

Protection, Promotion, and Support and Global Trends in Breastfeeding^{1–3}

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ABSTRACT

A number of case studies have shown that promotion of breastfeeding (BF) coincides with improved BF and exclusive BF (EBF) practices. We quantify the relationship between BF promotion and changes in BF practices by analyzing the relationship between implementation of the WHO/UNICEF Global Strategy for Infant and Young Child Feeding as measured by the World Breastfeeding Trends Initiative (WBTi) and trends in EBF and BF duration over the past 20 y in 22 countries in Africa, Asia, the Middle East, and Latin America. The median annual increase in EBF was 1.0%/y in countries in the upper 50th percentile of WBTi scores, indicating national policies and programs most consistent with WHO/UNICEF recommendations, whereas the median increase in EBF was only 0.2%/y in countries with the lowest WBTi scores ($P = 0.01$). The median annual increase in BF duration in all countries was $<0.1\%/y$. The annual increase in EBF was not associated with maternal demographic factors, such as urban residence, paid maternal employment, maternal education, or gross national income. Our results show that the association between BF protection, promotion, and support and improved EBF is measurable and strengthened by case studies possibly causal. *Adv. Nutr.* 4: 213–219, 2013.

Introduction

The causal chains of public health interventions are complex, particularly when they involve changes in behavior at multiple levels. In the case of breastfeeding (BF)⁶ protection, promotion, and support, behavioral changes are required among politicians, health care providers, and employers, among others, as part of the causal chain of support to the mothers who ultimately choose whether to put their newborn to their breast at birth and continue breastfeeding. Although a number of case studies have shown that promotion of BF coincides with improved BF and exclusive BF (EBF) practices (1,2), we are unaware of any analysis that quantifies this relationship. The objective of this article is to fill this gap by analyzing the relationship between the

implementation of the WHO/UNICEF Global Strategy for Infant and Young Child Feeding (3) as measured by the World Breastfeeding Trends Initiative (WBTi) (4) and trends in EBF and BF duration over the past 20 y.

Adopted by the World Health Assembly and the UNICEF Executive Board in 2002, the Global Strategy for Infant and Young Child Feeding recognized that “Malnutrition has been responsible directly or indirectly, for 60% of the 10.9 million deaths annually among children under five. Well over two-thirds of these deaths, which are often associated with inappropriate feeding practices, occur during the first year of life. No more than 35% of infants worldwide are exclusively breastfed for the first four months of life; complementary feeding frequently begins too early or too late, and foods are often nutritionally inadequate or unsafe. Malnourished children who survive are more often sick and suffer life-long consequences of impaired development. Because poor feeding practices are a major threat to social and economic development, they are among the most serious obstacles to attain and maintain health that face this age group” (3).

To address these problems, the Global Strategy set forth 9 operational targets related to both BF and complementary feeding. The first 4 reaffirm the relevance of the operational targets of the Innocenti Declaration on the Protection,

¹ Presented at the symposium “Strategic, Global Approaches to Improve Breastfeeding Rates” held April 21, 2012, at the ASN Scientific Sessions and Annual Meeting at Experimental Biology 2012 in San Diego, CA. The symposium was sponsored by the American Society for Nutrition, the Lactation Research Interest Section, and the Society for International Nutrition. It was funded in part by Medela, Inc., and the Bill & Melinda Gates Foundation. A summary of the symposium “Strategic, Global Approaches to Improve Breastfeeding Rates” was published in the September 2012 issue of *Advances in Nutrition*.

² Supported in part by grant HD 13021 “The role of human milk in infant nutrition and health” from the Eunice Kennedy Shriver National Institute of Child Health and Human Development.

³ Author disclosures: C. K. Lutter and A. L. Morrow, no conflicts of interest.

⁶ Abbreviations used: BF, breastfeeding; EBF, exclusive breastfeeding; WBTi, World Breastfeeding Trends Initiative.

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Promotion, and Support of Breastfeeding⁷ and are as follows: 1) appoint a national BF coordinator and establish a multisectoral national BF committee; 2) ensure that every facility providing maternity services fully practices all the “Ten steps to successful breastfeeding”; 3) give effect to the principles and aim of the International Code of Marketing of Breast-milk Substitutes and subsequent relevant World Health Assembly resolutions (code); and 4) enact imaginative legislation to protect the BF rights of working women.

The second 5 more broadly address BF, complementary feeding, and feeding in difficult circumstances, such as during emergencies or in the context of HIV/AIDS and are as follows: 1) develop, implement, monitor, and evaluate a comprehensive policy on infant and young child feeding; 2) ensure that the health and other relevant sectors protect, promote, and support EBF for 6 mo and continued BF up to 2 y of age or beyond; 3) promote timely, adequate, safe, and appropriate complementary feeding with continued BF; 4) provide guidance on feeding infants and young children in exceptionally difficult circumstances; and 5) consider new legislation or other measures to give effect to the principles and aim of the code.

To assess progress in the implementation of the Global Strategy, the WHO developed a tool for assessing national practices, policies, and programs in support of infant and young child feeding (5). It is designed to help users assess the strengths and weaknesses of policies and programs for protecting, promoting, and supporting optimal feeding practices in their local setting and to determine where improvements may be needed to meet the aims and objectives of the Global Strategy. Inspired by this tool, the International Baby Food Action Network of Asia developed the WBTi to track, assess, and monitor infant and young child feeding practices, policies, and programs worldwide in support of BF and complementary feeding (6). To provide a measure of the key factors associated with BF and complementary feeding practices, the WBTi focuses on a set of 15 indicators. The first 10 address policies and programs, and the second 5 address feeding practices (Table 1). Each indicator includes a list of key criteria and a subset of questions to consider in assessing implementation progress and in assigning a score for each indicator between 0 and 10 points and a total score for the 15 indicators between 0 and 150 points.

Methods

Globally, a total of 40 countries have carried out a WBTi (6). Among these, 22 countries also had ≥ 2 nationally representative demographic and health surveys completed by 2011 that were timed to measure trends in EBF and BF duration over a 13- to 25-y period; this included 7 countries in Africa, 7 in Asia and the Middle East, and 8 in Latin America (Table 2). We used these data to perform a secondary analysis to examine our objective.

To assess implementation of the Global Strategy, an adjusted WBTi score was calculated that excluded the indicators related

Table 1. World Breastfeeding Trends Initiative indicators

Indicators
1. National policy, program and coordination
2. Baby Friendly Hospital Initiative (Ten Steps to Successful Breastfeeding)
3. Implementation of the International Code of Marketing of Breast-milk Substitutes and relevant WHA ¹ resolutions
4. Maternity protection
5. Health and nutrition care system (in support of breastfeeding and infant and young child feeding)
6. Maternal support and community outreach/community-based support for the pregnant and breastfeeding mother
7. Information support
8. Infant feeding and HIV
9. Infant feeding during emergencies
10. Mechanisms of monitoring and evaluation systems
11. Percentage of infants breastfed within 1 h of birth
12. Percentage of infants <6 mo of age exclusively breastfed in the last 24 h
13. Infants are breastfed for a median duration of how many months?
14. Percentage of breastfed infants <6 mo old receiving other foods or drink from bottles
15. Percentage of breastfed infants receiving complementary foods at 6 to 9 mo of age

¹ WHA, World Health Assembly.

to infant feeding practices. Values for the adjusted score could range from 0 to 100 points. The WBTi analyses were conducted between 2008 and 2012 (median: 2009). The adjusted median WBTi score was 50 points, with a range from 27.5 to 77.0 points. In general, the scores for the indicators of infant and young child feeding and emergencies (3.2 points) and maternity protection (4.0 points) were lower than for the other indicators (Fig. 1). The 2 highest scores were for the code (7.8 points) and policies and programs (6.3 points). For the 22 countries studies, the median number of years between the first and last surveys measuring EBF and BF duration was 17.5 y. For the first survey, the survey years ranged from 1986 to 1996 (median: 1991), and for the second survey, the survey years ranged from 2004 to 2011 (average: 2007) (Table 2).

We hypothesized that implementation of policies and programs in support of BF as measured by the WBTi would be associated with significant improvements in EBF and the duration of any BF (months) at the national level. We used multiple linear regression to test these relationships. Variables examined in relation to BF outcomes included maternal education (proportion of women of reproductive age with secondary or higher education), urban residence (proportion of women of reproductive age living in urban areas), paid maternal employment (proportion of women of reproductive age with paid employment), and national gross national income price parity per capita (US\$). We chose these variables because previous studies have shown them to be negatively associated with BF (7,8) and because all except for income price parity per capita were available in the demographic and health surveys used.

Data on EBF, BF duration, and the potential confounding variables identified above were obtained from the Demographic and Health Survey Stat Compiler (9) and relevant publications on national nutrition and health

⁷ Meeting in Florence, Italy, in July 1990, government policy makers from >30 countries adopted the Innocenti Declaration. The fourth World Health Assembly, in 1991, welcomed the declaration as “a basis for international health policy and action” and requested the Director-General to monitor achievement of its targets (resolution WHA44.33).

Table 2. Year, prevalence of EBF, and adjusted WBTi score¹

Country	Year 1	EBF 1	Year 2	EBF 2	Year of WBTi	Adjusted WBTi score
		%		%		points
Africa						
Cameroon	1991	7.3	2004	23.5	2011	51.5
Ghana	1988	4.6	2008	63.4	2008	69.5
Kenya	1989	22.8	2008	31.9	2012	77.0
Malawi	1992	3.1	2010	71.4	2008	75.5
Uganda	1988	66.8	2006	59.9	2008	48.5
Zambia	1992	10.8	2007	60.9	2008	69.5
Zimbabwe	1988	10.7	2010	31.8	2012	67.5
Middle East						
Egypt	1992	46.4	2008	53.2	2011	40.0
Asia						
Bangladesh	1993	45.6	2007	42.9	2008	53.0
India	1993	43.5	2006	46.4	2008	41.0
Indonesia	1987	62.5	2007	32.4	2008	27.5
Nepal	1996	74.0	2011	69.9	2008	40.5
Pakistan	1991	23.0	2006	37.0	2008	62.5
Philippines	1993	25.4	2008	33.7	2009	51.5
Latin America						
Bolivia	1989	50.5	2008	60.4	2008	57.5
Brazil	1986	2.5	2006	38.6	2008	53.0
Colombia	1986	15.4	2010	42.7	2009	50.0
Dominican Republic	1986	10.8	2007	7.7	2008	37.5
Ecuador	1987	25.7	2004	39.6	2008	52.5
Guatemala	1995	46.1	2008	49.6	2008	45.5
Mexico	1987	28.8	2006	22.3	2008	31.0
Peru	1986	27.6	2007	66.6	2009	42.5

¹ EBF, exclusive breastfeeding; WBTi, World Breastfeeding Trends Initiative.

surveys. EBF was defined as the proportion of infants <6 mo of age given only breast milk in the past 24 h as per the WHO definition (10). Data on gross national income using purchasing power parity (for the years 2007–2011) were obtained from the World Bank (11), except for Zimbabwe for which data were obtained from the Index Mundi (12).

All analyses were conducted by using Statistical Package for Social Science (SPSS), release 17.0 (SPSS Inc). The dependent variables were defined as annual increase in EBF and annual increase in BF. This was defined as the most recent annual survey data (EBF2 or BF2) minus the baseline annual survey (EBF1 or BF1), divided by the number of years between surveys. For analysis of annual increase in

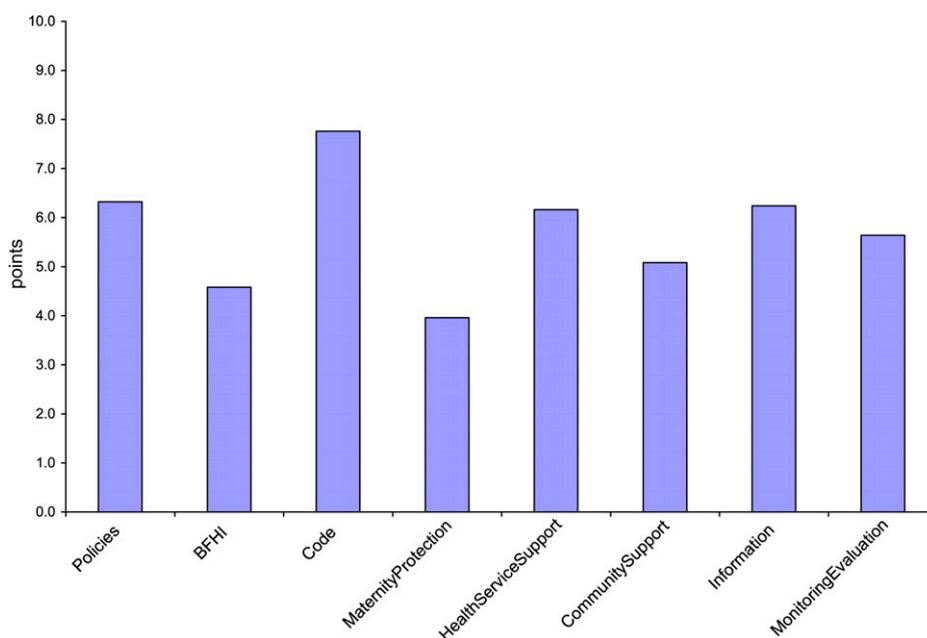


Figure 1 Scores for indicators of the World Breastfeeding Trends Initiative for 22 countries, 2008–2012. BFHI, Baby Friendly Hospital Initiative.

EBF: $Y = (EBF2 - EBF1)/(year\ 2 - year\ 1)$. Descriptive analyses and graphical representations of the data were undertaken to determine data distributions and to examine bivariate relationships, and statistical methods were applied as appropriate to the data distribution. Annual survey EBF and BF rates and annual change in BF rates between surveys were nonparametrically distributed, whereas the annualized increase in EBF rates calculated from the survey data approximated a parametric distribution. Spearman's ρ (r_s) correlation coefficients were used throughout to examine interrelationships among all variables. Multiple linear regression was used to examine annual increase in EBF as the dependent variable, with WBTi score as the main independent variable. Modeling included examination of baseline EBF and sociodemographic characteristics as potential confounding factors. Due to the limitation of having only 22 countries in the regression analysis, models were limited to the addition of only 1 covariate at a time along with WBTi. Other than WBTi, only the baseline survey EBF rate was identified as a significant predictor of annual increase in EBF. Significance was determined as $P \leq 0.05$.

Results

Change in national-level EBF rates

In the baseline surveys, the EBF rates of countries included in this study ranged from 2.5 to 74.0% (median: 25.4%), whereas in the second survey EBF rates ranged from 7.7 to 71.4% (median: 42.7%). There was only a weak and nonsignificant correlation ($r_s = 0.21$, $P = 0.34$) between initial and later EBF rates within countries. Rather, the EBF rates among the 22 countries studied significantly increased from baseline to later surveys ($P = 0.003$, 1-sample t test of the hypothesis that change in EBF rates within countries was not zero). This observed increase in EBF was strongly associated ($r_s = 0.66$, $P < 0.001$) with a higher adjusted WBTi score (Fig. 2).

However, the annual increase in EBF was also significantly ($P < 0.001$) associated with the EBF rate at baseline among the countries studied (Fig. 3A). This association was inverse, such that a low baseline EBF rate was associated with a greater increase in EBF. A low baseline rate of EBF was defined for this study as $<30\%$ EBF, which included 14 (64%) of the 22 countries. Among the 14 countries with a low baseline EBF rate, the median annual increase in the percentage of EBF was 1.0%/y (range: -0.3 – $3.8\%/y$). In contrast, among the 8 countries with a high baseline EBF rate, half of the countries experienced a decrease in their EBF rates, and the median annual increase in EBF was only 0.02%/y (range: -1.5 – $0.5\%/y$) (Fig. 3A). WBTi scores did not differ significantly ($P = 0.06$) between countries with high vs. low baseline EBF rates (Fig. 3B); however, in multiple linear regression analysis with the adjusted WBTi score and the baseline EBF rate included, both factors were significant predictors of annual change in EBF (Table 3). National sociodemographic factors [including, maternal education,

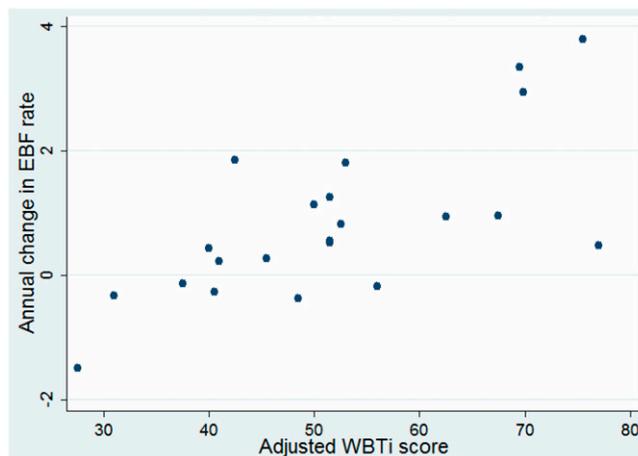


Figure 2 Annual change in EBF (%) by adjusted WBTi score. EBF, exclusive breastfeeding; WBTi, World Breastfeeding Trends Initiative.

urban residence, paid maternal employment and national gross national income price parity per capita (US\$)] were not significantly associated with change in EBF rates.

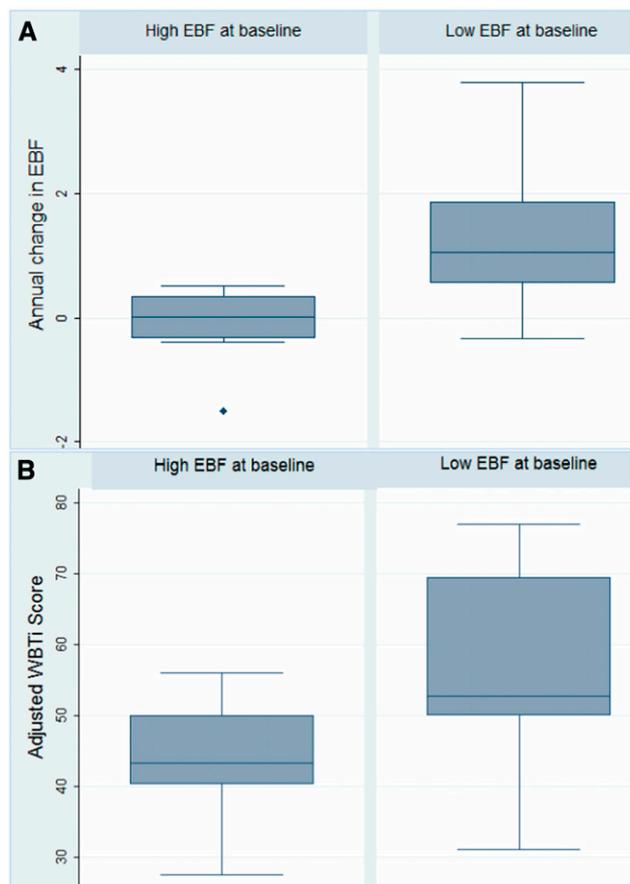


Figure 3 Box plots of low ($<30\%$) vs. high baseline EBF in relation to (A) change in EBF (annual percentage) and (B) adjusted WBTi score. EBF, exclusive breastfeeding; WBTi, World Breastfeeding Trends Initiative.

Table 3. Predictors of the annual increase in EBF by multiple linear regression analysis¹

Dependent variable	Independent variables	β	SE (β)	P value
EBF annual increase (adjusted $R^2 = 0.62$)	Baseline EBF rate	-0.028	0.01	0.007
	WBTi adjusted	.041	.014	0.012

¹ EBF, exclusive breastfeeding; WBTi, World Breastfeeding Trends Initiative.

Change in national-level BF rates

Over the period of the study, the median duration of BF increased by only 1 mo, from 19 to 20 mo. In contrast to the low correlation between EBF rates at baseline and later surveys, BF duration at the baseline survey largely explained BF duration at the last survey ($r_s = 0.92$, $P < 0.0001$). No association was found between annual change in BF rates and the adjusted WBTi score ($r_s = 0.22$, $P = 0.32$), or BF rates at the later survey and the adjusted WBTi score ($r_s = 0.19$, $P = 0.40$). However, among the 6 countries with a BF duration <15 months at baseline, the adjusted WBTi score was highly correlated with increase in BF ($\rho = 0.77$), though not statistically significant ($p = 0.072$).

Despite significant improvements in BF practices in many of the 22 countries included in this analysis, a big gap still separates current practices from accepted EBF and BF recommendations. In less than half of the countries with data are $\geq 50\%$ newborns put to the breast within 1 h of birth (Table 4). In only one-third of the countries are >50% of infants <6 mo of age exclusively breastfed.

Only 20 of the countries have data on bottle-feeding, which varies widely. Bottle-feeding is lower in African than in Latin American countries. The range is widest in Asian countries, from 6% in Nepal to close to 50% in Pakistan and the Philippines.

Discussion

The analysis presented in this article shows that implementation of the WHO Global Strategy for Infant and Young Child Feeding is associated with improvements in EBF and, potentially, with BF duration over a 10- to 20-y period. This suggests that, between the first and last surveys, changes occurred in social or cultural factors and/or in policies and programs that led to changes in EBF practices. One possible explanation is that policies and programs put into place starting in the 1980s and continuing through today have had an impact on EBF because public health officials have prioritized their promotion efforts because of EBF's very large effect on infant morbidity and mortality (13).

Our finding that characteristics historically associated with less BF are no longer significant in explaining trends in EBF is also consistent with recent publications, which show that changes in BF practices in Latin America and in Caribbean countries are entirely the result of changes in behavior among subgroups with factors such as increased urbanization and female education and employment exerting very little downward pull (14,15). In addition, improvements in the duration of BF in 4 Latin American countries

Table 4. Breastfeeding indicators for the most recent survey year¹

Country	Year	Breastfeeding duration	Early initiation of breastfeeding	Bottle-feeding
		<i>mo</i>	%	%
Africa				
Cameroon	2004	17.8	31.0	8.2
Ghana	2008	23.0	46.8	11.8
Kenya	2008	21.5	49.2	21.5 (E)
Malawi	2010	24.5	94.6	3.3 (E)
Uganda	2006	21.6	35.1	18.6
Zambia	2007	20.6	49.2	3.1
Zimbabwe	2010	18.1	63.5	6.1 (E)
Middle East				
Egypt	2008	18.4	49.7	11.6
Asia				
Bangladesh	2007	32.8	40.9	NA
India	2006	31.4	21.1	13.8
Indonesia	2007	21.8	43.5	30.4
Nepal	2011	31.0	40.4	6.2 (E)
Pakistan	2006	21.0	22.7	47.8
Philippines	2008	16.1	46.3	46.5 (E)
Latin America				
Bolivia	2008	19.5	62.4	44.3 (E)
Brazil	2006	14.0	NA	NA
Colombia	2010	15.1	56.5	56.8 (E)
Dominican Republic	2007	7.2	59.2	64.3 (E)
Ecuador	2004	15.3	26.4	NA
Guatemala	2008	21.0	55.5	35.3 ²
Mexico	2006	10.4	NA	NA
Peru	2007	21.1	56.6	37.2 (E)

¹ E, estimated; NA, not available.

² Breastfed children 6–24 mo of age.

(Bolivia, Brazil, Colombia, and Peru) are greatest among women living in urban areas and with more education and prenatal care compared with rural women and those with less education and prenatal care (16).

Brazil represents an international standard for BF promotion and support and provides many key lessons to consider. The median duration of BF increased from 5.2 mo in 1986 to 14.0 mo in 2006 in Brazil, whereas EBF increased from 2.5 to 38.6%. This remarkable increase coincides with a series of policies and programs put into place during the period along with continued refinement and readjustment to strengthen BF protection (Fig. 4). Another standout is Colombia, where BF duration increased from 8.5 to 14.9 mo between 1986 and 2010, and EBF increased from 15.4 to 46.8%. The progress in BF practices in Brazil and Colombia contrasts sharply with several other countries in Latin America where, over a similar period of time, little progress has been made. In the Dominican Republic, EBF increased by only 0.8 percentage points, from 7 to 7.8%, over a 16-y period. During the same period, BF duration declined from 9.3 to 7.1 mo. In Mexico, EBF decreased by 6.6 percentage points, from 28.8% in 1987–88 to 22.3% in 2006, and BF duration only increased from 9.5 to 10.4 mo over the same period. The lack of change in BF in Mexico and the Dominican Republic are not readily explained. However,

in Mexico, the Secretary of Health has included promotion of BF in his health agenda. A national BF policy was recently approved, and it is the first country that the authors are aware of to include the 10 steps of the Baby Friendly Hospital Initiative as part of the standard for hospital certification or recertification, which must take place every 5 y.

Factors for successful BF promotion policies and programs are well documented. They include implementation of the International Code of Marketing of Breast-milk Substitutes, the Baby Friendly Hospital Initiative, advocacy, training and education of health professionals, community-based promotion and support, maternity legislation, and workplace support (2). In addition, the implementation of human-milk banks in neonatal intensive care units is also likely to improve BF rates. Supported by the government of Brazil, nearly all countries in Latin America have ≥ 1 banks, which not only provide human milk for critically ill newborns but also foster a culture of BF in the hospital and serve as a reference center for training health care providers and for BF mothers. Legislation to lengthen maternity protection to 6 mo postpartum, such as that recently passed in Vietnam and Chile, is likely to help to improve EBF rates. Laws to mandate BF rooms in the workplace so that BF women can express and store breast milk, such as that stipulated in the Affordable Care Act in the United States, is

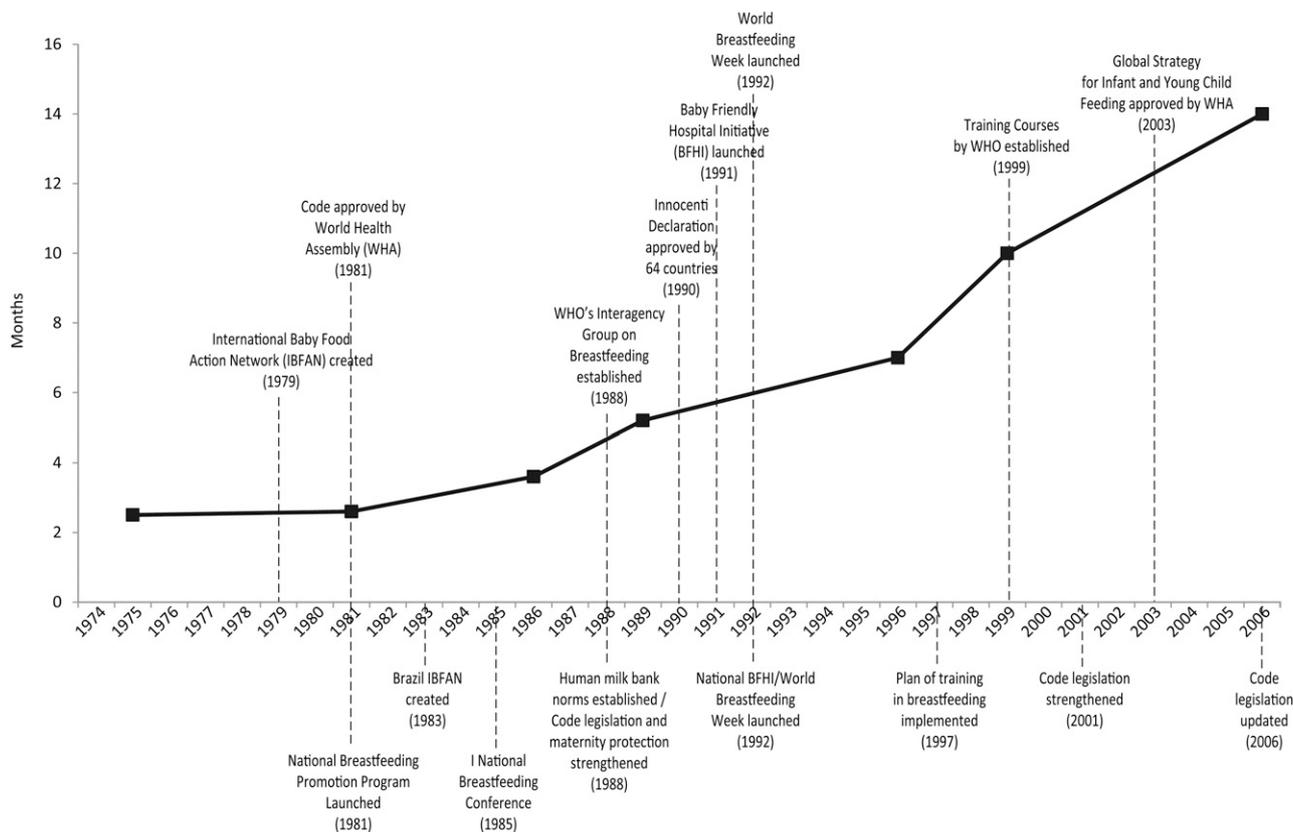


Figure 4 Median breastfeeding duration (mo) and global and Brazilian breastfeeding actions in 1974–2006; global actions are above the line showing median duration, and Brazilian actions are shown below line. The figure was translated from Portuguese, extended to 2006, and used with permission from Cadernos de Saúde Pública (20).

another measure needed to improve BF. An evidence-based framework and model to promote the effective scale up and sustainability of BF programs have recently been elucidated (17). Application of this model may further accelerate positive changes in BF practices. Last, continued measurement of implementation of the WHO Global Strategy for Infant and Young Child Feeding by using the WBTi tool and operations research to explore the functioning of health care systems and behavior of health professionals in relation to the persistence of impediments to improved BF practices is needed.

This study has limitations. Our data include only 22 countries, although these appear to be fairly evenly distributed across Africa, Asia, and Latin America and include large countries in each region such as Nigeria, India, and Brazil. Furthermore, our data are cross-sectional, and therefore, the analysis reflects only an association between trends in EBF and the BF environment as measured by the WBTi. Only 1 recent data point is available for the WBTi, whereas changes in EBF were measured over a 10- to 20-y period.

Nonetheless, the study has its strengths. Evaluation of national public health policies and interventions can only be observational in that they apply to the entire population where randomized controlled trials are neither possible nor necessarily ideal (18). In these situations, studies with adequacy designs, or those that show that implementation of policies and programs are associated with improvements in outcome indicators, are usually the only feasible designs and may provide evidence of impact (19).

In conclusion, our study demonstrates that trends in process indicators, in this case implementation of the Global Strategy, and outcome indicators, in this case EBF, both show substantial progress, suggesting that the strategy is having an important effect. Last, this analysis is, to our knowledge, the first quantitative assessment of the relationship between policies and programs in support of BF and changes in BF practices. Strengthened by previously published case studies (1,2), it also bolsters the argument that the association between BF protection, promotion, and support and improved EBF are measurable and possibly causal.

Acknowledgments

Both authors have read and approved the final manuscript.

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