% in intervention group vs 6.4% in control group) and 6 months (7.9% vs 0.6%) (24,25). In the United States, mothers not exposed to any Baby-Friendly hospital practices were from 8 to 13 times more likely to stop breastfeeding early when compared with those exposed to more Baby-Friendly practices (26,27). Furthermore, implementation of Baby-Friendly practices improves and sustains breastfeeding rates in populations with normally low rates of breastfeeding (20,21).

The aims of this study were to examine exposure to Baby-Friendly practices among mothers delivering in public hospitals in Hong Kong and to assess the impact of individual and cumulative Baby-Friendly hospital practices on breastfeeding duration.

Methods

Participants

The basis for this study was a nonpopulation-based sample of 1,417 mother-infant pairs recruited from obstetric units of four public hospitals in Hong Kong during the immediate postpartum period in 2006 to 2007, and followed-up prospectively for 1 year or until weaned, whichever was sooner. Sample selection criteria were as follows: 1) intention to breastfeed; 2) singleton pregnancies; 3) Cantonese speaking; 4) Hong Kong residents for more than 1 year; and 5) no serious medical or obstetrical complications. In addition, participants were excluded from the study if their baby 1) was born before 37 weeks' gestation, 2) had an Apgar score of less than 8 at 5 minutes, 3) had a birthweight of less than 2,500 g, 4) was born with severe medical conditions or congenital malformations, 5) was placed in the special care nursery for more than 48 hours after delivery, or 6) was placed in the intensive care nursery after delivery.

Variable Descriptions

The outcome variable was breastfeeding for 8 weeks or fewer postpartum, defined as the total number of weeks the infant received any breastmilk. The duration of breastfeeding for 8 weeks or less was chosen because it was the median duration of any breastfeeding in the sample. In addition, women in Hong Kong normally receive 10 weeks of paid maternity leave, two of which must be taken before the date of confinement (28). Independent variables were six of the Ten Steps that related

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primarily to hospital practices and that could be measured. These six practices included breastfeeding initiation within 1 hour of birth, no food or drink other than breastmilk, rooming-in, breastfeeding on demand, no artificial teats or pacifiers, and providing information to the mother on breastfeeding support groups on hospital discharge. We also measured many sociodemographic variables and potential confounders, including maternal age and education, family income, marital status, parity, previous breastfeeding experience, delivery type, maternal smoking, returning to work postpartum, mother's own breastfeeding status, and husband's infant feeding preference.

Data Sources

Basic demographic data were collected directly from participants while in hospital, and maternal, birth, and infant feeding data were extracted from participants' medical record by research nurses trained specifically for this study. Breastfeeding duration and exclusivity data were collected after hospital discharge through telephone follow-up at 1, 2, 3, 6, 9, and 12 months or until weaned. Data measuring the exposure to Baby-Friendly practices were available on the participant's hospital record, with the exception of Step 10 (refer mothers to breastfeeding support groups on hospital discharge), which was collected by self-report during the 1-month telephone follow-up interview.

Data Analysis

We computed basic frequency distributions to examine exposure to Baby-Friendly practices. To explore the association between Baby-Friendly hospital practices and breastfeeding duration we used bivariable and multivariable logistic regression analyses. For the multivariable analyses, we added potential confounders in turn based on subject matter relevance (29). Model 1 included all Baby-Friendly practices. Model 2 further adjusted for sociodemographic variables (i.e., maternal age, maternal education, and household income). Model 3, in addition, adjusted for delivery type (i.e., emergency cesarean section). Model 4, in addition, adjusted for returning to work in the postpartum period, and model 5 further adjusted for breastfeeding support variables (i.e., whether mother was breastfed as a child, mother's previous breastfeeding experience, husband's feeding preference). We also assessed the cumulative impact of Baby-Friendly practices on breastfeeding duration using the same models as in the previous analysis. Participants who experienced all six Baby-Friendly steps served as the reference group. Finally, to specifically assess the impact of Baby-Friendly practices on mothers with no previous breastfeeding experience, we repeated the analysis of our main findings using this restricted subset of mothers (n = 818) The Hosmer–Lemeshow test (30) was used to assess the adequacy of the analyses, and variance inflation factor (VIF) was used to assess for multicollinearity (31). All analyses were conducted using Stata version 9.2 statistical software (32).

Ethical approval for the study was obtained from the Institutional Review Board of the Li Ka-Shing Faculty of Medicine, University of Hong Kong, and the participating study sites, and informed written consent was obtained from all participants.

Results

In total 1,417 mother-infant pairs from the four study sites were in the baseline sample (site A = 419; site B = 378; site C = 302; site D = 318). After recruitment, we excluded eight participants because they subsequently did not meet the study eligibility criteria. We further excluded 87 (6.2%) participants with whom we had no further contact after hospitalization, and 80 participants with missing information relevant to this analysis, giving 1,242 (87.6%) mother-infant pairs in this analysis. Of these 1,242 participants, 1,054 (84.9%) stopped breastfeeding before the end of the study at 12 months, 157 (12.6%) were still breastfeeding at 12 months, and 31 (2.5%) were still breastfeeding when they were lost to follow-up or dropped out of the study. Among the 31 participants lost to follow-up, 21 were lost after sufficient follow-up to determine the study outcome (breastfeeding ≤ 8 weeks). A sensitivity analysis conducted after removing all 31 of these participants had minimal impact on the estimates. Therefore, 31 participants were included in the analyses and were assumed to have weaned at the time of last contact.

The prevalence of Baby-Friendly practices is presented in Table 1. Most practices were experienced by a large proportion of the participants. Less than 20 percent of infants, however, were exclusively breastfed while in hospital (Step 6), and less than one-third were put to the breast within the first hour after birth (Step 4). Approximately 80 percent of women were exposed to between two and four Baby-Friendly practices, and few women experienced all six practices (4.8%) or one practice or fewer (6.1%). Only four (0.3%) participants were not exposed to any Baby-Friendly practices.

Over one-half of participants (53.4%) breastfed for 8 weeks or less (Table 2). Early breastfeeding cessation was associated with younger maternal age, intermediate levels of education and family income, primiparity, having an emergency cesarean section, returning to work postpartum, husband's preference for infant formula

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Table 1. The Baby-Friendly Hospital Initiative's Ten Steps to Successful Breastfeeding and Prevalence of Practices Experienced by Participants (n = 1,242)

"Baby-Friendly" Ten Steps	*Prevalence (%)*
1. Have a written breastfeeding policy that is routinely communicated to all health care staff	NA
2. Train all health care staff in skills necessary to implement this policy	NA
3. Inform all pregnant women about the benefits and management of breastfeeding	NA
4. Help mothers initiate breastfeeding within 1 hr of birth[a]	28.5
5. Show mothers how to breastfeed, and how to maintain lactation, even if they should be separated from their infants	NA
6. Give newborn infants no food or drink other than breastmilk, unless *medically* indicated[b]	17.3
7. Practice "rooming in"—allow mothers and infants to remain together—24 hr per day[c]	65.4
8. Encourage breastfeeding on demand[d]	75.6
9. Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants[e]	58.0
10. Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic[f]	76.2

NA indicates that the step was not assessed.
[a]UNICEF (16) specifies that breastfeeding must be initiated within a half-hour of birth whereas the Baby-Friendly Hospital Initiative USA (40) specifies 1 hour. For this study, we used 1 hour after birth as the cutoff. How soon after birth first breastfeeding was given was recorded; practice coded as "yes" if time was less than 1 hour.
[b]How many supplements the infant was given in the first and second 24 hours of hospitalization was recorded; practice coded as "yes" if 1) the answer to both questions was 0, or 2) in the first 24 hours the answer was 0 and was missing for the second 24 hours (i.e., infant was discharged early).
[c]The location of infant after birth was recorded using the following choices: rooming-in with mother, regular nursery on maternity ward, and special care nursery; practice coded as "yes" if the answer was "rooming-in with mother."
[d]Practice coded as "yes" if infant was breastfed on demand.
[e]How formula supplements were given was recorded using the following choices: bottle, cup, syringe, finger/tube feeding, spoon, and others; practice coded as "yes" if infant was not supplemented with infant formula or if supplements were given by methods not using artificial nipple. Pacifiers are rarely used in Hong Kong public hospitals.
[f]Practice coded as "yes" if during 1-month telephone follow-up, the mother reported that health care staff provided her with contact information for a breastfeeding support group when she was discharged from the hospital.

or mixed feeding, and no previous breastfeeding experience.

In the unadjusted analysis (Table 3), four of the six Baby-Friendly practices (breastfeeding initiation within the first hour, only breastmilk in hospital, no artificial nipples given, and providing information about breastfeeding support) demonstrated a protective effect against early breastfeeding cessation. After adjustment for the other Baby-Friendly practices (Table 4, model 1), the protective effect remained statistically significant for three of these four practices (breastfeeding initiation within the first hour, only breastmilk in hospital, and providing information about breastfeeding support). In the fully adjusted model (Table 4, model 5), however, only one practice (only breastmilk in hospital) remained significantly associated with a longer duration of breastfeeding. The results of the Hosmer–Lemeshow goodness-of-fit tests for the logistic regression models ranged from 0.28 to 0.33, respectively, indicating that the models are a good fit for the data. VIF values showed no evidence of multicollinearity.

Table 5 shows the associations between the number of Baby-Friendly practices (0/1–6) experienced by participants and breastfeeding outcomes. When compared with mothers who experienced all six Baby-Friendly practices, those experiencing no or one Baby-Friendly practices were over four times more likely to wean in 8 weeks or less (model 1). After adjustment for other potential confounders (models 2–5), effect sizes decreased slightly; however, a dose–response relationship between the number of Baby-Friendly practices experienced and early weaning remained evident.

To assess whether the effects seen in the previous analysis would also apply to mothers with no previous breastfeeding experience, we repeated our main analysis on a restricted subset of participants, including only participants with no previous breastfeeding experience (n = 818), irrespective of overall parity. Findings from the restricted subset had similar point estimates (see Table S1 in online appendix) with the exception of Step 10 (provide information on breastfeeding support), which now showed a protective effect against early cessation of breastfeeding.

Discussion

Consistent with previous studies (26,27,33,34), we found that exposure to Baby-Friendly hospital practices provides substantial protection from early breastfeeding cessation. Although in the adjusted analysis of the individual Baby-Friendly practices, only maintaining

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exclusive breastfeeding while in hospital showed a statistically significant protective effect against early weaning, exposure to Baby-Friendly practices showed a clear dose–response relationship between the number of Baby-Friendly practices experienced and breastfeeding cessation. Women who were exposed to no or one Baby-Friendly practice had three to four times higher rate of early breastfeeding cessation when compared with those who were exposed to all six practices.

This study provides further evidence that in a population with high breastfeeding attrition rates, hospital practices can have a substantial effect on breastfeeding outcomes. Less than 5 percent of participants, however, experienced all six Baby-Friendly steps, suggesting that hospitals in Hong Kong need to increase their efforts to implement Baby-Friendly practices more widely so that all new mothers are exposed to practices supportive of breastfeeding.

The proportion of participants exposed to the different Baby-Friendly practices varied substantially. Just over one-quarter of participants breastfed their baby within 1 hour of birth and over 80 percent of healthy full-term breastfeeding newborns were given infant formula during their hospital stay, suggesting two key areas where Baby-Friendly practices could be substantially improved. The detrimental effect of infant formula on the continuation of breastfeeding has been documented previously (35), and our findings further demonstrated the importance of exclusive breastfeeding as a key determinant of breastfeeding success.

At the time of this study, all public hospitals in Hong Kong accepted free infant formula from formula manufacturers (36), which undoubtedly influenced the high amount of infant formula provided to breastfed babies while in hospital. Pressure from Baby-Friendly supporters and breastfeeding experts along with a desire by

Table 2. Demographic Characteristics of Participants Grouped According to Breastfeeding Duration (n = 1,242)

Demographic Variable	*Breastfed for ≤8 wk* (n = 663) *No. (%)*	*Breastfed for >8 wk* (n = 579) *No. (%)*	χ^2 p
Age of mother (yr)			
18–24	56 (8.5)	26 (4.5)	<0.01
25–29	165 (24.9)	116 (20.0)	
30–34	298 (44.6)	278 (48.0)	
≥35	144 (21.7)	159 (27.5)	
Highest level of maternal education			
Compulsory secondary[a]	150 (22.6)	143 (24.7)	<0.001
Upper secondary	298 (45.0)	173 (29.9)	
University degree or above	215 (32.4)	263 (45.4)	
Monthly family income (HKD)[b]			
<$15,000	123 (18.6)	153 (26.4)	<0.001
$15,000–$29,999	257 (38.8)	159 (27.5)	
≥$30,000	283 (42.7)	267 (46.1)	
Previous children			
0	448 (67.6)	283 (48.9)	<0.001
≥1	215 (32.4)	296 (51.1)	
Emergency cesarean			
Yes	89 (13.4)	54 (9.3)	0.02
No	574 (86.6)	525 (90.7)	
Mother intends to return to work			
≤6 mo after birth	544 (82.1)	373 (64.4)	<0.001
>6 mo after birth	119 (18.0)	206 (35.6)	
Mother was breastfed as a child			
Yes	254 (38.3)	302 (52.2)	<0.001
No	409 (61.7)	277 (47.8)	
Mother had previous breastfeeding experience			
Yes	161 (24.3)	263 (45.4)	<0.001
No	502 (75.7)	316 (54.6)	
Husband's infant feeding preference			
Breastfeeding	363 (54.8)	406 (70.1)	<0.001
Infant formula or mixed feeding	172 (25.9)	65 (11.2)	
No preference	128 (19.3)	108 (18.7)	

[a]*Compulsory secondary education is to form 3 or grade 9;* [b]*1 USD = 7.78 HKD.*

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Table 3. Prevalence of Weaning by 8 Weeks or More According to Individual Baby-Friendly Hospital Practices (n = 1,242)

"Baby-Friendly" Practices	n	*Breastfed for ≤8 wk (%)*	*OR (95% CI)*
Step 4: Breastfeeding initiation within 1 hr			
Yes	352	45.7	0.65 (0.51–0.83)
No	890	56.4	1.00
Step 6: Only breastmilk given			
Yes	216	38.0	0.47 (0.35–0.63)
No	1,026	56.6	1.00
Step 7: Rooming-in			
Yes	810	54.4	1.13 (0.89–1.43)
No	432	51.4	1.00
Step 8: Breastfeeding on demand			
Yes	939	53.5	1.01 (0.78–1.31)
No	303	53.1	1.00
Step 9: No artificial nipple			
Yes	726	49.2	0.66 (0.53–0.83)
No	516	59.3	1.00
Step 10: Provide information on breastfeeding support			
Yes	944	51.1	0.67 (0.52–0.88)
No	298	60.7	1.00

Table 4. Association Between Baby-Friendly Hospital Practices and Breastfeeding Duration ≤8 Weeks (n = 1,242)

"Baby-Friendly" Practices	*Model 1 aOR (95% CI)*[a]	*Model 2 aOR (95% CI)*[b]	*Model 3 aOR (95% CI)*[c]	*Model 4 aOR (95% CI)*[d]	*Model 5 aOR (95% CI)*[e]
Breastfeeding initiation within 1 hr	0.73 (0.56–0.96)	0.73 (0.55–0.95)	0.76 (0.58–1.00)	0.78 (0.59–1.03)	0.83 (0.62–1.11)
Only breastmilk given	0.55 (0.39–0.77)	0.57 (0.40–0.81)	0.58 (0.40–0.82)	0.58 (0.41–0.84)	0.61 (0.42–0.88)
Rooming-in	1.17 (0.91–1.52)	1.18 (0.90–1.53)	1.25 (0.95–1.64)	1.30 (0.98–1.71)	1.14 (0.86–1.52)
Breastfeeding on demand	0.97 (0.74–1.27)	0.98 (0.74–1.30)	0.97 (0.73–1.29)	0.98 (0.74–1.31)	1.13 (0.85–1.53)
No artificial nipple	0.84 (0.65–1.10)	0.80 (0.61–1.05)	0.82 (0.62–1.08)	0.87 (0.65–1.15)	0.96 (0.72–1.29)
Provide information on breastfeeding support	0.75 (0.57–0.98)	0.79 (0.60–1.05)	0.78 (0.59–1.03)	0.73 (0.55–0.98)	0.74 (0.55–1.00)

[a]Model 1 adjusted for other "Baby-Friendly" hospital practices only; [b]model 2 additionally adjusted for maternal age, maternal education, and household income; [c]model 3 additionally adjusted for emergency cesarean section; [d]model 4 additionally adjusted for return to work; [e]model 5 additionally adjusted for breastfeeding support variables (i.e., whether mother was breastfed as a child, mother's previous breastfeeding experience, husband's feeding preference).

administrators to make public hospitals more Baby-Friendly, has resulted in a system-wide policy change after the conclusion of this data collection. Currently, all public hospitals purchase infant formula at market value, making Hong Kong public hospitals among the very few regions where this occurs.

Two Baby-Friendly practices, rooming-in (Step 7) and breastfeeding on demand (Step 8), unexpectedly had no effect on breastfeeding duration, even in the unadjusted analysis. Several possible explanations for these findings exist. First, a high proportion of participants were exposed to both practices. Second, rooming-in practices varied substantially among hospitals. To maintain hospital anonymity, we did not present results by study site. In three of the four hospitals, however, more than 80 percent of all participants were rooming-in. Conversely, in one hospital just over 10 percent were rooming-in. Third, it is difficult to assess the effect of these two steps independently because full on-demand breastfeeding is only possible with 24-hour rooming-in (33). Because others have reported similar findings (27,37), future researchers may want to assess the effects of rooming-in and breastfeeding on demand as one practice rather than as two discrete practices. Fourth, although three-quarters of babies were reported to be breastfed "on demand," the high rates of formula supplementation in this cohort would make it difficult for mothers to truly breastfeed on demand.

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Table 5. Association Between Number of "Baby-Friendly" Hospital Practices and Breastfeeding Duration ≤8 Weeks (n = 1,242)

No. of Practices Experienced	*Prevalence No. (%)*	*Model 1 aOR (95% CI)*[a]	*Model 2 aOR (95% CI)*[b]	*Model 3 aOR (95% CI)*[c]	*Model 4 aOR (95% CI)*[d]	*Model 5 aOR (95% CI)*[e]
0–1	76 (6.1)	4.13 (2.00–8.55)	4.50 (2.12–9.53)	4.16 (1.95–8.87)	3.81 (1.76–8.26)	3.13 (1.41–6.95)
2	299 (24.1)	2.96 (1.63–5.39)	3.24 (1.75–6.01)	3.07 (1.65–5.71)	2.57 (1.36–4.87)	2.03 (1.05–3.94)
3	385 (31.0)	3.10 (1.72–5.60)	3.41 (1.86–6.26)	3.26 (1.77–5.99)	2.76 (1.48–5.16)	2.31 (1.21–4.42)
4	307 (24.7)	2.42 (1.33–4.39)	2.69 (1.45–4.96)	2.67 (1.45–4.93)	2.37 (1.26–4.46)	2.08 (1.08–4.00)
5	116 (9.3)	1.55 (0.80–3.02)	1.87 (0.94–3.71)	1.87 (0.94–3.71)	1.58 (0.78–3.20)	1.45 (0.70–2.99)
6	59 (4.8)	1.00	1.00	1.00	1.00	1.00

[a]Model 1 adjusted for other "Baby-Friendly" hospital practices only; [b]model 2 additionally adjusted for maternal age, maternal education, and household income; [c]model 3 additionally adjusted for emergency cesarean section; [d]model 4 additionally adjusted for return to work; [e]model 5 additionally adjusted for breastfeeding support variables (i.e., whether mother was breastfed as a child, mother's previous breastfeeding experience, husband's feeding preference).

To our knowledge, this study is one of the first to assess the impact of Baby-Friendly hospital practices on breastfeeding outcomes in Hong Kong and one of the first prospective longitudinal studies on this topic. The dropout rate was low, and breastfeeding follow-up data were gathered on 87.6 percent of the sample. In addition, data on exposure to Baby-Friendly practices, with the exception of Step 10, were collected from the client record, thus minimizing maternal recall bias.

This study, however, has some limitations. First, although our cohort was large it was not population based. Thus, the possibility that participants with more positive breastfeeding attitudes and behaviors were more likely to agree to participate cannot be ruled out. Second, we do not know what proportion of eligible participants refused to participate and what their demographic characteristics were. Recent population-based statistics on breastfeeding continuation in Hong Kong, however, have reported similar rates of any breastfeeding and exclusive breastfeeding (38), suggesting that the breastfeeding data collected in our sample are similar to the overall breastfeeding pattern in Hong Kong mothers. Third, although data on breastfeeding duration and exclusivity were collected prospectively, they were self-reported data. It is possible that mothers did not accurately report either the duration of any breastfeeding or of exclusive breastfeeding or both. Researchers have shown, however, that maternal reporting of breastfeeding initiation and duration is accurate up to 3 years after the period of breastfeeding (39).

Conclusions

Worldwide, hospitals have made substantial improvements in breastfeeding support for new mothers over the past several decades. Evidence supporting greater maternal exposure to Baby-Friendly practices, especially exclusive breastfeeding, in substantially extending breastfeeding duration was clearly present in our findings. Continued implementation of Baby-Friendly practices would enable more new mothers in Hong Kong and globally to achieve WHO breastfeeding goals. To further improve maternity care practices in hospitals, however, institutional and administrative support is required to ensure that all mothers receive adequate breastfeeding support in accordance with the WHO guidelines.

References

1. World Health Organization. *Global Strategy for Infant and Young Child Feeding*, A54/INF.DOC./4. Geneva, Switzerland: Author, 2001.
2. Khin PP, Cheung SL, Loh T. Support and promotion of breastfeeding. Where are we now? *Public Health Epidemiol Bull* 2002; 11(3):25–32.
3. Leung GM, Ho L, Lam T. Breastfeeding rates in Hong Kong: A comparison of the 1987 and 1997 birth cohorts. *Birth* 2002;29(3):162–168.
4. Callen J, Pinelli J. Incidence and duration of breastfeeding for term infants in Canada, United States, Europe, and Australia: A literature review. *Birth* 2004;31(4):285–292.
5. Foo LL, Quek SJS, Ng SA, et al. Breastfeeding prevalence and practices among Singaporean Chinese, Malay and Indian mothers. *Health Promot Int* 2005;20(3):229–237.
6. Department of Health. *Breastfeeding Policy*. Hong Kong: Author, 2003.
7. Tarrant M, Fong DY, Wu KM, et al. Breastfeeding and weaning practices among Hong Kong mothers: A prospective study. *BMC Pregnancy Childbirth* 2010;10:27.
8. Dodgson JE, Tarrant M, Fong DYT, et al. Breastfeeding patterns of primiparous mothers in Hong Kong. *Birth* 2003;30(3): 195–202.
9. Tarrant M, Dodgson JE, Tsang SF. Initiating and sustaining breastfeeding in Hong Kong: Contextual influences on new mothers' experiences. *Nurs Health Sci* 2002;4(4):189–199.
10. Dodgson JE, Henly SJ, Duckett L, Tarrant M. Theory of Planned Behavior-based models for breastfeeding duration among Hong Kong mothers. *Nurs Res* 2003;52(3):148–158.
11. Lau Y. Breastfeeding intention among pregnant HK Chinese women. *Matern Child Health J* 2010;14(5):790–798.

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12. Chan SM, Nelson EAS, Leung SSF, Li CY. Breastfeeding failure in a longitudinal post-partum maternal nutrition study in Hong Kong. *J Paediatr Child Health* 2000;36:466–471.
13. Kong SKF, Lee DTF. Factors influencing decision to breastfeed. *J Adv Nurs* 2004;46(4):369–379.
14. Tarrant M, Dodgson JE, Choi WK. Becoming a role model: The breastfeeding trajectory of Hong Kong women breastfeeding longer than six months. *Int J Nurs Stud* 2004;41(5): 535–546.
15. Lau Y, Chan KS. Perinatal depressive symptoms, sociodemographic correlates, and breast-feeding among Chinese women. *J Perinat Neonatal Nurs* 2009;23(4):335–345.
16. World Health Organization. *Protecting, Promoting, and Supporting Breastfeeding: The Special Role of Maternity Services*. Geneva, Switzerland: WHO/UNICEF, 1989.
17. United Nations Children's Fund (UNICEF). *Current Status of Baby-Friendly Hospital Initiative: Country Profile*, 2002. Accessed November 23, 2010. Available at: http://www.unicef.org/nutrition/files/nutrition_statusbfhi.pdf.
18. Giovannini M, Riva E, Banderali G, et al. Exclusive versus predominant breastfeeding in Italian maternity wards and feeding practices through the first year of life. *J Hum Lact* 2005; 21(3):259–265.
19. Braun MLG, Giugliani ERJ, Soares MEM, et al. Evaluation of the impact of the baby-friendly hospital initiative on rates of breastfeeding. *Am J Public Health* 2003;93(8):1277–1279.
20. Philipp BL, Malone KL, Cimo S, Merewood A. Sustained breastfeeding rates at a US baby-friendly hospital. *Pediatrics* 2003;112(3 Pt 1):e234–e236.
21. Philipp BL, Merewood A, Miller LW, et al. Baby-Friendly Hospital Initiative improves breastfeeding initiation rates in a US hospital setting. *Pediatrics* 2001;108(3):677–681.
22. Merewood A, Mehta SD, Chamberlain LB, et al. Breastfeeding rates in US Baby-Friendly hospitals: Results of a national survey. *Pediatrics* 2005;116(3):628–634.
23. Merten S, Dratva J, Ackermann-Liebrich U. Do baby-friendly hospitals influence breastfeeding duration on a national level? *Pediatrics* 2005;116(5):e702–e708.
24. Kramer MS, Chalmers B, Hodnett ED, et al. Promotion of Breastfeeding Intervention Trial (PROBIT): A randomized trial in the Republic of Belarus. *JAMA* 2001;285(4):413–420.
25. Kramer MS, Chalmers B, Hodnett ED, et al. Promotion of Breastfeeding Intervention Trial (PROBIT): A cluster-randomized trial in the Republic of Belarus. Design, follow-up, and data validation. *Adv Exp Med Biol* 2000;478:327–345.
26. DiGirolamo AM, Grummer-Strawn LM, Fein S. Maternity care practices: Implications for breastfeeding. *Birth* 2001;28(2):94–100.
27. DiGirolamo AM, Grummer-Strawn LM, Fein SB. Effect of maternity-care practices on breastfeeding. *Pediatrics* 2008;122(Suppl. 2):S43–S49.
28. Hong Kong Labour Relations Promotion Unit. *Maternity Protection*. Hong Kong: Labour Relations Promotion Unit, 2002.
29. Rothman KJ, Greenland S, Lash TL. *Modern Epidemiology*, 3rd ed. Philadelphia: Lippincott Williams & Wilkins, 2008.
30. Hosmer DW, Hosmer T, Le Cessie S, Lemeshow S. A comparison of goodness-of-fit tests for the logistic regression model. *Stat Med* 1997;16(9):965–980.
31. Hair JF. *Multivariate Data Analysis*, 7th ed. Upper Saddle River, NJ: Prentice Hall, 2010.
32. StataCorp. *Stata Statistical Software: Release 9*. College Station, TX: StataCorp LP, 2005.
33. World Health Organization Division of Child Health and Development. *Evidence for the Ten Steps to Successful Breastfeeding*, WHO/CHD/98.9. Geneva, Switzerland: Author, 1998.
34. Murray EK, Ricketts S, Dellaport J. Hospital practices that increase breastfeeding duration: Results from a population-based study. *Birth* 2007;34(3):202–211.
35. McNiel ME, Labbok MH, Abrahams SW. What are the risks associated with formula feeding? A re-analysis and review. *Birth* 2010;37(1):50–58.
36. Ip PL. Health professionals and the International Code of Marketing of Breast-milk Substitutes. *Hong Kong Med J* 2006; 12(5):400–401.
37. Pincombe J, Baghurst P, Antoniou G, et al. Baby Friendly Hospital Initiative practices and breast feeding duration in a cohort of first-time mothers in Adelaide, Australia. *Midwifery* 2008;24(1):55–61.
38. Department of Health. *Breastfeeding Rate on the Rise*. Hong Kong: Centre for Health Protection, 2007.
39. Li R, Scanlon KS, Serdula MK. The validity and reliability of maternal recall of breastfeeding practice. *Nutr Rev* 2005;63(4):103–110.
40. Baby-Friendly Hospital Initiative in the United States. *The Ten Steps to Successful Breastfeeding*, 2010. Accessed December 6, 2010. Available at: http://www.babyfriendlyusa.org/eng/10steps.html.

Supporting Information

Additional Supporting Information may be found in the online version of this article:

Table S1. Association Between Baby-Friendly Hospital Practices and Breastfeeding Duration ≤8 Weeks Among Mothers with No Previous Breastfeeding Experience (n = 818)

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