


Research



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Corresponding author: Janvier Hitayezu, Department of Pediatrics and Child Health, the University Teaching Hospital of Kigali, Kigali, Rwanda. jhitayezu@gmail.com

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A cross-sectional study to evaluate adherence to the ten steps to successful breastfeeding at a referral hospital in Rwanda

Janvier Hitayezu^{1,&}, David Ntirushwa², Jean Claude Ntiyamira³, Jeannette Kayitesi², Rose Mary Murungi², Adeyemi John Olufolabi^{2,4}

¹Department of Pediatrics and Child Health, the University Teaching Hospital of Kigali, Kigali, Rwanda, ²Department of Obstetrics and Gynecology, the University Teaching Hospital of Kigali, Kigali, Rwanda, ³Department of Pediatrics and Child Health, University of Rwanda, ⁴Duke

University Medical Center, Erwin Road, Durham, North Carolina, USA

&Corresponding author

Janvier Hitayezu, Department of Pediatrics and Child Health, the University Teaching Hospital of Kigali, Kigali, Rwanda

Abstract

Introduction: the World Health Organization recommends exclusive breastfeeding for the first six months of life. Over 85% of infants are exclusively breastfed in Rwanda, with nearly 20% of them being stunted by this age. This suggests nutritional issues start few weeks after birth and even antenatally. It is postulated that mother-and-infant health care designed to promote infant nutrition may be one solution to this issue. Our objectives were to conduct a baseline assessment of hospital practices against the Ten Steps to Successful Breastfeeding, identify gaps, and suggest potential solutions. **Methods:** in a cross-sectional survey at the University Teaching Hospital of Kigali (CHUK, from French: “Centre Hospitalier Universitaire de Kigali”), data were collected on 311 participants over two months and using the adjusted hospital self-appraisal tool by United Nations Children's Fund/World Health Organization (UNICEF/WHO). Logistic regression was performed to determine factors that influence exclusive breastfeeding in the hospital. **Results:** CHUK has no written breastfeeding policy and 299/311 (96.1%) of women received no education about breastfeeding during their antenatal care. All mothers initiated breastfeeding after delivery with nearly a third of their infants also receiving formula. Infants in the special care unit are more likely to receive formula with p -value < 0.0001 . **Conclusion:** adherence to the Ten Steps is deficient. Lack of breastfeeding education is one of the main gaps. We recommend hospital-initiated policies focusing on breastfeeding education as part of routine antenatal and neonatal care. This can be one way of preventing high rates of stunting noted in infants when breastmilk is their sole food.

Introduction

The World Health Organization (WHO) recommends exclusive breastfeeding of infants (i.e. they receive nothing else than breast milk, except for medications, vitamin or mineral drops, oral rehydration solution, etc.) for the first six months of

life and its continuation along with supplementary foods for up to two years of age or beyond [1,2]. Advantages of breastfeeding (BF) are tremendous and well recognized for both the mother and her child [3-7]. However, current data show only 37% of infants worldwide breast-feed exclusively while the 2025 World Health Assembly's Global Target for Nutrition is to achieve an increase in the rate of exclusively breast-fed infants aged 0-6 months to at least 50% [1,8,9]. The Baby-Friendly Hospital Initiative (BFHI) conceived in the early 1990s by the WHO and the United Nations Children's Fund (UNICEF) and revised in 2009 is now a recognized program with evidence-based advantages on infant and young child feeding; it is based on the “Ten Steps to Successful Breastfeeding” (ten steps) [10-14] (Table 1). Multiple factors predict the success of breast-feeding initiation and continuation; they include education about breast-feeding and hospital breast-feeding practices and policies [4,15-19]. The BFHI was therefore introduced to address many hospital routines and practices that disadvantage nursing mothers and affect breastfeeding.

The adequacy of protection, promotion, and support for breastfeeding in a facility can be approximated by the number of women breastfeeding exclusively from birth to discharge. Rwandan mothers practicing exclusive breastfeeding are $>85\%$ according to the latest demographic and health survey (RDHS 2014-2015) [20]. The same survey, however, denotes very high proportions of stunting for children in their first 1,000 days of life (18.2% and 49.4% at 6-8 months and 18-23 months of age respectively). This is a critical window of development during which a child is expected to reach his/her full potential and when breastfeeding is the cornerstone of a child's nutrition [20]. If nearly 20% of infants are already stunted by six months of age, this suggests that the problem might have started within few weeks after birth and even antenatally. The above-mentioned RDHS revealed nearly all mothers (99%) receive at least one antenatal care by skilled personnel. Subjective

observation is that support to mothers and their babies in maternities is suboptimal regarding exclusive breastfeeding. A significant proportion of newborns are fed with other form of milk. Rwanda indeed promotes exclusive breastfeeding through the national nutrition policy but there is no baby-friendly hospitals in the country [21]. It is postulated that strong policies designed to promote infant feeding at a health facility level may help prevent the high level of stunting which is observed only few months after birth and contrasting with the high figures of exclusive breastfeeding, breast milk being the principal nutrition in this age group.

Study objectives: the overall goal is to improve quality of care for maternal and neonatal services vis-à-vis infant feeding. Our objectives were (i) to conduct a baseline assessment of current hospital policies and practices on how they measure up with the ten steps to successful breastfeeding, (ii) identify gaps, and (iii) find/advise on immediate and long-term solutions.

Methods

Study design, area, participants and period: a cross-sectional survey was conducted at CHUK. This is a general public and teaching hospital with a tertiary level of care located in the center of the city of Kigali, Nyarugenge district. It is the largest health facility in Rwanda with a total capacity of 553 beds by 2017. It supports referrals from district hospitals within the city of Kigali, Northern province and the North-West, but also receives transfers from other tertiary hospitals for sub-specialized care. This accounts for more than two thirds of Rwandan population in its catchment area. Data were collected in neonatology and maternity wards for pairs of mother-baby as well as in obstetrics and gynecology outpatient clinic for pregnant women coming for antenatal visits over a period of two months from August 29, 2017 to October 26, 2017.

Data collection procedures: information was collected using the hospital self-appraisal tool

developed by UNICEF/WHO for certification in being “baby-friendly” and freely available for download [22]. Additional social demographic data for individual participants were also collected. To avoid any influence on care giver’s attitude, the individual collecting data was independent of clinical care for participants. An independent observer collected information of health care interactions with participants in the maternity wards, neonatal unit and the antenatal clinics. Further information from maternal and baby medical records were also collected. This included information about age, gestation and parity history, gestation age, antenatal care, delivery and neonatal care (Table 2).

Sampling and sample size: a convenience sampling approach was used where all mothers/babies seen in the hospital during the period of data collection were enrolled if inclusion criteria were met. Theoretically all mothers and newborns were eligible, but it was anticipated that would be excluded mothers who were unwilling to participate, neonates without mothers (died) and mothers without babies (died or admitted for maternal wellbeing with the baby at home). Of note, there was no single reported situation where a mother was approached and expressed the will not to participate in the survey. With an average of more than 150 deliveries a month at CHUK, we had planned to enroll a similar number of mothers and their babies. It was pre-determined that the number of mothers and deliveries occurring over a period of one month are relatively sufficient to give a general annual picture of perinatal services in the hospital. Hence the choice of convenience sampling approach and there was no specific formula used to decide on sample size. Rather, it was decided based on the average monthly deliveries from the hospital statistics from previous years. For instance, total births in the preceding year, 2017 were 2546 i.e. 212 deliveries a month on average. Data were collected over 2 months to get 159 admitted mother-infant pairs (122 and 37 from maternity and neonatal units respectively) while 152 pregnant women were also prospectively recruited

from antenatal clinics. The data collection went on over 2 months because it was not restricted to a specific month. Also, babies delivered over the week-end and immediately discharged when there were none to collect their information could not be accessed. The intention was to reach the desired number.

Data management and statistical analyses: information collected onto a questionnaire was transferred into a password-protected computer using Epidata 3.1 and exported to Stata SE 13 software for statistical analyses. Summary statistics (frequencies/proportions for categorical data, median and interquartile range [IQR] for numerical variables) were analyzed to describe socio-demographic characteristics of the participants (Table 2) and adherence status to the Ten Steps (Table 3). We performed bivariate analyses to assess the association between select infant and maternal characteristics/conditions and the administration of breastmilk supplements (infant formulas) to newborn babies. Maternal age, parity, level of education/schooling, cesarean delivery, prematurity and admission to the special care unit for infants were thought to be potential predictors of feeding patterns thus considered in the bivariate analysis model. After calculating chi-square statistics and odds ratio with a 95% confidence interval (CI), only parity [primi-], prematurity and admission to the special care unit were found to be likely associated with the initiation of breast milk (BM) supplements and were considered for the multivariate logistic regression analysis on the use of BM supplements (Table 4) to determine significant association (p -value <0.05). Exclusive breastfeeding and/or supplement with formula were observed from birth to discharge for well babies and during the period of data collection only for babies in a special care unit (and not for the entire hospital stay).

Ethical considerations: the study was approved by the Ethics Committee of CHUK hospital. Approval notice: Ref: EC/CHUK/402/2017.

Role of the funding source: the funder of the study had no role in study design, data collection, data analysis, data interpretation, or manuscript preparation. The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

A total of 311 participants were enrolled (Table 2): 159 mother-baby pairs (51.1%) and 152 pregnant women (48.9%) that attended antenatal care visits at the two hospital outpatient sites. Of the 303 mothers with recorded age, the median age was 30 years (IQR: 27-34) with a range from 16 to 44 years. The majority were primigravida and primiparous, 109/299 (36.4%) and 90/237 (37.9%) respectively. The median gestation age (both at birth & for pregnant women with a total of 303) was 37 weeks (IQR: 32-39). All mothers had done at least one antenatal care visit. Sixty-nine point one percent (69.1%) antenatal care occurred at CHUK including 42.8% both at CHUK and other health facilities. Of the 159 mothers who had already delivered, only 39% had had at least one antenatal care attendance in this hospital. Out of 289 mothers with known education status, 284 or 98.3% of them had some school educational exposure (university 33.9%, secondary 48.8%, primary 15.6%). The capital city of Kigali accounted for 73.3% of participants while the more rural Western province was the least represented with only 6 participants or 1.9% (South: 12.5%, North: 6.2% and East: 5.9%). Out of 159 newborns, 133 babies (or 83.6%) were term. Among the 37 babies (23.3% of all babies) admitted to Neonatal Intensive Care Unit (NICU), 56.7% were preterm and 61.6% of all delivered babies were by cesarean section with six of them under general anesthesia.

Findings on the ten steps: (further details on the self-appraisal questionnaire are provided as a supplement to this document). Step one and two: the hospital has no breastfeeding policy (Table 3). Step three: out of the 311 women enrolled in this

study, 299 (or 96.1%) did not receive any type of education about breastfeeding during their antenatal care visits. Eight of 159 mothers (or 5%) knew the risks of providing BM substitutes to their infants and this knowledge was independent of education during their antenatal clinic (ANC) attendance. Step four: 81.1% babies received skin-to-skin contact with their mothers immediately after birth. However, this was only applied briefly in the delivery room. Clinical condition or admission to NICU precluded many babies from receiving skin to skin. Step five: 93/159 (58.5%) mothers were offered help with breastfeeding within 6 hours of birth. Thirteen point eight percent of babies were not breastfed due to their condition or NICU admission. Only 11/159 (6.9%) mothers could properly position and attach their babies on the breast; 78% mother were unable to do so. Few (1.3%) mothers were taught hand expression. All mothers wanted to breastfeed while none of the mothers with babies in special care were offered help within six hours of birth to establish and maintain lactation. Step six: BM supplements (all were formula milk) were given to 49/156 (31.4%) infants while 107 (68.6%) of them were exclusively breastfeeding; some factors associated with the use of breast milk supplements were analyzed and admission to the special care unit appeared to be a strong predictor (Table 4). Step seven: mothers and babies room-in together, including at night in > 97% (134/137) unless separation is justified. Step eight: only 19/135 (14.1%) mothers reported they recognized cues that their babies were hungry and/or satisfied, while 131 (97%) reported they were not advised to try to breastfeed when breasts became engorged. Step nine: 35/136 (25.7%) babies were bottle-fed and all of them were receiving breast milk supplements. No single baby was given a pacifier and none were taught about the risks of using feeding bottles. Step 10: No breastfeeding support groups were available and breastfeeding plans after discharge are almost non-existing (only two mothers had discussion with staff about this).

Logistic regression analysis on use of breast milk supplements: results in this survey show all mothers, regardless of the baby's status want to breastfeed. Nearly a third (49 out of 156 mothers) of them used BM substitutes. Socio-demographic and clinical conditions analyzed included maternal factors (age, parity, level of education, cesarean delivery) and newborn-associated factors (prematurity, NICU admission) as predictors of feeding babies with breast milk supplements. Each of these independent variables was analyzed in a univariate model of logistic regression by calculating the chi-square (χ^2), odds ratio (OR) at 95% CI and the p-value. Admission to NICU and prematurity were found to have a statistically significant p-value (i.e. < 0.05) while it was 0.09 for primiparity. The 3 parameters were therefore found to be the likely predictors of use of breastmilk supplements in the studied population. These were then analyzed together in a multivariate model that eliminated prematurity while admission to the special care unit and primiparity remained the potential predictors with p-values of <0.0001 and 0.045 (adjusted ORs: 12.8 and 0.43) respectively (Table 4).

Discussion

This is the first study to evaluate and appraise obstetrical and neonatal care services vis-à-vis the protection of infant feeding within health facilities in Rwanda and it can serve as the baseline towards policy change. The study site, as the main referral hospital has a particular advantage of providing policy guidance to lower health facilities. The survey of both antepartum and postpartum mothers provided an objective assessment of practice both in CHUK and other facilities where 100% of parturients attend antenatal services at least once. Despite a single site survey, we propose that the pattern of poor breastfeeding education is not restricted to CHUK as many of surveyed parturients attended antenatal classes in other health facilities. The survey highlights the lack of breastfeeding education as part of routine antenatal care instruction. Only 3.9% of all mothers

received some instructions about breastfeeding. Furthermore, despite the education of participants with a majority having received secondary or university education, many (78%) were unable to effectively breastfeed nor recognize cues of feeding satisfaction in their babies. One can assume that not being a designated breastfeeding health facility that practices the ten steps has contributed to the failure in educating parturients in many centers. These findings call for an imperative change and improvement of antenatal care practices to include education of expectant parents about feeding choices. Mothers in this study had the education level far above the national average with 181/209 (86.6%) and 53/74 (71.6%) of women in Kigali and provinces respectively having completed their secondary school; the national average is 23.4% for women aged 15-49 years (higher in the City of Kigali with 43.2% and lower in provinces with 18.0-21.8%) [20].

The hospital received a significant number of high-risk pregnancies associated with comorbidities in mother and baby. Premature babies were 20% and 80% of them admitted to NICU. Many deliveries (60%) occurred by cesarean section. It is not surprising that many of these babies were not breastfed. Babies in NICU can benefit from the nutritional values of breastmilk [23,24] but the lack of breastfeeding education and the unlikely provision of expressed breastmilk by concerned mothers seem a consequence of a failure in policy. The survey showed a strong association between admission in the neonatology unit and giving an infant breastmilk supplements (p -value <0.0001). Primiparity also showed significant prediction of negative impact on exclusive breastfeeding in the hospital. These significant findings in the poor incidence of exclusive breastfeeding again point to poor information and education of concerned or first-time mothers. A policy addressing this seem the right solution. Much of the missing data in the self-appraisal questionnaire is likely due to the hospital not being a designated BFH facility. The first two steps of the Ten step program deal with the introduction of the policy but at the time of this

survey, there was no such a policy. The survey was therefore started from step 3. Despite the many areas for improvement, other steps within the policy seem to show encouraging trends. Step 7 examines the immediate bonding of mother and baby and this should be seen as a success in Rwanda where 97.8% of immediate bonding is instituted. Also, the use of pacifiers for breastfeeding is generally absent (step 9); no single breastfeeding baby was given a pacifier, a positive trend.

We have demonstrated that current practices at CHUK are not following the recommendation of the WHO/UNICEF breastfeeding guidelines. Evidence has shown adherence to these guidelines does have a positive impact on breastfeeding outcomes. Other studies however show insufficient compliance owing to a variety of factors in both developed and developing countries and within the same country or community [2,12,25-27]. Breastfeeding initiation is near universal in poor-resource African countries but exclusivity is an issue that depends on maternal or community factors but also on health care workers attitude and practice [2,26,28-30]. In Cameroon, a number of cultural factors led mothers to supplement their infants where 38% of the 320 surveyed mothers gave water supplementation to their newborns by age three weeks after birth and all of them had introduced supplementation prior to six months of age [2]. Cultural barriers were also identified in Nigeria where a high proportion of mothers were discarding the colostrum and delaying the initiation of breastfeeding to give their own prelacteal feeds [29]. Limited knowledge of health care providers is also a recognized barrier where more than 50% of the 71 surveyed health care providers admitted they can recommend water supplement during the neonatal period in a South African study [30].

Staff education obviously impacts the success of breastfeeding [13,28,31,32]. Often, the reluctant breastfeeder or the mother producing little breastmilk is often encouraged to provide breastmilk supplements. This has been observed in

daily practices for Rwandan health facilities and is highlighted in the South African study above [30]. Nipple pain, as seen mainly in first-time mothers and resulting from improper attachment to the breast has been frequently reported as a cause of giving supplement [26]. This highlights a special attention needed to first-time mothers and those with infants in special care unit [24] as our findings suggest. Despite the limitations of the study, our findings call for change. Improvement of current practices in maternal and neonatal care to support exclusive breastfeeding at CHUK and all health facilities are now due. Leadership initiative, policy implementation and monitoring are required. These interventions are relatively low cost to implement. Mothers from our survey are already motivated to breastfeed. Locally adapted written breastfeeding policy can be instituted and staff trained in the implementation. Designated “baby-friendly” health facilities should be celebrated since this certification has proven to have a positive impact on exclusivity and duration of breastfeeding [9,12,28].

Limitations of the study: the survey was conducted in one tertiary site where advanced care is provided to mothers and babies with sometimes high-risk disease. Some elements in the self-appraisal questionnaire are very diffuse and generalized, making it very difficult to analyze using a single study. Furthermore, the methodology of self-appraisal, not initiated by the hospital, seems to have led to missing data. On the other hand, this may serve as an important pilot baseline for subsequent studies. Most of available studies have tested only few (one or two) of the 10 steps in a separate research. We also did not explore the impact factors of breastfeeding in NICU admitted babies, a group that is particularly vulnerable to feeding issues.

Conclusion

Current maternal and neonatal care services at CHUK, the main referral hospital in Rwanda, are insufficient with regards to the recommendations

of the WHO/UNICEF breastfeeding guidelines (the 10 steps). One of the main gaps is a lack of breastfeeding education as part of routine antenatal care instruction. Breastfeeding is a proven healthy and cost-effective investment. Thus, adoption and implementation of the Ten Steps can be one of positive national strategies towards improving infant nutrition and reducing stunting already observed in nearly 20% of infants by age 6 months when breastmilk is the main, if not the only, type of food. Further studies with larger samples are needed to identify all the underlying factors and develop further suitable interventions. Health facilities in Rwanda, and CHUK in particular, need to integrate breastfeeding promotion and protection in their routine maternal and pediatric practices by developing and implementing related policies. Data on infant feeding should be included in regular reports from maternal and neonatal units. And to ensure long-term sustainability, this need to be hand in hand with the existing initiatives and programs in the health sector. Fostering the creation of breastfeeding peer support groups through community health workers may be a strategic way to monitor, expand and maintain this especially within the communities.

What is known about this topic

- *Baby-friendly hospital Initiative is proven tool for increasing rates of exclusive breastfeeding (both initiation and continuation);*
- *Rwanda is one of the countries with the highest rates of exclusive breastfeeding;*
- *There is no facility with a baby-friendly designation in Rwanda.*

What this study adds

- *There is a discrepancy in exclusive breastfeeding rates at birth (hospital) and national average;*
- *The subsequent demographic and health surveys may want to include the aspect of breastfeeding at a health facility level and its implications;*

- *Similar settings in Africa where breastfeeding initiation is nearly universal may want to conduct similar studies.*

Competing interests

The authors declare no competing interests.

Authors' contributions

JH conceived, designed, organized the study, cleaned, analyzed and interpreted data and wrote the first draft of the manuscript. DN participated in the final design, actively helped in coordination and monitoring of the study, data interpretation and subsequent drafts and final version of the manuscript. JCN, JK & RMM collected data, participated in data interpretation and manuscript revisions. AJO contributed in data interpretation, manuscript and grammar revisions. All the authors have read and agreed to the final manuscript.

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Tables

Table 1: the ten steps to successful breastfeeding

Table 2: socio-demographic characteristics of participants

Table 3: summary findings on the ten steps

Table 4: analysis of select factors as predictors of use of breastmilk supplements

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Table 1: the ten steps to successful breastfeeding

Step 1	Have a written breastfeeding policy that is routinely communicated to all health care staff
Step 2	Train all health care staff in skills necessary to implement the policy
Step 3	Inform all pregnant women about the benefits and management of breastfeeding
Step 4	Help mothers initiate breastfeeding within a half-hour of birth This step is now interpreted as Place babies in skin-to-skin contact with their mothers immediately following birth for at least an hour. Encourage mothers to recognize when their babies are ready to breastfeed and offer help if needed
Step 5	Show mothers how to breastfeed and how to maintain lactation, even if they should be separated from their infants
Step 6	Give newborn infants no food or drink other than breast milk, unless medically indicated.
Step 7	Practice rooming-in - allow mothers and infants to remain together-24 hours a day
Step 8	Encourage breastfeeding on demand
Step 9	Give no artificial teats or pacifiers (also called dummies or soothers) to breastfeeding infants
Step 10	Foster the establishment of breastfeeding support groups and refer mothers to them on discharge from the hospital or clinic

Source: WHO/UNICEF. (2009)

Table 2: socio-demographic characteristics of participants

Characteristics/variables	n (%) or median (IQR)	Mean (SD)/Range
Enrolled/participants	311	
Mother-baby pair	159 (51.1)	
Pregnant mother	152 (48.9)	
Maternal age in years (N=303)	30 (27-34)	30.8 (4.8)/16-44
Number of pregnancies (N=299)		
G1	109 (36.4)	
G2	70 (23.4)	
G3	51 (17.1)	
G4	29 (9.7)	
G5 & above	40 (13.4)	
Parity (N=237)		
P1	90 (38)	
P2	59 (24.9)	
P3	40 (16.9)	
P4	28 (11.8)	
P5 & above	20 (8.4)	
Level of education	289	
No schooling	5 (1.7)	
Primary	45 (15.6)	
Secondary	141(48.8)	
University	98 (33.9)	
Gestation age in weeks (N=303)	37 (32-39)	33.5 (8.6)/ 5-41
Mother-baby pairs (N=156)	39 (37-40)	37.8 (3.2)/27-41
Pregnant women (N=147)	33 (21-37)	28.9 (10.0)/ 5.-1
Antenatal consultations	311(100)	
Facility		
CHUK	215 (69.1)	
CHUK only	82 (26.4)	
CHUK + any other facility	133 (42.7)	
DH	26 (8.3)	
Private hospital/clinic	27 (8.7)	
Health center	40 (12.9)	
Another referral hospital	3 (0.9)	
Infants in special care (N=159)		
YES	37 (23.3)	
Term (133)	16 (12.0)	
Preterm (26)	21(80.8)	
NO	122 (76.7)	
Term (133)	117 (88)	
Preterm (26)	5 (19.2)	
Sex		
Male	88 (56.8)	
Female	67 (43.2)	

Table 3: summary findings on the ten steps

Step	Yes [n (%)]	No [n (%)]	N/A [n (%)]
1. A written BF policy		0	
2. Training all health care staff on the policy		0	
3. Informing pregnant women about BF			
3.1. Antenatal clinic available	0		
3.2. importance and management of BF (N311)	12 (3.9)	299 (96.1)	
3.3. BF discussion in antenatal records	0	171 (55)	140 (45)
3.4. Key topics on importance & management of BF covered	1 (0.3)	172 (55.3)	138 (44.4)
3.5. Protection from artificial feeding promotion/instruction	0	211 (67.9)	100 (32.1)
3.6. Risks of giving supplements while BF in the 1 st 6 months known	8 (2.6)	292 (93.9)	11 (3.5)
3.7. Importance of early skin-to-skin contact & rooming-in with a baby known	11 (3.5)	289 (92.9)	11 (3.5)
3.8. antenatal record available at the time of delivery	0	59 (19)	252 (81)
4. Help mothers initiate breastfeeding within a half-hour of birth			
4.1. babies placed in skin-to-skin contact with their mothers immediately after birth	129 (81.1)	8 (5)	22 (13.9)
4.2. mothers recognize signs their babies are ready to BF & helped	15 (9.4)	126 (79.3)	18 (11.3)
4.3. skin-to-skin contact in special care	2 (1.3)	39 (24.5)	118 (74.2)
5. Show mothers how to breastfeed and maintain lactation			
5.1. staff offers breastfeeding assistance within six hours of delivery	93 (58.5)	44 (27.7)	22 (13.8)
5.2. staff can describe types of information/skills given	70 (44)	89 (56)	
5.3. staff available full time	4 (2.5)	155 (97.5)	
5.4. advice on other feeding options if choice not to BF			159 (100)
5.5. correct baby positioning and attachment for BF	11 (6.9)	124 (78)	24 (15.1)
5.6. Education/help/advice about breast milk hand expression	2	156 (98.1)	1
5.7. special attention and support during ANC & postpartum	0	105 (66)	54 (34)
5.9. mothers with babies in special care helped within 6 hours of birth to establish and maintain lactation	0	35 (22)	124 (78)
6. Give newborn infants no food/drink other than breast milk			
6.1. hospital data: at least 75% of the full-term babies discharged in the last year have been exclusively breastfeed			
6.2. breastfed babies receive other food/drink than breast milk (n=156)	49 (31.4)	107 (68.6)	
6.3. care not to display/distribute any materials recommending BMS		0	
6.5. adequate space & equipment for formula preparatio...		0	
6.6. BF protocols/standards in line with BFHI standard...			0
7. Allow mothers and infants to remain together-24 hours a day			
7.1. mother and baby together immediately after birth	128 (80.5)	7 (4.4)	24 (15.1)
7.2. rooming in after general anesthesia			
7.3. mother and infant together 24 hours a day (n=137)	134 (97.8)	3 (2.2)	
8. Encourage breastfeeding on demand (n=135)			
8.1. mothers taught how to recognize the cues that babies are hungry	19 (14.1)	116 (85.9)	
8.2. mothers encouraged to breastfeed their babies on ad lib (n=135)	55 (40.7)	80 (59.3)	
8.3. advice to breastfeed if breasts overfull	4 (3)	131 (97)	
9. Artificial teats or pacifiers to breastfeeding infants (n=136)			
9.1. BF babies cared for without any bottle feeds	101(74.3)	35 (25.7)	
9.2. taught risks associated with feeding milk with bottles and teats	0	136 (100)	
9.3. use of pacifier	0	136 (100)	
10. Foster breastfeeding support groups		0	
10.1. Plans on BF after return home discussed	2 (1.3)	157 (98.7)	
10.2. system of follow-up support for mothers after discharge	0	159 (100)	

Table 4: analysis of select factors as predictors of use of breastmilk supplements

Variable	Yes [n (%)]	NO [n (%)]	Univariate model		Multivariable	
			OR (95 % CI), X2	p	OR (95 % CI)	P
Age (median; IQR)	30 (27-34)		0.9 (0.8-1.00), 3.8	0.6		
Primiparity	51(32.1)	108(67.9)	0.54 (0.25-1.1], 2.9	0.09	0.43 (0.19-0.98)	0.045
Poor schooling*	50 (17.3)	239 (82.7)	1.8 (0.8-4.3), 2	1.6		
Prematurity	26 (16.7)	130 (83.3)	4.7 (1.9-11.4), 12.2	0.0005	0.9 (0.25-3.2)	0.8
Special care	36 (23.1)	120 (76.9)	11 (4.6-25.9), 34.4	< 0.0001	12.8 (4.1-39.7)	< 0.0001
Cesarean delivery	98 (61.6)	61 (38.4)	0.7 (0.4-1.5), 0.8	0.4		

*Poor schooling was here defined as no formal schooling or having at most attended the primary school