

Social Value of Baby-Friendly Hospital Initiative Implementation in Australia: Case Study

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Abstract

Background

Breastfeeding has positive impacts on the health, environment, and economic wealth of families and countries. Nevertheless, barriers to accessing high-quality breastfeeding support are evident in the low global exclusive breastfeeding rate of 41%. The World Health Organization (WHO) launched the Baby Friendly Hospital Initiative (BFHI) in 1991 as a global program to incentivize maternity services to implement the Ten Steps to Successful Breastfeeding (Ten Steps). These were developed to ensure that maternity services remove barriers for mothers and families to successfully initiate breastfeeding and to continue breastfeeding through referral to community support after hospital discharge. However, in 2020 only 26% of Australian hospitals were BFHI-accredited. This study aimed to examine the social return on investment (SROI) of implementing the BFHI in one public maternity unit in Australia.

Method

The study was non-experimental and conducted in the maternity unit of an Australian BFHI-accredited public hospital with around 1000 births annually. This facility illustrated costs for BFHI implementation in a relatively affluent urban population, and more than three in four births in Australia take place in public hospitals. Stakeholders considered within scope of the study were the mother-baby dyad and the maternity facility. We interviewed the hospital's Director of Maternity Services and the Clinical Midwifery Educator, guided by a structured questionnaire, which examined the cost (financial, time and other resources) and benefits of each of the Ten Steps. Analysis was informed by the Social Return on Investment (SROI) framework, which uses monetary values to measure social, environmental and economic outcomes of change. This information was supplemented with micro costing studies from the literature that measure the benefits of the BFHI.

Results

The social return from the BFHI initiative in this facility was calculated to be AU\$ 1,398,140. The total investment required was AU\$ 24,433 per year. Therefore, the SROI ratio was approximately AU\$ 55:1 (sensitivity analysis: AU\$ 16-112), which meant that every AU\$1 invested in BFHI implementation by this maternal and newborn care facility generated approximately AU\$55 of benefit.

Conclusions

Scaled up nationally, the BFHI could provide important benefits to the Australian health system and national economy. In this public hospital, the BFHI produced social value greater than the cost of investment, providing new evidence of its effectiveness and economic gains as a public health intervention. Our findings using a novel tool to calculate the social rate of return, indicate that implementation of the BFHI is an investment in the health and wellbeing of families, communities and the Australian economy, as well as in health equity.

Background

Breastfeeding is the normal biological standard of infant feeding. It has benefits to infant and maternal health, and reduces health inequality, as well as reducing harmful impacts to the environment and decreasing health expenditure attributed to preventable illness. Socioeconomic groups with lower education and income levels are less likely to breastfeed when compared to their higher education and income group peers (1). Children who are not breastfed have, inter alia, higher rates of obesity, malocclusion and asthma, and lower intelligence quotients (2), while a lack of breastfeeding increases maternal risk of ovarian cancer, breast cancer, type 2 diabetes and osteoporosis (3, 4). The World Health Organization (WHO) recommends breastfeeding exclusively for the first six months of infants' life (5). Despite the benefits, the exclusive breastfeeding rate globally is only 41% (6). High-income countries such as Australia have shorter breastfeeding duration than low- and middle-income countries, even though breastfeeding has been proven to reduce the risk of sudden infant deaths by more than one third in high-income countries and half of all diarrhea episodes and a third of respiratory infections in low and middle-income countries (7).

Factors associated to low breastfeeding initiation and/or duration include maternal and paternal lower education (8, 9), partners' negative attitudes towards breastfeeding (10), mother/baby separation after birth (9) and lack of health professionals' knowledge of breastfeeding (11, 12). The first few hours and days of an infant's life are critical to establish breastfeeding. Therefore, WHO launched Ten Steps to Successful Breastfeeding in 1989 and Baby Friendly Hospital Initiative (BFHI) in 1991 to focus on providing a high

standard of maternity services to enable every infant to attain the best nutrition standards available. In 2018, WHO revised the Ten Steps (13). The revisions are subtle, but meaningful for implementation, with the focus shifted from healthcare staff to parents and families, empowering and enabling women and families to make choices regarding infant feeding method based on information free from conflict of interest (14). BFHI status is awarded to hospitals that implement high quality maternity care through the Ten Steps to Successful Breastfeeding policy; while remaining independent from formula companies and their affiliates (15), and re-assessed every three years (16). UNICEF Australia passed governance of BFHI within Australia to Australian College of Midwives (16). In 2006, the Australian Baby Friendly Hospital Initiative became the Baby Friendly *Health* Initiative in order to more accurately reflect the expansion of the initiative into community health facilities (16).

Implementing the Ten Steps and achieving BFHI accreditation is essential to ensure quality of maternity care received by mothers and families, regardless of their social, economic, race and religious background. The benefits of implementing Ten Steps and achieving BFHI accreditation and its impact on breastfeeding has been demonstrated in research internationally (17-21), and the cost-effectiveness of BFHI in reducing late neonatal infant mortality rate has been established (22). Despite evidence that the BFHI improves the wellbeing of mothers and significantly increases the duration of breastfeeding (17), only 10% of births occur in maternity services that are designated as baby-friendly internationally (23), and only 77 out of 266 maternity services (26%) in Australia are baby-friendly accredited as of 2020 (24). Several Australian studies showed barriers to BFHI implementation that are similar to those described internationally (25), such as lack of policy support and funding due to the low priority and value of breastfeeding (26, 27).

One Australian study showed that perception that the cost of BFHI accreditation may outweigh the benefit which could hinder the scale up of the BFHI program in Australia (28). No studies have explored the social return on investment of the BFHI in the Australian context.

Research aim/question

This study aimed to examine the social return on investment (SROI) of implementing the BFHI in one public maternity unit in Australia.

Methods

Sample and location

The study was conducted in an Australian BFHI-accredited public hospital in August 2019. We selected this hospital because three in four Australian mothers give birth in public hospital (29) and this particular hospital has been BFHI-friendly accredited for 15 years.

Data collection

Interviews aimed to elucidate the costs of implementing the BFHI. Underpinned by the principles of the Social Return on Investment (SROI) framework, and in collaboration with the Director of Midwifery, the Clinical Midwife Consultant, and the Clinical Midwifery Educator, we developed a structured questionnaire based on the 2018 Ten Steps to Successful Breastfeeding (Ten Steps) which was used for the interview. The interview was conducted on 21st August 2019 and took one and a half hours.

Data storage

The interview was audio-recorded and then transcribed verbatim. Data was stored on password protected computer at the university and only accessible to the primary researcher.

Data analysis

Data was analyzed in excel using the SROI framework, which uses monetary values to measure social, environmental and economic outcomes of change. The SROI is a framework for measuring and accounting for the much broader concept of value; it seeks to reduce inequality and environmental degradation, and improve wellbeing by incorporating social, environmental and economic costs and benefits (30). The benefits of breastfeeding are associated with a wide range of outcomes including health and social benefits. Therefore, the SROI methodology was relevant to help understand the value created by these programs to inform policy making. The information obtained in the interviews was supplemented with evidence-based estimations from the literature that measured the

benefits of the BFHI. SROI analysis involves a 5-step process: establishing scope and involving stakeholders, mapping outcomes, evidencing and valuing outcomes, establishing impact, and calculating the SROI ratio. Each step is explained in detail below.

Establishing scope and involving stakeholders

First, we identified the stakeholders for SROI analysis. For our analysis, implementation of the Ten Steps as a framework for the BFHI involved two main stakeholders: the mother and baby dyad, and the maternity facility. These two main stakeholders were included as they were identified to derive the greatest benefits from Ten Steps implementation and sufficient evidence was available, and it was feasible to measure and include.

Mapping outcomes

Second, we mapped the outcomes for each stakeholder. A theory of change was developed from the literature, representing how the BFHI were expected to bring about change. For mothers, the benefits included risk reduction of breast cancer, cardiovascular disease, ovarian cancer, hypertension, and for no cost related to buying formula (3, 31-35). For babies, the benefits include reduced risk of diarrhea, respiratory infection, acute otitis media, necrotizing enterocolitis, obesity, Sudden Infant Death Syndrome (SIDS) diabetes, and higher IQ (2, 36-45).

Evidencing and valuing outcomes

Third, we searched the literature to evidence outcomes (Table 1). The cost in achieving BFHI accreditation based on interview findings (see Appendix 1). From the interview, costs relating to the BFHI application fee, lunch cost for the assessors, human resource relating to the cost of policy revision, BFHI system monitoring and compliance, breastfeeding counseling, staff training, as well as printing and laminating cost, provision of breastfeeding tools (e.g. nipple shield, pill-cups for cup feeding, hospital-grade breast-pump) and formula purchase for special-needs, preterm and low birth weight babies.

Table 1. Financial proxy used to allocate a market price

Babies	Financial proxy	Cost
Reduce risk of diarrhea	Cost of gastrointestinal (46)	AUD 20.27
Reduce risk of respiratory infection	Cost of influenza-related disease (47)	AUD 2,864
Reduce risk of acute otitis media	Cost of treating otitis media in Australia (48)	AUD 594
Reduce risk of necrotizing enterocolitis	Cost of NEC treatment (49)	AUD 13,863
Higher IQ	Annual earnings (average weekly income in Australia (50) x 52 weeks)*	AUD 89,487
Reduce risk of obesity	Cost of obesity in Australia (51)	AUD 2,500
Reduce risk of type 1 diabetes	Cost of diabetes in Australia (52)	AUD 3,131
Reduce risk of type 2 diabetes		
Reduce risk of Sudden Infant Death Syndrome (SIDS)	Annual earnings (average weekly income in Australia (50) x 52 weeks)*	AUD 89,487
Mothers		
Reduce risk of breast cancer	Cost of breast cancer treatment per case in Australia (53)	AUD 36,448
Reduce risk of cardiovascular disease	Cost of cardiovascular disease treatment in hospital in Australia (54)	AUD 1,700
Not buying formula	Formula supply for one year for full formula-fed baby (1.5 tins for a week for the first 6 months and 0.6 tin for a week for the next 6 months) * We followed WHO guidance (55) and adapt it to Australian settings	AUD 1,160
Reduce risk of ovarian cancer	Cost of ovarian cancer treatment per person in Australia (53)	AUD 31,958
Reduce risk of hypertension	Cost of hypertension treatment per diagnosed case (54)	AUD 570
*assumption		

Establishing Impact

Deadweight, attribution, and displacement were subtracted from the outcome to reduce the risk of over-claiming benefits. To determine the specific value, we reviewed the literature on breastfeeding. Deadweight relates to a change that would have happened anyway even if BFHI was not implemented; we assumed that 5% of benefits would have happened without the BFHI. Displacement is an assessment of how much of the outcome displaced other outcomes; we assumed the BFHI would displace 20% of other activity. Attribution is the term used for change that occurred caused by other intervention; we assumed 25% of benefits were attributed to other activities. We also assumed that 20% of the benefits would decline (drop off) over time.

Calculating the SROI and sensitivity analysis

In this step we estimated how long the outcomes will last and used them in the analysis. Here we knew the duration of the outcome due to earlier literature search and interviews. We assumed the benefit included the risk reduction of diarrhea, respiratory infection, acute otitis media and necrotizing enterocolitis lasted for three years; higher IQ, risk reduction of obesity, type 1 and type 2 diabetes and SIDS for 30 years; risk reduction of breast and ovarian cancer, hypertension and cardiovascular disease for 15 years; and formula supply for two years. The costs and benefits were discounted to calculate the net present value, to ensure that the costs and benefits in different time periods were comparable. The recommended rate of 4% (56) was used, recognizing the value of cash today is higher than value of cash in the future. This is the net present value (NPV). After the net present value was calculated, we subtracted the investment and then divided it by the total input, that being the total monetary investment in the BHFI.

$$\text{SROI} = \frac{\text{Net present value of BFHI (NPV)} - \text{Value of investment}}{\text{Value of investment}}$$

We conducted a sensitivity analysis identifying the estimated with the greatest impact on the SROI ratio, to test how sensitive the ratio is to changes in these estimates including in the deadweight, displacement and attrition and specific estimates.

Results

The average number of births in Calvary public hospital was 1000 annually, with exclusive breastfeeding rate on discharge of 97% in 2019. The value of benefits and costs is summarized in Table 2.

Table 2: Value of benefits and costs of BFHI accreditation at Calvary Public Hospital

Benefits	Annual amount in AUD
Babies	
Reduce risk of diarrhea	3,004
Reduce risk of respiratory infection	41,138
Reduce risk of acute otitis media	36,397
Reduce risk of necrotizing enterocolitis	100,591
Higher IQ	9
Reduce risk of obesity	276,832
Reduce risk of type 1 diabetes	118
Reduce risk of type 2 diabetes	33,106
Reduce risk of Sudden Infant Death Syndrome (SIDS)	612,091
Mothers	
Reduce risk of breast cancer	111,668
Reduce risk of cardiovascular disease	4,186
Not buying formula	121,859
Reduce risk of ovarian cancer	52,462
Reduce risk of hypertension	4,679
Total value of benefits	1,398,140
Investments	
Total value of investments	24,433.80
Net Yield (benefits less investments)	1,373,705.73
Social Return on Investment (SROI)	55.38

The social return (benefits) was calculated to be AU\$ 1,398,140 and total investment required was AU\$ 24,433 per year. Therefore, the SROI ratio was 55:1, which meant that every AU\$ 1 invested in the BFHI generated approximately AU\$55 of benefit to the Australian economy. The payback period was 0.63 month, which meant that all the investment would return in around 1 month.

For our baseline estimation of the SROI we used conservative assumptions. We conducted sensitivity analysis by trying different assumptions (table 3). The SROI calculation was dominated by the high value of risk reduction in obesity and SIDS for babies as well as breast cancer risk reduction for mothers.

Table 3: Base and new case scenarios

Sensitivity analysis	Base case	New case	New ratio
Attribution	25%	50%	AU\$ 37
Deadweight	5%	50%	AU\$ 29
Displacement	20%	0%	AU\$ 69
Drop off	20%	50%	AU\$ 16
Discount rate	4%	6%	AU\$ 51
Value of obesity risk reduction	26%	22%	AU\$ 53
		30	AU\$ 57
Value of SIDS risk reduction	40%	18%	AU\$ 40
		56%	AU\$ 67
Value of breast cancer risk reduction	4.3%	2.9%	AU\$ 54
		5.8%	AU\$ 57
Total value of outcome	On average AU\$ 99,867	Value divided by 2	AU\$ 27
		Value multiplied by 2	AU\$ 112
Birth type	Single birth (N=1000)	Twins and triplet (N=700)	AU\$ 52

All scenarios tested demonstrated the SROI ratio in favor of the BHFI was >1, indicating that social value of the BHFI is likely to be greater than the investment made in the program.

Discussion

Our results demonstrate that every investment of AU\$1 drives a social return of AU\$55. This evaluation also demonstrated the impact of the BHFI whose principal goals are to ensuring maternity service quality is equitable for every mother and family. Other studies have also found a positive social return for breastfeeding support programs; for example, a nutritional counselling and breastfeeding support program in Nairobi brought US\$71 for every US\$1 invested (57). A breastfeeding group facilitated by Public Health Nurse in Ireland brought €15.85 for every €1 invested (50).

To the best of our knowledge, there are few studies using SROI to examine programs related to breastfeeding. One strength of the SROI methodology includes deep engagement with stakeholders, enabling practice-based identification of outcomes and values. Difficulties can be encountered in valuing outcomes and what might have happened anyway. This type of research is most commonly conducted by consultants, which can be costly (58). There are few peer-reviewed reports of SROI in the public domain, limiting our capacity to compare our findings with those from previous studies (58).

Modelling conducted for the Lancet Breastfeeding Series estimates that global economic losses related to lower cognition from not breastfeeding reached a staggering US\$302 billion in 2012, equivalent to 0.49% of world gross national income. In high-income countries alone these losses amounted to US\$231.4 billion, equivalent to 0.53% of gross national income (7). The annual cost of not breastfeeding according to WHO recommendations (six months of exclusive breastfeeding and continued breastfeeding until two years old or beyond) globally was approximately US\$1.1 billion annually from preventable maternal and infant morbidity and mortality (59). In the Australian Capital Territory alone, the cost of treating five common but preventable diseases by breastfeeding (gastrointestinal illness, respiratory illness, otitis media, eczema and necrotizing enterocolitis) was estimated at AU\$1-2 million annually in 2001 (60). An American study of suboptimal breastfeeding cost of necrotizing enterocolitis morbidity and mortality in extremely low birth weight newborn calculated US\$27.1 million in direct medical costs, US\$563,655 in indirect nonmedical costs and US\$1.5 billion in cost attributable to premature death (61). The promotion of breastfeeding is protective of both the health and wealth of society.

As part of our SROI analysis, stakeholder engagement did not provide all the inputs to the SROI model resulting in some of the outcome values being taken from the literature. Compared to the conventional Return on Investment analysis, SROI not only calculates

benefits against capital invested, but also takes into account externalities (spillover effects from the intervention) (62). In fact, in the real world there are no activities entirely limited to its direct impacts, as there are consequences which also affect broader social, economic and environmental dimensions (62).

Breast feeding can play an important role in narrowing health inequalities. Low breastfeeding rates are related to several factors, and exacerbated by disparities including access to services and socioeconomic and educational background of the mother (63, 64). Pregnancy presents a unique opportunity for a universal population health intervention to reduce social inequalities. As shown by this research embedding breastfeeding support programs, such as the BFHI, into routine care benefits society and contributes significantly to reducing infant and mother health disparities. In a publicly funded health system, like Australia's, it provides an opportunity to intervene before systemic barriers that create differential experiences for mothers occur (65). There is overwhelming evidence that the benefits of breastfeeding in both the short and long term enable infants to have the best possible health regardless of family's social and economic background. Empowering mothers and families with information that breastfeeding provides the ideal nutrition for children could also meet other policy aims of government. A key aim of the Australian government's closing the gap policy is targeted at improving Aboriginal and Torres Strait Islander health and to halve the gap in child (ages 0–4) mortality rates. Within the indigenous community infant and child mortality is twice as likely before the age of 5, than their non-indigenous counterparts (66). Research has shown that Indigenous women are less likely to breastfeed their babies (67). One of the reasons attributed to this decrease is lack of professional support services (68) such as those offered by the BFHI Ten Steps criteria for quality maternal and newborn care.

The perceived lack of policy commitment might be due to low valuation of breastfeeding as a result of the invisibility of breastfeeding and breast milk's contribution from an economic perspective (64). Breastfeeding and breast milk are perceived as free products, even though it is not free when it costs mother's time and effort. One Australian study measured the value of human milk in economic production statistic (e.g. gross domestic product/GDP) and showed that human milk production levels exceed \$3 billion annually (64).

Supporting mothers in the early days after birth in hospital through the BFHI is essential for health equity, as exclusive breastfeeding in hospital is associated with longer duration of breastfeeding (18, 19, 21, 69), particularly in mothers from lower socioeconomic backgrounds (70). The BFHI represents an initiative that is available for all, regardless of their socioeconomic status, and it addresses inequalities throughout the lifetime.

Implication

The results of our study align with previous research regarding the SROI of breastfeeding programs. Investment in breastfeeding support programs, including the BFHI, benefits the community. As the social benefits are greater than the investment and it provides the best start for every infant, the BFHI needs to be prioritized by the government. In principle, the Australian government supports and promotes breastfeeding, and specifically the BFHI, at the national (68, 71, 72) and state and territory levels (73-75); however there is lack of follow-up action. The Best Start report recommended the BFHI to be integrated with national accreditation standards since 2007 (68) and the National Breastfeeding Strategy, which includes the BFHI integration into the national standards, however neither recommendation has been actioned (76). Breastfeeding and breast milk are perceived as free products, even though it is not free when it costs mother's time and effort.

Limitations

This study measured the benefits compared to the cost invested by the hospital. Nevertheless, our study did not include cost savings for healthcare providers, which were not taken into account due to large gaps in the literature relevant to the Australian health system. There is also no literature on the benefits to healthcare professionals in implementing the BFHI. Moreover, mothers' time and effort to breastfeed were not included in the calculation, with only limited data on this important investment available in the current literature (77-79). The impact of breastfeeding support programs on mothers is well documented (80-82); however, elucidation of the SROI from mothers' perspectives would be of great value in further clarifying the social impact of implementing the BFHI. Our examination of the SROI of implementation of the BFHI in one public hospital in Canberra, Australia provides the foundation for future research in other hospitals and community settings.

Conclusion

The results of our study indicate that implementation of the Ten Steps and the BFHI is worth the investment; the social return received was far greater than the investment. BFHI accreditation is a way to ensure equitable quality maternity care. This study was the first that

measured social return of BFHI accreditation and provides strong evidence to prioritize the BFHI at a national level.

Declarations

Ethics approval and consent to participate

The ethics for this study was approved by The Australian National University Human Research Ethics Committees (Protocol 2019/227) and the Calvary Hospital Ethics Committee. Written informed consents were obtained from the Director of Midwifery, the Clinical Midwife Consultant, and the Clinical Midwifery Educator.

Consent for publication

The ethical approval provides the consent for publication.

Availability of supporting data

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Competing interest

The authors declared no potential conflicts of interest with respect to the research, authorship and/or publication of this article.

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Authors' contributions

AP, JD and SB collected data; AP and SB conducted SROI analysis; AP, SB, JS and JD drafted and revised the paper. All authors read and approved the final manuscript.

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