Cost Comparison of Baby Friendly and Non–Baby Friendly Hospitals in the United States

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KEY WORDS

breastfeeding, baby friendly, cost, hospital, economic analysis

ABBREVIATION

BFHI—Baby-Friendly Hospital Initiative

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WHAT'S KNOWN ON THIS SUBJECT: The slow adoption of Baby-Friendly Hospital Initiative standards in the United States has been largely attributed to the barrier of paying for formula in hospitals. Little is known about the true cost differences between Baby Friendly and non-Baby Friendly hospitals.

WHAT THIS STUDY ADDS: This study adds to the literature by calculating the average cost differences between Baby Friendly and non-Baby Friendly hospitals in the US. Baby Friendly hospitals do not have significantly higher labor and delivery costs than non-Baby Friendly hospitals.

abstract

OBJECTIVES: The objectives of this study were to provide an economic assessment of the incremental costs associated with obtaining the World Health Organization and United Nations International Children's Emergency Fund designation as a Infant-Friendly hospital. We hypothesized that baby-friendly hospitals will have higher costs than similar non–baby-friendly hospitals.

METHODS: Data from the 2007 American Hospital Association and the 2007 Centers for Medicare and Medicaid Cost Reports were used to compare labor and delivery costs in baby-friendly and non–baby-friendly hospitals. Operational costs per delivery were calculated using a matched-pairs analysis of a sample of baby-friendly and non–baby-friendly hospitals in the United States. Costs associated with labor-and-delivery diagnosis–related codes were analyzed for each baby-friendly hospital and compared with the mean and median costs incurred by non–baby-friendly hospitals.

RESULTS: Nursery plus labor-and-delivery costs for the baby-friendly sites were $2205 per delivery, compared with $2170 for the non–baby-friendly matched pair. Baby-friendly facilities have slightly higher costs than non–baby-friendly facilities, ranging from 1.6% to 5%, but these costs were not statistically significant ($P > .05$).

CONCLUSIONS: These results suggest that becoming baby-friendly is relatively cost-neutral for a typical acute care hospital. Although the overall expense of providing baby-friendly hospital nursery services is greater than nursery service costs of non–baby-friendly hospitals, the cost difference was not statistically significant. Additional research is needed to compare the economic impact of maternal and infant health benefits from breastfeeding versus the incremental expenses of becoming a baby-friendly hospital. *Pediatrics* 2011;127:e989–e994

Infant nutrition and breastfeeding promotion have been the focus of worldwide attention for over 40 years through ongoing international efforts by the World Health Organization, the United Nations International Children's Emergency Fund, and other entities. In response to 2 major international summit declarations, in 1991 the World Health Organization and the United Nations International Children's Emergency Fund jointly launched the Baby-Friendly Hospital Initiative (BFHI) to promote successful breastfeeding. The objective of the BFHI is to designate a hospital or birthing site as baby friendly if it demonstrates compliance with the standards and guidelines summarized in the Ten Steps to Successful Breastfeeding. [1,2] Over the past 20 years, the BFHI was swiftly embraced on a nearly worldwide scope, leading to many thousands of baby-friendly designated sites. During the 1990s, almost 100% of hospitals in countries such as Sweden, Mongolia, Eritrea, and Namibia achieved baby-friendly status, and other countries such as Chile, Cuba, the United Kingdom, and the Netherlands significantly increased the number of baby-friendly hospitals.[3] However, the United States took a much slower approach, resulting in only 26 sites in the United States having received a baby-friendly designation by June 2000.[4] In 1993, the Healthy Mother, Healthy Infant coalition established an expert work group to study the feasibility of BFHI implementation in the United States. In 1994, the expert work group released its controversial recommendations despite significant discord among the expert work group members and criticism from major organizations, including the American Academy of Pediatrics.[5] Overall, there was a lack of uniform recommendation among major medical organizations in the United States about baby friendliness, specifically surrounding the baby-friendly–recommended prohibition of free infant formula provision to birth facilities. The BFHI Steps 6 and 9 expressly prohibit neonatal food or drink other than breast milk, ban the use of artificial teats or pacifiers, and stipulate that "the hospital or birthing site must pay fair market price for all formula and infant feeding supplies that it uses and can not accept free or heavily discounted formula and supplies."[6]

Implementation of the BFHI in the United States has slowly ensued on an elective basis, despite an accruing body of research that has substantiated the considerable health benefits that breastfeeding affords both nursing mothers and their infants.[7–9] Currently, less than 2% of hospitals in the United States have achieved a baby-friendly designation, and in 2009, there were only 86 baby-friendly–designated hospitals and birthing centers in the United States[10–11] Hospital regulatory agencies in the United States, such as the Joint Commission, have started to recognize hospital delivery– and nursery-associated initiation and promotion of breastfeeding as a quality-of-care issue. Exclusive breastfeeding was added to the Joint Commission's Perinatal Care Core Measure Set in January 2010.[12] The need to meet new quality-assurance measures and accreditation standards pertaining to exclusive breastfeeding may motivate health care professionals and facility administrators to implement initiatives to improve neonatal breastfeeding rates. As additional motivation to become baby friendly, the Centers for Disease Control and Prevention conducted the first national Maternity Practices in Infant Nutrition and Care survey in 2007 to characterize maternity practices in hospitals and birthing centers related to breastfeeding.[13] The Maternity Practices in Infant Nutrition and Care scores are published by state but not by facility. Hospitals receive their own score as it compares to other hospitals, and this should hopefully make them examine their own practices and try to improve perinatal care with regards to infant nutrition. Because baby-friendly–designated hospitals have higher breastfeeding rates,[14–17] a resurgence of interest by hospitals in becoming baby friendly is anticipated. In addition, in 2009 the American Academy of Pediatrics recently endorsed the BFHI and Ten Steps to Successful Breastfeeding.[18]

The slow adoption of BFHI standards in the United States has been largely attributed to the barrier of free formula availability in hospitals.[4] Although the resultant costs of declining these free products often is touted as the prime barrier to change, the health care cost burden of fully implementing the BFHI has not been studied to date. In addition, a baby-friendly designation requires multiple stages for implementation,[4] which consumes both time and resources and can increase costs for as personnel, information management systems, and financial capital. The amount of additional costs (such as supplies, personnel, and training) that will be incurred as a result of pursuing and achieving the baby-friendly designation remain undetermined. This study was undertaken to provide an economic analysis of the incremental institutional costs associated with becoming baby friendly so that administrative leadership of hospitals and birthing sites could make economically informed decisions about pursuing the baby-friendly designation. We hypothesized that baby-friendly hospitals will have higher costs than similar non–baby-friendly hospitals, which will be reflected in the overall expense per delivery.

METHODS

Sample

All baby-friendly hospital and birthing sites in the United States in 2009 were

identified using the baby-friendly public Web site, www.babyfriendlusa.org. Sixty-one of 82 baby-friendly sites identified also had data available in public data files so that they could be matched with similar size and type non–baby-friendly hospitals in the same city to conduct a matched-pairs statistical analysis on the costs of baby-friendly and non–baby-friendly hospitals. Baby-friendly and non–baby-friendly hospitals were matched by organizational data, such city, state, bed size, and number of all deliveries. These data were extracted from the American Hospital Association Directory. By matching baby-friendly hospitals to non–baby-friendly hospitals with similar organizational characteristics, potential influences from geographical differences and labor-pricing deviations were controlled. To ensure that our matched pairs were similar, beyond the variables of city, state, bed size, and number of deliveries, we also tested for significant differences between our baby-friendly and non–baby-friendly hospitals on other variables such as length of stay, case mix index, and percent Medicaid and self-pay deliveries. Table 1 shows similarities and differences between the baby-friendly and matched non–baby-friendly hospitals.

TABLE 1 Matched-Pairs Analysis Results of Infant-Friendly and Non–Infant-Friendly Hospitals

	Infant-Friendly Hospitals	Matched Non–Infant-Friendly Hospitals	*P*
Bed size	256	293	.289
Mean length of stay for deliveries	4.1	3.76	.052
Mean number of births per day	4.75	6.2	.053
Case mix index	1.42	1.52	.313
Percentage of Medicaid and self-pay deliveries	0.43	0.46	.082
Mean cost per delivery	$2205	$2170	.928
Median cost per delivery	$2012	$1975	.661

Analyses

Cost data were extracted from both the 2007 Centers for Medicare and Medicaid cost reports[19] and the 2007 American Hospital Association annual survey database,[11] which collect both nursery and labor-and-delivery costs. All nursery and labor-and-delivery expenses in each facility were summed then divided by the number of all births in 2007 to get a departmental cost-per-delivery estimate. Analysis of variance testing was performed to identify significant differences between the mean departmental cost per delivery for the baby-friendly and matched non–baby-friendly hospitals.

Cost data associated with 2007 labor-and-delivery diagnosis–related codes were then extracted from the 2007 Centers for Medicare and Medicaid cost reports specifically for each of the baby-friendly sites and for the entire population of acute care hospitals that had labor and delivery services and reported complete data in the United States in 2007. A Student *t* test was used to compare the costs of the 61 baby-friendly hospitals to the mean and median costs of the population of 2746 acute care hospitals. This study was reviewed and approved by the University of Texas Health Science Center at San Antonio Institutional Review Board and was deemed as nonhuman subjects research.

RESULTS

Cost data extraction and analyses showed that the total departmental costs (nursery plus labor and delivery) for the baby-friendly sites were $2205 per delivery on average (combining vaginal and cesarean delivery), compared with $2170 for the non–baby-friendly matched pair ($35 variance), reflecting a 1.6% higher cost for baby-friendly facilities. The matched pairs seemed comparable in most respects, whereas the baby-friendly facilities were slightly smaller institutions with 256 beds versus 293 and had an average of 4.75 births per day versus 6.2 in non–baby-friendly hospitals, although these differences were not statistically significant. *T* tests for differences found no significant differences in costs between the groups. A Student *t* test demonstrated no statistically significant difference in the mean labor-and-delivery costs for the baby-friendly hospitals and their matched pairs ($t = 0.091$, $P = .928$). Applying the Mann-Whitney-Wilcoxon test to test for significant differences in median costs for baby-friendly hospitals and their matched pairs found no statistically significant differences ($W = 74.0$, $P = .661$). F tests for SDs, which tests the hypothesis that the means of these 2 normally distributed populations all have the same SD and are equal, also yielded no difference between the 2 groups ($F = 1.414$, $P = .208$). Although the labor-and-delivery costs were slightly higher for baby-friendly hospitals, they were not statistically significantly greater than similarly matched non–baby-friendly facilities. In addition, length of stay was higher for the baby-friendly hospitals, and the percentage of Medicaid patients was higher for the non–baby-friendly hospitals, both of which bordered on being statistically significant. These results are presented in Table 1.

Diagnosis-related code costs associated with labor and delivery also were analyzed for baby-friendly and non–baby-friendly hospitals. These costs were averaged across all of the 6 labor-and-delivery diagnosis-related codes for the sample of baby-friendly facilities then compared with comparably averaged labor-and-delivery

code costs derived from the population of acute care hospitals in our database (2746 hospitals). The data were normally distributed, so only the mean costs are reported. The non–baby-friendly facilities' mean labor-and-delivery cost was $3510, which was comparable with those reported for all deliveries in 2006.[20] The average cost for the same diagnosis-related codes in baby-friendly sites was $3688, representing a 5% higher cost. Student *t* tests confirmed that this was not significant ($t = .102$, $P = .839$). All costs were standardized to 2007 US dollars.

In summary, both cost analyses suggest that baby-friendly facilities have slightly higher costs than non–baby-friendly facilities, ranging from 1.6% to 5%. No cost differences were found to be statistically significant, which also means that the possibility that these cost differences are on the basis of random variation or chance alone cannot be excluded. The commonly touted belief that baby-friendly facilities have labor-and-delivery costs that prohibitively exceed those of non–baby-friendly hospitals was not supported by our findings when baby-friendly hospitals were compared with similar non–baby-friendly hospitals or in comparison with the entire population of acute care hospitals that provide labor-and-delivery services.

DISCUSSION

These 2 analyses provide a reliable comparison of cost differences between baby-friendly and non–baby-friendly hospitals. The analyses do not support the hypothesis that baby-friendly hospitals have significantly higher costs than non–baby-friendly hospitals. These findings are consistent with 2 previous studies that indicate minimal additional costs of becoming baby friendly. One study[15] found that the hospital cost of formula was approximately $20 000 after achieving baby-friendly status, and another study[21] reported that the cost of breast milk for premature infants was $0.95 per 100 mL compared with $2.97 for liquid ready-to-feed specialty formula. These additional references provide additional context to the economic argument for baby-friendly adoption. Breastfeeding has long been recognized through extensive research as offering infants, mothers, families, and society a wide variety of compelling "health, nutritional, immunologic, developmental, psychological, social, economic, and environmental benefits."[22] These widely known advantages have helped inform the development of goals and objective for many health initiatives in the United States, such as *Healthy People 2000* and *Healthy People 2010*, the Department of Health and Human Services' *HHS Blueprint for Action on Breastfeeding*, the US Breastfeeding Committee's *Breastfeeding in the United States: A National Agenda*, and the American Academy of Pediatrics/American College of Obstetricians and Gynecologists' *Guidelines for Perinatal Care*. There is no longer any debate about the importance of breastfeeding for the overall health of our nation. The frontier that remains is how our health systems can support women and families in breastfeeding.[23]

Adoption of the World Health Organization/United Nations International Children's Emergency Fund BFHI has been highly successful worldwide, as reflected in breastfeeding-rate increases associated with designation as a baby-friendly facility.[17,24,25] More than 20 000 facilities in 156 countries are baby friendly.[24] The BFHI has resulted in an 8% increase in exclusive breastfeeding; this increase is estimated to have reduced infant mortality by more than 1 million and saved countries billions of dollars in unneeded breastmilk substitutes.[26] For many years, hospitals have accepted free or heavily discounted formula and related accoutrements, such as bottle water, nipples, volu-feeders, and pacifiers from manufacturers. The formula industry has long maintained a successful marketing strategy that has engendered a cooperative alliance with hospitals. Free or heavily discounted formula, as well as formula-feeding–related products and gifts, are available from manufacturers to be passed to both formula and breastfeeding mothers and newborns at birth and on hospital discharge. Over time, the receipt of free or heavily discounted formula industry products has become a systematic and dependable service without perceived costs to hospitals or patients. This habit has continued because it seemingly has not posed an economic burden to the hospitals or patients. Although continuation of this practice is in direct conflict with best-care practices for exclusive breastfeeding and the BFHI Ten Steps to Successful Breastfeeding, many facilities have chosen to maintain status quo rather than opt to update their policies in favor of clear health advantages. This study is the first to apply an economic analysis to determine the true costs of changing hospital policy to meet the criteria to become baby friendly. Although implementing baby-friendly policy in a typical hospital with labor-and-delivery and nursery services will likely increase overall costs per delivery, our findings show that the average overall increase in cost per delivery is low, ranging from 1.6% to 5%. This range is based on averages, so numerous other factors, such as hospital efficiency and successful baby-friendly implementation, will need to be considered to estimate the potential impact on overall labor-and-delivery costs.

One limitation of this study is that we were not able to control for the length of time a hospital has been designated as baby friendly. Unfortunately, these data are not publicly available. As

baby-friendly hospitals are able to increase their breastfeeding rates, they will have to purchase less formula and fewer supplies, which will lower their overall labor-and-delivery costs. Some baby-friendly hospitals in our sample had recently implemented baby-friendliness and may not have been able to achieve the high breastfeeding rates that more experienced baby-friendly hospitals have and therefore still have somewhat higher costs. In addition, some hospitals are likely to achieve baby-friendly status very rapidly and have few changes to implement, whereas other hospitals may take a longer period of time to implement changes and achieve baby-friendly status. Considering that labor-and-delivery costs associated with baby-friendly designation may continue to trend lower over time, it is likely that the overall cost of sustained baby-friendliness may be even lower than our analyses suggest.

A second limitation to our study arises from this being a comparison of costs between current baby-friendly and non–baby-friendly hospitals. Many current baby-friendly hospitals are smaller hospitals located in specific regions of the country and serve a predominantly white and insured patient population. As of 2010, ~20% of baby-friendly hospitals are located in the Northeast, 24% in the Midwest, 13% in the South, and 42% on the West Coast (1% in Hawaii and Alaska).[26] The matched-pairs analysis controlled for geographic location of the hospitals, but there may be overall regional differences in costs, given the predominance of West Coast baby-friendly hospitals. In addition, we were unable to control for racial and other patient-mix demographic characteristics because neither data set contained this information. Although there are notable exceptions,[4] few baby-friendly hospitals are large urban teaching hospitals that serve medically complex, ethnically diverse, underserved, or uninsured high-risk obstetric patients. For these types of facilities, it is unclear if the increase in costs associated with a baby-friendly designation would remain insignificant. When patient populations have a greater prevalence of sick infants who may not be able to breastfeed, the costs of formula and other equipment for infant feeding may be more than what can be estimated by this method of study. By becoming baby friendly, a facility would no longer accept free or discounted product, potentially increasing formula-related costs if breastfeeding is not possible.

Not all breastfeeding outcomes are directed by the hospital stay; community support also is necessary to increase breastfeeding rates. Patient race and demographics have been shown to impact breastfeeding rates, so these factors would need to be addressed to succeed in becoming baby friendly while serving this patient population. Low-income women and black women typically have lower breastfeeding rates,[28–29] although baby-friendly hospitals have typically been able to increase these rates for both populations.[14] Therefore, hospitals considering implementing baby friendliness should take into consideration patient acuity and demographic characteristics. Hospitals with high-risk, low-income, or diverse patient populations may have higher labor-and-delivery costs initially, and it is unclear from this study if their long-term costs will remain insignificant because there are very few large urban medical centers that are baby friendly. However, most hospitals are now part of systems that provide ongoing care; cost savings of less future illness and healthier children should be factored into the economic savings. Future research should compare the labor-and-delivery costs between baby-friendly and non–baby-friendly large, urban academic medical centers with high-risk, low-income, and diverse patient populations.

Another consideration for hospitals deciding to pursue baby-friendly status is the need to get support from upper management, key physicians, and nurses before attempting to implement baby friendliness. Our costing model did not include any organizational or structural costs of gaining approval to pursue a baby-friendly designation, reorganizing departments, facility redesign to accommodate single birthing rooms, clinical education and training, and program implementation, but these costs can be significant up-front costs. In addition, because of the costs of program implementation and the cultural and behavior changes required of physicians and nurses, it is important to identify champions who will be able to push the program through and sell it to others.

CONCLUSIONS

Our study offers valuable new insight into the potentially low economic burden to hospitals and birthing sites considering pursuing and attaining a baby-friendly designation in accordance with the BFHI criteria. In addition, overall labor-and-delivery costs are not significantly greater for baby-friendly hospitals. Although the cost of purchasing formula and supplies is often cited as a barrier to implementation of the BFHI, the findings from this study indicate that increased costs for baby-friendly hospitals are minimal. Future studies are needed to determine whether costs for baby-friendly hospitals would continue to decrease as breastfeeding rates are maximized over time.

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