

# BMJ Open Self-reported breast feeding practices and the Baby Friendly Hospital Initiative in Riyadh, Saudi Arabia: prospective cohort study

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## ABSTRACT

**Background:** The Baby Friendly Hospital Initiative (BFHI) is a practice guideline for healthcare providers to promote breastfeeding and increase breastfeeding rates.

**Objective:** This study aimed to examine reported experiences and views on breastfeeding of women using prenatal and postnatal services, and opinions of staff, in the context of the BFHI programme in Riyadh, Saudi Arabia.

**Design:** Prospective cohort study.

**Setting:** This prospective, longitudinal study was conducted from December 2013 to September 2015 at two healthcare facilities (BFHI and non-BFHI) in Riyadh Saudi Arabia.

**Methods:** Women 36–40 weeks gestation receiving antenatal care at the hospitals were enrolled.

Questionnaires were administered prenatally, at 1, 3 and 6 months postnatal and to the administrator and maternity staff.

**Results:** We recruited 277 women with an estimated 80% response rate. 156 (BFHI=78/139, non-BFHI=78/138, 56%) participants completed all questionnaires. Most BFHI-hospital participants (77.9%, n=8 for this question) acknowledged seeing the breast feeding policy compared to 23.5% (n=23) at the non-BFHI-hospital ( $p<0.01$ ). Breast feeding education and encouragement was higher at the BFHI-hospital (93.3%) compared to the non-BFHI-hospital (48.2%;  $p<0.01$ ). At postpartum discharge, 51% (n=53) of mothers in the BFHI-hospital were breast feeding exclusively versus 29.6% (n=29) at the non-BFHI-hospital. Where formula feed was introduced, women in the BFHI-hospital more often practiced mixed feeding rather than exclusive formula feeding with some switching from mixed feeding to exclusive breast feeding between 3 and 6 months postpartum. Exclusive breast feeding rates declined in both hospitals at 3 and 6 months postpartum with lack of community services for lactation being a major reason. Although BFHI-hospital staff (n=9) were more conversant with BFHI principles, defects in adherence to the BFHI 10 Steps were identified.

**Conclusions:** This is the first study assessing the effectiveness of BFHI implementation in Saudi Arabia.

## Strengths and limitations of this study

- Participants were followed up for 6 months by dedicated investigators.
- The maternity and administrative staff in the hospitals were surveyed in the study giving us comprehensive view points from all stakeholders regarding breast feeding and Baby Friendly Hospital Initiative implementation.
- Chart reviews or direct observation were not included in data collection.
- The estimated overall participation rate was 80% but only 56% of participants completed all questionnaires.
- Representation of the population was limited to two study hospitals in Riyadh, which is predominantly for Saudi nationals and of the lower to mid-socioeconomic strata.

Although women reported increased breast feeding rates, we identified important weaknesses that could be improved through strict compliance with BFHI practices.

## INTRODUCTION

Breast feeding is the gold standard for infant nutrition, providing immediate and lifelong benefits for infants, mothers, the society, economy and environment.<sup>1</sup> Infants not breast fed face higher risks of infectious disease in the first year of life and elevated risks of childhood obesity, diabetes mellitus, leukaemia and sudden infant death syndrome.<sup>2</sup> Lack of breast feeding is associated with an increased risk of premenopausal breast cancer, ovarian cancer, retained gestational weight and diabetes mellitus. Acknowledging this serious community health risk, the WHO recommends<sup>3</sup> infants be exclusively breast fed for the first 6 months of life

and continuing to receive breastmilk until age two. Healthcare practitioners play a critical role in supporting and encouraging breast feeding. To facilitate this, the Baby Friendly Hospital Initiative (BFHI) was developed by WHO and United Nations Children's Fund (UNICEF), including a 10 Steps breast feeding policy for healthcare professionals to implement.<sup>4</sup> Since inception, it has been shown to increase breast feeding rates in time and exclusivity.<sup>5-7</sup>

Saudi Arabia has a cultural and religious-based encouragement to breast feed children for the first 2 years of life. Recent studies found a high breast feeding initiation rate in Saudi Arabia but sustained breast feeding falls extremely short of WHO recommendations.<sup>8,9</sup> Of the 400 hospitals in the country, only 28 are BFHI designated<sup>10</sup> with no published literature on efficacy or implementation. Our study's objective is to examine women's views on the implementation of the BFHI programme, assess self-reported efficacy in increasing breast feeding duration and exclusivity, and determine the potential to improve breast feeding rates in Riyadh, Saudi Arabia. This observational study prospectively followed women receiving antepartum, intrapartum and postpartum care at two government hospitals in Riyadh, Saudi Arabia: King Saud Medical City (KSMC) (BFHI hospital) and Al-Yamamah Hospital (non-BFHI hospital). KSMC has experience implementing the BFHI for 24 years. Al-Yamamah hospital does not have a BFHI programme but employs a staff member for immediate postpartum breast feeding education and support. The population of both hospitals is within the mid to lower socioeconomic stratum.

We created questionnaires based on 'Section 4 Hospital Self-Appraisal and Monitoring' by the WHO and UNICEF ([http://www.who.int/nutrition/publications/infantfeeding/bfhi\\_trainingcourse\\_s4](http://www.who.int/nutrition/publications/infantfeeding/bfhi_trainingcourse_s4) accessed 14 October 2015) to be administered prenatally and at 1, 3 and 6 months postnatal and a separate questionnaire for administration and staff. We pretested the questionnaires, translated them into Arabic and pretested again. We determined our sample size through power calculation, obtained ethical approval to proceed (ORG/CMB/2012/013) and obtained participation agreement from both hospitals.

## METHODS

### Study design

#### Patient recruitment and administration of questionnaires

We conducted the study between December 2013 and October 2015. Participants were of 36 weeks gestation or more receiving prenatal care. Four investigators were assigned to each hospital. All prenatal patients presenting for appointments, to the emergency room or in early labour were invited to participate. The number of patients present determined the sample size. Only women receiving prenatal care at the hospitals were eligible for inclusion. Women and babies with conditions contraindicating breast feeding were excluded. After

giving an explanation of the study and obtaining informed consent, the prenatal questionnaire was administered. Questions pertained to demographics, pregnancy and breast feeding history, breast feeding plans and information, education and support given by staff. Open-ended questions allowed women to share their feelings or concerns on breast feeding (see online supplementary file 1).

We administered follow-up questionnaires over the telephone (see online supplementary file 1). In the first month we asked mothers about birth and postnatal breast feeding history, the hospital staff providing information, encouragement and support of breast feeding, and any problems experienced. Postnatal questions included infant feeding on discharge and current feeding practices and their opinion on the best nutrition for a baby. We regarded babies receiving only breastmilk to be receiving exclusively breast feeding and those receiving breastmilk plus a supplement to be receiving mixed feeding. Third and sixth month questionnaires included breast feeding history, current feeding practice, reasons for discontinuing breast feeding, support or assessment of breast feeding given in clinic visits, any problems faced and support given. We based statistical analysis on the number of participants completing the questionnaire at each particular time period, excluding those patients who dropped out of the study or who were lost to follow-up. Any unanswered question by a participant was listed as a 'no response' answer in the data analysis for that particular question and reported as such. Questions pertaining to the BFHI 10 Steps implementation and information regarding a participant's personal preference and practice were included in the analyses with each question treated as one outcome.

#### Administration and maternity staff questionnaires

We invited all relevant administrators and maternity staff members to participate, including hospital administrators, department managers, breast feeding educators, doctors and nurses in the clinics and wards. Questions (see online supplementary file 1) asked about training, a written breast feeding policy addressing the BFHI 10 Steps, a posted summary policy and implementation in practice.

#### Bias

To help prevent investigator bias we standardised the interviewer's interaction with patients. This was carried out by reviewing the questions and potential answers with the investigators, instructing how they should only clarify questions and not add additional questions or explanations of any kind when interviewing participants. Data was submitted incrementally by investigators to the data collectors on the team and the compilation of outcomes was not shared with the investigators until all data collection was completed and analysed. To avoid recall bias, questions were replicated with different wording in the follow-up questionnaires. Transfer bias was

minimised by making repeated efforts to contact participants at different times of the day and different days of the week to keep losses to follow-up to a minimum and equal as much as possible. Assistant investigators were enlisted to help with follow-up calls and they were trained in an identical manner.

### Statistical analysis

The data were analysed using SPSS software (IBM Corp Released 2013. IBM SPSS Statistics for Windows, V.22.0. Armonk, New York, USA: IBM Corp). Fisher's exact test and  $\chi^2$  tests were used for the calculation of statistical significance in comparison of BFHI and non-BFHI hospitals. *p* Value <0.05 was considered as statistically significant.

### Patient involvement

No patients were involved in setting the research question, the outcome measures, the design or the implementation of the study. There are no plans to involve patients in dissemination.

### Results

Of the 277 women (BFHI *n*=139, non-BFHI *n*=138) recruited in the study, only 156 (BFHI=78 (56%) non-BFHI=78 (56%)) of the participants completed all questionnaires. **Figure 1** presents the flow chart of participants at each stage of the study including those found eligible and those excluded.

### Prenatal questionnaire

Participant recruitment and retention in the study as well as the demographics of each group is shown in **table 1**.

In response to the core questions regarding BFHI policies (**table 2**), 26.7% of the women said they were given the hospital policy on breast feeding in the BFHI hospital compared to only 12.2% at the non-BFHI hospital (*p*<0.001).

Regarding feeding intent, almost equal number of women from both hospitals expressed intent to practice exclusive breast feeding.

A combined 39.6% of women received breast feeding information from doctors and nurses at the BFHI hospital compared to 13.4% at the non-BFHI hospital. Most received breast feeding information from other sources. About 16.3% of BFHI participants and 20% of non-BFHI participants acknowledged receiving information or encouragement to formula feed (**table 3**).

### Experiences of mothers during in-hospital stay and in the first month postpartum

The majority of BFHI hospital participants (77.9%, *n*=81) saw the breast feeding policy compared to 23.5% (*n*=23) at the non-BFHI hospital (*p*<0.01). Similarly, a significantly greater number (93.3% *n*=97) at the BFHI hospital said staff encouraged them to breastfeed compared to 48% (*n*=47) at the non-BFHI hospital

(*p*<0.01). Mothers at the BFHI hospital said they sought information regarding breast feeding from relatives (37.5%, *n*=39), doctors (27.9%, *n*=29) and nurses (19.2%, *n*=20). More mothers at the non-BFHI hospital sought advice from relatives (76.5%, *n*=75) compared to doctors (10.2%, *n*=10) and nurses (2.04%, *n*=2).

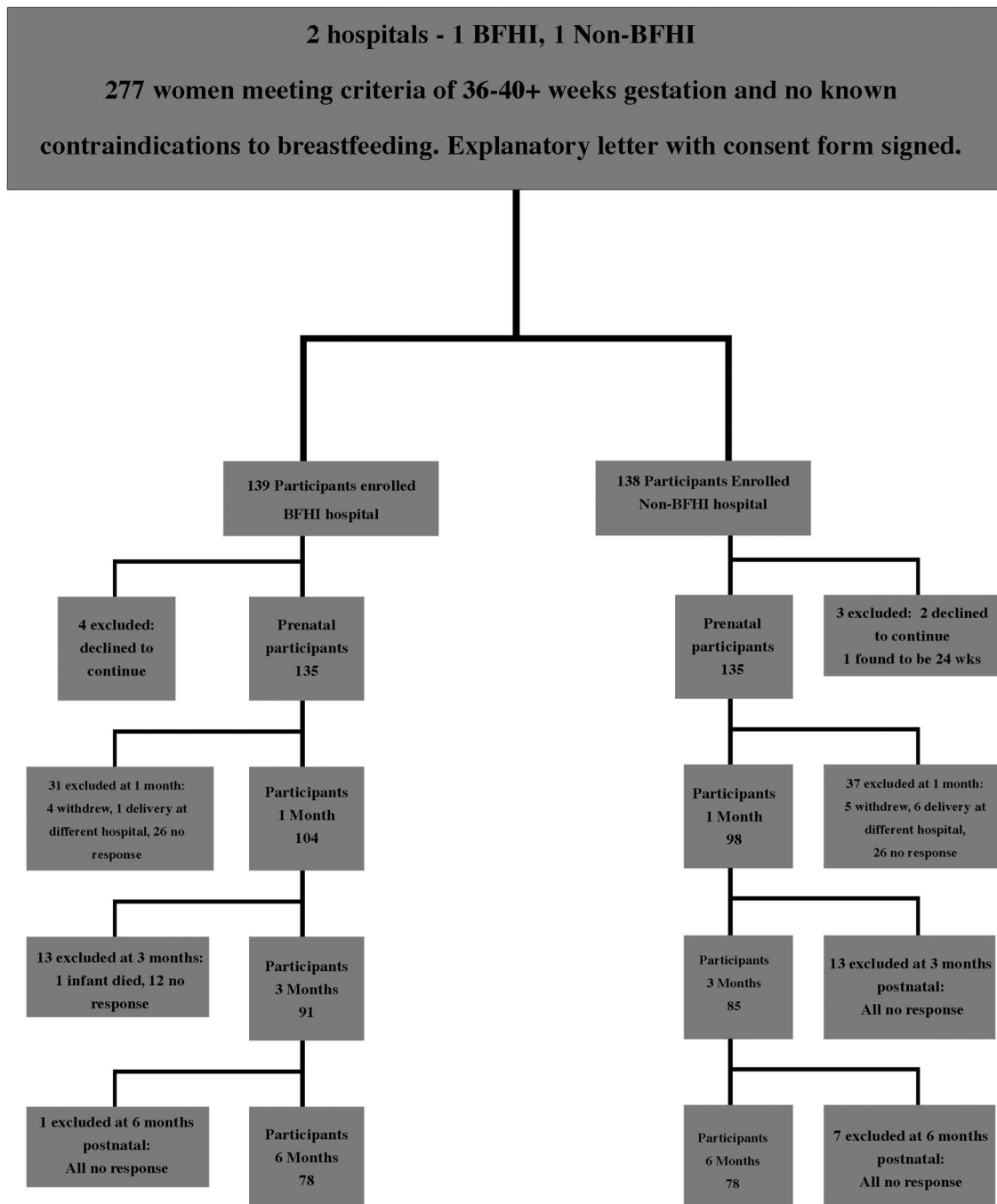
About half of mothers at the BFHI hospital (50%; *n*=52) stated their baby received other food or drink—19 (18.3%) due to medical reasons while 29 (27.9%) stated it was at the initiative of the nursing staff. In the non-BFHI hospital higher numbers of mothers (*n*=92; 93.9%) reported supplement drink given to their babies with 16 (16.3%) of these citing medical reasons, 16 (16.3%) by choice, and a majority (*n*=60; 61.2%) given at the initiative of the staff. Implementation of the BFHI was asked about in detail, including rooming in, breast feeding help, supplements given, support postdischarge and promotion of breastmilk substitutes (**table 2**).

Replying to an open-ended question, 6 from the BFHI hospital and 23 from the non-BFHI said staff took infants to the nursery during visiting hours. We asked women postpartum what they regarded to be the best infant feeding practices. About 60.6% (*n*=63) the BFHI hospital participants felt breastmilk to be best compared to 44 (44.9%) of non-BFHI hospital. More at the non-BFHI hospital (53.1%, *n*=52) felt mixed feeding was optimal while 38% at the BFHI hospital stated the same.

### Breast feeding rates and determinants of breast feeding at birth, 1, 3 and 6 months postpartum

Percentages of women breast feeding exclusively, formula feeding or giving mixed feeding (breastmilk and formula) at hospital discharge from the BFHI-hospital were 51% (*n*=53), 1% (*n*=1) and 47.1% (*n*=49), respectively. In contrast, 29.6% (*n*=29) of non-BFHI hospital participants were breast feeding exclusively, 11.2% (*n*=11) were formula feeding and 59.2% (*n*=58) were giving mixed feeding. A comparative view of the overall breast feeding trends at both hospitals at 1, 3 and 6 months postpartum is shown in **table 4**.

At 1 month similar proportions of women were exclusively breast feeding (BFHI: *n*=18; 17.3% vs non-BFHI: *n*=18; 18.4%). However, fewer from the BFHI hospital (*n*=12; 11.4%) gave formula alone compared to the non-BFHI hospital (*n*=21; 21.4%). In addition, more women (*n*=73; 70.2%) from the BFHI hospital practiced mixed feeding compared to the non-BFHI hospital (*n*=59; 60.2%). Exclusive breast feeding rates declined in both hospitals by 3 months (BFHI 13.2% vs non-BFHI 10.6%). However, BFHI hospital mothers tended to practice more mixed feeding rather than formula only. By 6 months, 19.2% (*n*=15) of the mothers from the BFHI hospital were breast feeding exclusively, 48.7% (*n*=38) were formula feeding alone, and 32.1% (*n*=25) were mixed feeding. In stark contrast, only 2.6% (*n*=2) of the women from the non-BFHI hospital were still breast feeding exclusively while 47.4% (*n*=37) were formula feeding and 50% (*n*=39) were mixed feeding.



**Figure 1** Patients enrolled, participant numbers and excluded at prenatal, 1, 3 and 6 months.

### Reasons for stopping breast feeding and use of pacifiers

The top three reasons for stopping breast feeding postnatal were similar (table 4). Mother's perception of insufficient milk and excessive crying by baby was cited at both 3 and 6 months. Use of pacifiers by BFHI hospital mothers at 3 and 6 months was 39.6% and 35.9% (n=36) versus 38.8% and 32.1% (n=33) by non-BFHI mothers.

### Support for breast feeding problems

At discharge, very few women received information about community services, support groups and lactation

consultants (BFHI: n=8; non-BFHI: n=1). When asked if at subsequent clinic visits they were offered lactation support services, few women stated they did (table 4). Of all mothers from the BFHI hospital who faced problems breast feeding by 3 months postnatal, only 15.4% (n=14) sought help versus 17.6% (n=15) of those at the non-BFHI hospital. At 6 months a greater percentage (29.5% n=23) of women from the non-BFHI hospital sought help compared to those at the BFHI hospital (10.3% n=8). Most sought help from doctors (42.9% and 46.7%).



**Table 1** Participant demographics

Parameter	BFHI N=135 (%) <sup>*</sup>	Non-BFHI N=135 (%) <sup>*</sup>
Participant demographics		
Age	n=133	n=130
Average age	31.2 years, SD=6.25	29.8, SD=5.81
<i>Nationality</i>		
Saudi	115 (86.5%)	121 (93.1%)
Non-Saudi	18 (13.5%)	9 (6.9%)
No response	2	5
<i>Education level</i>		
Did not complete high school	29 (29.3%)	40 (32.0%)
High school graduate	36 (36.4%)	42 (33.6%)
College graduate	34 (34.3%)	43 (34.4%)
No response	36	10
<i>Employment</i>		
Employed	25 (20.8%)	15 (11.9%)
Not Employed	95 (79.2%)	111 (88.1%)
No response	15	9
<i>Household income</i>		
<2000 SR	11 (9.8%)	9 (7.9%)
2000–5000 SR	47 (42%)	41 (36%)
5000–10 000 SR	52 (46.4%)	53 (46.5%)
> 10 000 SR	2 (1.8%)	11 (9.6%)
No response	23	21

<sup>\*</sup>Percentages are based on the total respondents. BFHI, Baby Friendly Hospital Initiative; SR, Saudi Riyals.

### Administration and maternity staff questionnaires

Few administrators and maternity staff completed and returned the questionnaire to us despite several attempts to encourage participation. In contrast to the responses from the non-BFHI hospital, the administrators in the BFHI hospital confirmed that there was a breast feeding policy in place and mechanisms for displaying and evaluating the policy along with support for patients and training for staff (table 5).

We asked maternity staff about policies, patient care, education and support of women based on the BFHI 10 Steps. All participants (n=7; 100%) said a breast feeding policy and posted summary policy is in place and prohibits breastmilk substitutes promotion and gift packs. In contrast, 100% of non-BFHI hospital maternity staff said there is no breastfeeding policy, no staff training and no policy protection from breastmilk substitutes, commercial gift packs or samples. Additionally, 100% of non-BFHI hospital staff reported infants are taken from mothers during visiting hours (table 5).

### DISCUSSION

The BFHI provides practices to promote, protect and support women breastfeeding<sup>4</sup> and is applied in more than 152 countries worldwide, with reports of increased exclusive breast feeding following its establishment.<sup>6</sup> Saudi Arabia has a pro-breast feeding environment of religious encouragement and cultural support. However, breast feeding has declined and exclusive breast feeding rates are not sustained, with many switching to formula within 3 months.<sup>8 9 11 12</sup> The BFHI is not widely implemented in the country and we were unable to find any studies assessing its reported implementation and efficacy in Saudi Arabia, making this study the first to do so. In this study, women's views on the implementation of the BFHI programme as well as self-reported breast feeding duration and exclusivity by participants was used to determine the efficacy of the BFHI programme in increasing breast feeding rates. To assess each hospital's promotion of breast feeding, we surveyed administration and staff at each hospital, including administrators, managers, obstetricians, nurses and breast feeding educators. Of note, our study showed only one staff member in each hospital overseeing breast feeding education, which highlighted the need for lactation consultants and other breast feeding experts on patient care teams. Ten per cent of staff at the BFHI hospital agreed that their hospital policies were in line with current BFHI

**Table 2** Efficacy of BFHI 10 Steps implementation as per patient responses

Parameter <sup>*</sup>	BFHI N=104 (%)	Non-BFHI N=98 (%)	Significance <sup>†</sup>
Did you see hospital's written BF policy?	81 (77.9%)	23 (23.5%)	p<0.0001
Encouraged by clinical staff to BF?	97 (93.3%)	47 (48.0%)	p<0.0001
Encouraged to BF within the first half hour after birth?	49 (47.1%)	10 (10.2%)	p<0.0001
After delivery offered help/shown how to BF?	68 (65.4%)	13 (13.3%)	p<0.0001
Baby given any food or drink other than breastmilk?	52 (50.0%)	92 (94.0%)	p<0.0001
Rooming in: did you and your baby remain together 24 hours a day?	52 (50.0%)	18 (18.4%)	p<0.0001
Were you told the importance of BF on demand?	62 (59.6%)	18 (18.4%)	p<0.0001
Was baby cared for in hospital without using a pacifier?	54 (51.9%)	46 (46.9%)	p=0.48
Did the hospital offer follow-up support for you after discharge?	12 (11.5%)	39 (39.8%)	p<0.0001

One of the 10 Steps questions not provided here is regarding training provided to staff. This is covered in the section of administrator and maternity staff responses.

<sup>\*</sup>Data indicates the number and percentages of women who gave an affirmative (YES) response to these questions.

<sup>†</sup>Fisher's exact test (p<0.05 was considered as statistically significant).

BF, breast feeding; BFHI, Baby Friendly Hospital Initiative.

**Table 3** Promotion of breast milk substitutes at each hospital

Parameter*	BFHI	Non-BFHI	Significance†
<i>Receipt of encouragement or information about formula feeding in the prenatal phase</i>			
	N=135 (%)	N=135 (%)	
Yes	22 (16.3%)	27 (20.0%)	p=0.52
<i>Breastmilk substitute promotions, availability and gift packs</i>			
Saw promotions of breastmilk substitutes at the hospital	8 (5.8%)	16 (11.5%)	p=0.13
Availability of formula at hospital	17 (12.5%)	95 (70.2%)	p<0.0001
Receipt of marketing samples/gift packs with substitutes by mothers	6 (4.8%)	34 (25.0%)	p<0.001

\*Data indicates the number and percentages of women who gave an affirmative (YES) response to these statements.

†Fisher's exact test (p<0.05 was considered as statistically significant).

BFHI, Baby Friendly Hospital Initiative.

standards and they were provided with adequate training; however, staff at the non-BFHI hospital stated no such policies were in place and no training was provided, emphasising the need for education and training. Moreover, 80% of the surveyed BFHI administration staff (n=5) stated they had records of breastmilk substitutes provision to babies born at their hospital, but only 20% (n=4) of non-BFHI administration staff confirmed the same. Another significant observation was that 100% of the BFHI hospital staff (n=12) said women at their hospital were protected from breast feeding substitutes promotions while all of the non-BFHI staff (n=9) surveyed said no such protection was provided to their patients.

Despite establishing that the principles of the BFHI were in place at the BFHI-hospital, it was somewhat surprising that our study hypothesis—hospitals that implement the BFHI policies successfully promote initiation of and sustain exclusive breast feeding practices—was not fully supported by our findings. Previous studies from Saudi Arabia reported high breast feeding initiation rates.<sup>8 11 13–15</sup> However, a distinction must be made between initiation of exclusive breast feeding and initiation of breast feeding along with supplementation with formula. In a 2014 review of 17 cross-sectional studies on breast feeding in Saudi Arabia, Al Juaid *et al* found high initiation rates reported but only 5 studies used standard definitions, making it difficult to determine exclusive breast feeding initiation rates. The authors concluded that initiation rates, breast feeding rates (particularly exclusive breast feeding rates) and breast feeding duration may be overestimated.<sup>12</sup> Indeed our findings support this, as exclusive breast feeding at discharge was only demonstrable in 51% and 29.6% of mothers in the BFHI and non-BFHI hospitals, respectively. In terms of higher rates of exclusive breast feeding at 1 and 3 months post partum, we found that the percentage of mothers practicing exclusive breast feeding in the BFHI (17.3%) and non-BFHI (18.4%) hospitals were very similar. A striking difference appeared in the sixth month postpartum responses, showing 19.2% of the BFHI hospital women were exclusively breast feeding at that time compared to only 2.6% of the non-BFHI hospital mothers. We believe this may be

due to the support and education that was given to women at the BFHI hospital.

In Saudi Arabia, formula feeding has been identified as a barrier to successful implementation of exclusive breast feeding<sup>16</sup> despite regulations banning advertising and promotion of breastmilk substitutes and free samples at hospitals and clinics. In a review of the data of the Health Profile for Saudi Children and Adolescent Project, a prevalence of willingness in Saudi mothers to breastfeed but a tendency to switch to formula feed early was identified.<sup>13</sup> The International Baby Food Action Network (IBFAN) reported the national average of formula feeding in Saudi Arabia was 51% at 1 month, 76% at 3 months, 90% at 6 months. This is much higher than the 31% average rate reported by IBFAN based on data from 33 countries. These trends are a serious concern deserving our attention. In our study we found the use of formula feed to be generally less in the BFHI hospital compared to the non-BFHI hospital. The impact of education by the BFHI hospital is likely to be responsible for this effect. A 2001 intervention trial conducted across 31 hospitals in the Republic of Belarus<sup>17</sup> showed mothers exposed to the BFHI breast fed longer than those who were not, the main reason cited being BFHI breast feeding education. Our findings support the notion of the positive impact of education in the BFHI-hospital. We found that where formula feed was introduced, mixed feeding rather than exclusive formula feeding was more likely to be practiced by women in the BFHI-hospital. Also, some women from the BFHI-hospital switched from mixed feeding to exclusive breast feeding between 3 and 6 months postpartum. We speculate that as they felt more confident in their ability to breastfeed, they made an educated choice to discontinue formula feeding.

Studies show that barriers to successful implementation of the BFHI differ from country to country.<sup>9 11</sup> Problems such as perceived insufficient production of breastmilk, excessive crying by the baby and easy availability formula feeds were factors leading mothers in our study to introduce formula. These findings are similar to those in other studies from Saudi Arabia.<sup>9 14 15</sup> In a study from Brazil examining determinants of exclusive

**Table 4** Breast feeding education, views and practices of participants at both hospitals

Parameter	BFHI Hospital	Non-BFHI Hospital	DF	Significance*
<i>Sources of info about breast feeding</i>				
Prenatal sample size	N=135 (%)	N=135		
Doctors	21 (15.6%)	10 (7.4%)	3	p<0.001
Nurses	32 (23.7%)	8 (5.9%)		
Other	63 (46.6%)	59 (43.7%)		
No response	19 (14.1%)	58 (43.0%)		
Prenatal feeding intent of mother				
Exclusive breast feeding	55 (40.7%)	52 (38.5%)	4	p<0.05
Formula feeding	18 (13.3%)	4 (3.0%)		
Mixed feeding	52 (38.5%)	66 (48.9%)		
Undecided	10 (7.5%)	12 (8.9%)		
No response†	0 (0.0%)	1(0.7%)		
Breast feeding rates at discharge				
1 month sample size	n=104 (%)	n=98 (%)		
Exclusive breast feeding	53 (50.9%)	29 (29.6%)	2	p<0.001
Formula feeding	1 (1.0%)	11 (11.2%)		
Mixed feeding	49 (47.1%)	58 (59.2%)		
No response†	1 (1.0%)	0 (0.0%)		
Breast feeding rates at 1 month postpartum				
1 month sample size	n=104 (%)	n=98 (%)		
Exclusive breast feeding	18 (17.3%)	18 (18.4%)	2	p=0.148
Formula feeding	12 (11.4%)	21 (21.4%)		
Mixed feeding	73 (70.2%)	59 (60.2%)		
No response	1 (1.1%)	0 (0.0%)		
Breast feeding rates at 3 months postpartum				
3 months sample size	n=91 (%)	n=85 (%)		
Exclusive breast feeding	12 (13.2%)	9 (10.6%)	2	p=0.215
Formula feeding	27 (29.7%)	36 (42.3%)		
Mixed feeding	52 (57.1%)	40 (47.1%)		
Breast feeding rates at 6 months postpartum				
6 months sample size	n=78 (%)	n=78 (%)		
Exclusive breast feeding	15 (19.2%)	2 (2.6%)	2	p<0.01
Formula feeding	38 (48.7%)	37 (47.4%)		
Mixed feeding	25 (32.1%)	39 (50.0%)		
Women offered or guided to lactation support services				
Sample size	n=91 (%)	n=85 (%)		
3 months	8 (8.8%)	1 (1.1%)	1	p<0.05
Sample size	n=78 (%)	n=78 (%)		
6 months	11 (14.1%)	5 (6.4%)	1	p=0.113
Top reasons for stopping breast feeding at 3 months postpartum				
Sample size	n=91 (%)	n=85 (%)		
Insufficient milk	15 (16.5%)	13 (15.3%)	3	p=0.659
Excessive crying	12 (13.2%)	6 (7.1%)		
Illness (baby or self)	6 (6.6%)	5 (5.9%)		
Bottle feeding easier	NG	NG		
Top reasons for stopping breast feeding at 6 months postpartum				
Sample size	n=78 (%)	n=78 (%)		
Insufficient milk	21 (26.9%)	22 (28.2%)	3	p<0.05
Excessive crying	18 (23.1%)	10 (12.8%)		
Illness (baby or self)	NG	NG		
Bottle feeding easier	17 (21.8%)	4 (5.1%)		

\* $\chi^2$  test (p<0.05 was considered statistically significant).

†Not included in  $\chi^2$  test calculation.

BFHI, Baby Friendly Hospital Initiative; DF, degrees of freedom; NG, this reason was not given at this time.

breast feeding, primiparity/lack of previous breast feeding experience, lack of knowledge about latching, mammary complications and/or improper positioning were identified as risk factors negating exclusive breast

feeding.<sup>18</sup> Another study in France identified routine visit to a general practitioner's office 2 weeks post partum as supporting exclusive breast feeding practices.<sup>19</sup> It thus appears that both education and provision

**Table 5** Efficacy of BFHI implementation at each hospital as reflected by hospital administration questionnaire and maternity staff questionnaire

Parameter	BFHI hospital	Non-BFHI Hospital
<i>Administration questionnaire responses</i>		
	N=5	N=4
BF policies current?	100%	0%
Records of BF substitutes?	80%	20%
Staff training?	100%	0%
BF support and education	100%	0%
Mechanism for evaluation policy?	60%	0%
Policy summary posted?	80%	0%
Policy prohibits substitutes?	80%	0%
Written BF policy in place?	100%	0%
BF policy in place?	100%	0%
<i>Maternity staff questionnaire responses</i>		
	N=7	N=5
Has a written BF policy?	100%	0%
Policy against BF substitutes?	100%	0%
Prohibits gifts/promo of formula	100%	10%
Policy summary posted for mothers?	100%	0%
Staff trained?	80%	0%
Mothers educated on breast feeding?	100%	40%
Immediate skin-to-skin after birth?	100%	40%
Mothers shown how/helped to BF?	100%	100%
No BF substitute unless medically necessary or choice	100%	0%
24 hours rooming-in	100%	80%
Infants with mothers during visiting hours	70%	0%
Encourage BF on demand?	100%	100%
No pacifiers	100%	0%
Hospital provides BF support postdischarge	70%	0%

BF, BFHI, Baby Friendly Hospital Initiative.

of adequate postpartum support are essential for successful implementation of the BFHI. Although education was adequate for both patients and medical staff in the BFHI-hospital we speculate that absence of a strong support system could explain why many BFHI-hospital mothers do not sustain exclusive breast feeding for 6 months. Therefore, the need to establish a network for postnatal support, including lactation consultants and community groups, and to coordinate lactation care between hospitals and outpatient clinics is an important factor for BFHI success. Though the BFHI-hospital in our study initiated the programme over 20 years ago, we have no measure of its efficacy over time due to the lack of data collection. Therefore, we can only offer a comparison of the two hospitals for the time period of this particular study. From our findings, it does appear that the BFHI-hospital still has considerable weaknesses in its implementation of the 10 Steps. The patient responses shown in table 2 were generally less than the 80% expected threshold and were in contrast to the responses of the staff. The reasons for this disconnect between patient and staff responses on the implementation of BFHI remains unclear and needs further study. Indeed, two critical lapses identified include that of

removal of the infant to the nursery during visiting hours, where formula is reportedly given. Second, the hospital was found to have no clear postdischarge breast feeding support system for mothers. A system of support is a major factor in sustaining exclusive breast feeding until 6 months.<sup>6 7 19–21</sup> It must be noted that the two study hospitals are government facilities for the care of Saudi citizens, so we had few non-Saudi patients as participants in the study. Owing to the lack of a private BFHI-designated hospital in Riyadh we were not able to extend the study for comparison. Also, many participants were of a lower socioeconomic status. Therefore, the findings of the two case study hospitals may not be generalisable to other hospitals in the country.

In conclusion, the implementation of the BFHI dramatically affected the number of women exclusively breast feeding at discharge, although continuity of exclusive breast feeding was not as high as expected. However, a greater percentage continued breast feeding up to 6 months compared to those in the non-BFHI hospital. We recommend further large-scale, multicentre studies to investigate the impact and factors affecting the implementation of the BFHI programme in Saudi Arabia.



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**Data sharing statement** Patient level data (and/or) full data set available from the corresponding author at cmosher@alfaisal.edu. Participants gave informed consent for data collection and sharing for the purposes of the study. The presented data are anonymised and risk of identification is low.

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