

Successful Breast-Feeding Following a Level II NICU Stay In Qatar – A Prospective Study

Brijroy Viswanathan (✉ bviswanathan@hamad.qa)

Hamad Medical Corporation <https://orcid.org/0000-0002-0836-3696>

Rajai Al-Bedaywi

Hamad Medical Corporation

Ahmed Tomerak

Hamad Medical Corporation

Sarfrazul Abedin

Hamad Medical Corporation

Research

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Abstract

Background: Exclusive breast-feeding is recommended by WHO for maternal and infant benefits. Cultural practices and demands of employment influence feeding practices significantly. There remains conflicting evidence regarding the association between NICU admission and breastfeeding outcomes and there is limited published data from Qatar.

Aim of the study: This study aims to estimate the rate of breast milk feeding at the time of a level II NICU discharge and estimate the rate of successful breast-feeding (exclusive or partial) after a level II NICU discharge in Qatar during a well-baby follow up and formulate appropriate strategy to promote exclusive breast feeding and build a culture to attain BFHI status.

Methods: It's a qualitative longitudinal prospective study conducted over 18 months starting from 1st of January 2019 of neonates born in Al Wakra hospital and admitted to its NICU.

Data: Demography details, diagnosis, duration of NICU stay, feeding during NICU stay and at the time of discharge were obtained through a lactation chart. Breast feeding education received, feeding and cultural practices were obtained through a questionnaire administered at or before 4- and 8-weeks post discharge in the well-baby clinic.

Results: Rate of exclusive breast feeding was 20%, 54% and 42% respectively at discharge, at 4 weeks and 8 weeks respectively. Rate of partial breast feeding was 64%, 40% and 43% at discharge, at 4 weeks and at 8 weeks respectively. Neonates who had longer than 1-week NICU stay had higher rate of exclusive breast feeding at the time of discharge but were found to have reduced rate of breast feeding and higher rate of formula feeding during the 4 weeks and 8 weeks follow up.

Conclusion: The overall breast-feeding rates from this single center level II NICU from Qatar are better compared to previously available data. Follow up encouragement and breast-feeding support methods need to be established and studies with extended follow up and assessment of intervention methods should be planned to improve and sustain the practice of exclusive breast feeding.

Introduction

The human milk is the ideal and complete nourishment that is essential for normal development of newborns and has been found to have beneficial effects to health of mother and infants. [1] The World Health Organization (WHO) recommends exclusive breastfeeding for the first six months of an infant's life, followed by continued breastfeeding with gradual introduction of solid foods for up to two years. [2] Meta-analysis and review reports that compared breast-feeding to bottle-feeding have shown that breast-feeding and its longer duration is protective against obesity and non-communicable disease later in life. [3] According to UNICEF, the exclusive breast-feeding rate of Qatar is 12% when compared to global rate of 37%. The decision to breastfeed is greatly influenced by breastfeeding knowledge, awareness of the potential benefits of breastfeeding, which could be affected by cultural practices and environmental

factors. [4] Though preterm birth is a risk factor for early cessation of breast-feeding, there remains conflicting evidence regarding the association between NICU admission and breastfeeding outcomes among late preterm infants.[5] One of the main reasons that women stop breast-feeding is that they need to return to work. Progress in female labor force participation in middle east has been slow which remains less than 30% according to World Bank figures released in 2012 despite advances in education. [6] Qatar's National Development Strategy (2011–2016) has emphasized the integration of early prevention and intervention of obesity and other NCDs into different aspects of the health care system, with special focus on improving maternal and child health.[7] Without clear understanding of the cultural factors that influence breastfeeding attitudes and practices in the current socioeconomic background in Qatar between Arab women and the immigrant population, health care professionals' ability to develop and implement programs to promote exclusive breastfeeding are likely to be limited. [8] We proposed to prospectively study the breast-feeding rates during a level II NICU stay in Qatar and the subsequent follow up of these mothers after discharge from NICU to find out their exclusive breast-feeding adherence, cultural influence, and impact of support from family and work environment on breast feeding.

Methods

A Qualitative, longitudinal descriptive method is employed in this prospective study. The primary outcome variable was to estimate the rate of exclusive breast feeding and partial breast feeding (breast feed + formula feed) at the time of discharge and to estimate exclusive breast feeding and partial breast feeding (breast feed + formula feed) at or before 4 weeks of discharge. The study also estimated the exclusive formula feeding at the time of NICU discharge, at 4 weeks follow up and estimated exclusive breast feed, partial breast feeding and formula feed at or before 8 weeks of discharge. The study was conducted in the NICU and the well-baby clinics of Al Wakra hospital. The data for the study period was collected over 18 months starting from 1st January 2019. Inclusion criteria included all neonates born in Al Wakra hospital and admitted to NICU of Al Wakra hospital since birth and continued till discharge, irrespective of gestation or birth weight. Babies born outside the NICU of Al Wakra hospital and babies born in Al Wakra and subsequently transferred to other centers for further management were excluded.

Data was collected as a two-stage process. (A schematic representation of data collection method is shown in Fig. 1). At the first stage, during the NICU stay, a modified lactation chart was used to collect data that included infant characteristics such as gestational age, birth weight, primary diagnosis, type and time of initiation of feeding, length of stay, expressed milk feeding, direct breast feeding and formula feeding details. This data was obtained from electronic medical record (CERNER) and the feeding details maintained for each newborn baby by the lactation nurse.

During the second stage, these NICU discharged babies were followed up in the well-baby clinics. A validated questionnaire was used to collect data regarding socio demography, maternal characteristics, Obstetric factors, and breast-feeding practices of mothers during the well-baby follow up. Details of health education to promote breast feeding such as personnel, number of visits, time and method of education were also assessed through this questionnaire. These data were obtained at the first follow up

visit within 4 weeks of discharge and subsequently at the 2nd follow up within 8 weeks. The questionnaire was administered by a face-to-face interview or by a telephonic interview for those who failed to come for the follow up visits. This happened mainly during the COVID pandemic and most of the OPD follow ups were cancelled or were conducted as telephonic consultations. Both lactation chart data and questionnaire data were entered into excel independently and analyzed using statistical methods.

Statistical analysis

Descriptive statistics is used to summarize all demographic characteristics of the participants. The normally distributed data and results are reported with mean and standard deviation (SD); the remaining results are reported with median and range or frequencies and percentages. Proportions of exclusive breast feed, formula and partial breast feeding for different age groups of infants are calculated and the corresponding 95% CI is computed to measure the precision of the prevalence estimate. Associations between two or more qualitative variables were assessed using chi-square (χ^2) test or Fisher Exact test as appropriate. For association between two continuous variable T-test for two independent means or Mann-Whitney U test was used, for more than two continuous variable repeated measures ANOVA or Kruskal-Wallis Test was used. For Post hoc analysis Bonferroni method was used when needed. All P values presented are two-tailed, and P values < 0.05 are considered as statistically significant. All Statistical analyses were done using statistical packages SPSS 22.0 (SPSS Inc. Chicago, IL) software. The sample size calculated for 95% CI was 323 and for 97% CI was 397.

Results

We recruited 400 infants after getting informed consent and 364 cases were eligible for complete data analysis after exclusion (**Figure 2**). The baseline demography details of neonates and parents are represented in **table 1**.

Feeding practices at discharge, at 4 weeks and at 8 weeks.

The chart 1 shows the rate of exclusive breast feeding, exclusive formula feeding and partial breast feeding (breast feeding + formula feeding) at the time of NICU discharge, at 4 weeks and at 8 weeks. Rate of exclusive breast feeding was 20% (95% confidence interval 16.2% to 24.4%), 54% (95% confidence interval 48.9% to 59.1%) and 42% (95% confidence interval 37% to 47.1%) respectively at discharge, at 4 weeks and 8 weeks respectively. Rate of partial breast feeding was 64% (95% confidence interval 58.9% to 68.7%), 40% (95% confidence interval 35.2% to 45.2%) and 43% (95% confidence interval 38.1% to 48.2%) at discharge, at 4 weeks and at 8 weeks respectively. Rate of exclusive formula feeding was 16 % (95% confidence interval 12.5% to 20%), 6% (95% confidence interval 3.8% to 8.6%) and 15% (95% confidence interval 11.5% to 18.8%) at discharge, at 4 weeks and at 8 weeks respectively.

Feeding practices compared with neonatal and maternal parameters.

The breast-feeding rates at discharge, 4 weeks and 8 weeks were compared with the gestational age, duration of NICU stay, mode of delivery, parity, nationality, mother tongue, maternal educational status, occupational status and family income. These data are shown in **table 2**.

Term gestation predominated the study population, and the median was 38 weeks. When compared between the different gestational age groups and the breast-feeding type and rates, neonates who had lower gestation had better breast-feeding rates at the time of discharge and this relation was statistically significant ($p < 0.001$). During the follow up it was found that the breast-feeding rates varied between the different gestational age groups; the exclusive formula feeding, and partial breast-feeding rates were increased by 8 weeks, but this observation was not statistically significant between the groups.

The duration of NICU stay had a wide range from 1 to 55 days and the median was 3 days.

When compared between breast feeding type and rates with the duration of NICU stay, neonates who had longer than 1-week NICU stay had higher rate of exclusive breast feeding or partial breast feeding, whereas neonates who had less than 7 days of NICU stay had higher exclusive formula feeding. This observation was statistically significant ($p < 0.001$) at the time of discharge.

The correlation between breast feeding type and rates and the duration of NICU stay was still significant at 4 weeks ($p 0.01$) and not significant by 8 weeks ($p 0.10$).

There was no statistically significant relation between the age of parents, parity or educational status of mothers and the feeding type and rates at discharge or during the 4 weeks and 8 weeks follow up. But there was a statistically significant relation between the mode of delivery and the feeding types at discharge ($p < 0.001$); neonates delivered by LSCS had higher formula feeding rates, but this relation was not significant for 4 weeks and 8 weeks follow up.

When compared between the occupational status and breast-feeding practices, there was no statistically significant relation at the time of NICU discharge and 4 weeks follow up, but there was a statistically significant relation ($p < 0.013$) at 8 weeks follow up where the mothers who were working had higher rate of formula or mixed feeding than those mothers who were not working.

When compared with income groups, there was no statistically significant relation between type of feeding at the time of NICU discharge, but the breast-feeding rates were significantly better ($p < 0.03$ and 0.005) in the middle-income groups during the follow up at 4 weeks and 8 weeks respectively. When compared between Arabic speaking and non-Arabic speaking mothers, there was no statistically significant difference in the feeding practices at NICU discharge and 4 weeks follow up, but there was a statistically significant relation ($p < 0.02$) at 8 weeks where the Arabic speaking mothers had higher exclusive formula feeding practices.

Feeding practices in relation to breast feeding education and supports

(Feeding education and relation with practices are summarized in **table 3**).

95% of mothers said that they were advised and recommended for breast feeding, but only 48% said that this education was given pre partum and 86.4% said that this was by verbal method only. 91% mothers said that they received family support for breast feeding, when 61% said they received support from hospital staff and 20% said they received support from friends.

When compared with the breast-feeding practices and the education and supports received, there was no statistically significant relation between them at discharge, at 4 weeks or at 8 weeks except the feeding practices at 4 weeks and the family support (p value was < 0.03).

Breast feeding attitudes (Table 4)

During the 4 weeks mothers were asked about their attitudes and believes on breast feeding and their preferences for formula milk. Though 82% said that formula milk can over feed, 16% mothers believe that formula milk is the healthier milk. When 33% prefer formula milk for nighttime feeding and for travel, 13% believe that babies could be crying due to low breast milk and opt for formula milk feeding. 16.5% mothers felt that formula milk is the better milk for working mothers.

Discussion

The aim of this study was to find out the rate of breast feeding (exclusive or partial) at the time of a level II NICU discharge, find out the successful breast-feeding during follow up after NICU discharge. Breast feeding rates were calculated separately for exclusive breast-feeding group, partial breast feeding and exclusive formula feeding groups.

The key findings from this study are that the rates of excluding breast milk feeding at the time of NICU discharge is 20% and partial feeding (Breast feeding + formula feeds) is 64%. Rate of exclusive breast feeding was 54% and 42% respectively at 4 weeks and 8 weeks follow up respectively. Rate of partial breast feeding was 40% and 43% at 4 weeks and at 8 weeks respectively. Rate of exclusive formula feeding was 16 %, 6% and 15% at discharge, at 4 weeks and at 8 weeks respectively.

Similar NICU post discharge data from Qatar are not published before, but Kayyali in 1989 reported 32% of neonatal OPD follow up mothers having exclusive breast feeding.[9] Sadriya Al-Kohji reported 18.9% exclusive breast feeding in babies less than 6 months among Arab mothers who were followed in the primary health centers of Qatar when studied in the year of 2009.[10] Alzaheb had meta-analysis of 19 studies published from the middle east and only 20.5% were found to feed exclusive breast milk for the first 6 months.[11] The importance of initiating direct breast feeding during NICU stay and its impact on the duration of prolonged breast feeding was studied and published by Pined R[12] who observed that mothers who initiated breast milk feedings but did not put their infants to breast in the NICU were no longer providing breast milk for their infants at NICU discharge. But this study was mainly done on preterm babies with weight < 1500 gm. In our study, 73% of neonates < 32 weeks had exclusive breast milk feeding at the time of NICU discharge, but this rate dropped to 37% at 4 weeks and 21% by 8 weeks.

Better exclusive breast-feeding rates observed during the longer NICU stay groups and very preterm neonates in our study show the support, education and motivation offered by the NICU staffs to the lactating mothers during the NICU stay and at the time of discharge. Carrie-Ellen Briere et al reported 48% exclusive breast feeding at the time of NICU discharge for neonates < 32 weeks and 51% continued to have exclusive breast feeding at 1 month follow up after NICU discharge for the same population. They also found that mothers who had initiated direct breast feeding during the NICU stay or those who had prior breast-feeding experience were likely to continue breast feeding at 1 month after NICU discharge. They also found that by 4 months follow up discharge breast feeding rates dropped to 26%.[13] Nancy et al reported 49.7% neonates getting discharged on some breast milk feeding when looked at the discharge feeding data for 124 NICUs for 2 years from 1999 to 2000.[14]

In our study, the median gestational age was 38 weeks, so most of the babies were term and had short NICU stay. The predominant NICU admissions were due to Transient tachypnoea of newborn in term baby, delivered out of LSCS and there was a statistically significant relation between the mode of delivery and the feeding types at discharge ($p < 0.001$) where neonates delivered through LSCS had higher formula feeding rates at the time of discharge. This likely could explain the low breast-feeding rates for neonates with short NICU stay. We found that those neonates who were term or late preterm who did not have breast feeding at the time of NICU discharge could pick up breast feeding after NICU discharge. During the follow up, the breast-feeding rates showed improvement at 4 weeks as the neonates who had shorter NICU stay had improving breast feeding rate (7.4% to 58%). But very preterm neonates who had high breast-feeding rates at the time of NICU discharge started to show decreasing breast-feeding trends by 4 weeks (73% to 51%). By 8 weeks, the breast-feeding rates dropped in all gestational ages, but the association was statistically not significant (P value 0.53).

Prospective study conducted in Sharjah in 2006 showed exclusive breast feeding at 76.5%, 48.4% and 13.3% at birth, at 1 month and at 6 months respectively. [15] H. Niela-Vilén *et al* reported a randomized study of the breast feeding experience of preterm mothers by a social media peer group during and post NICU discharge.[16] Preterm mothers expressed difficulty maintaining breast milk feeding after NICU discharge which needed prolonged support and encouragement for breast pumping requiring continued NICU nurse's support. [16]

In our study, there was no significant relation between the age of parents, parity or educational status of mothers and the feeding type and rates of breast feeding at discharge or during the 4 weeks and 8 weeks follow up. Though the occupational status and income levels did not have impact on the breast feeding at the time of NICU discharge, it was found that middle income groups had better breast-feeding rates during follow up and working mothers had higher exclusive formula feeding practices by 8 weeks ($P < 0.013$).

UNICEF data and other published data showed significant relation between the level of education and the income levels with the feeding practices.[17][18] When compared between Arabic speaking and non-Arabic speaking mothers, Arabic speaking mothers had higher exclusive formula feeding at 8 weeks (P

value was < 0.02). Sadriya Al-Kohji et al [10] had similar observations among Arabic mothers when studied in 2009. Lisa W. Kuan and colleagues had a similarly conducted survey of mothers who had breast feeding plans in the post-partum period and found that 76% mothers had successful breast feeding, but by 4 weeks 17% and by 8 weeks 29% had stopped breast feeding.[20] This study too raised the need for health system support for breast feeding not only during the NICU stay, but as ongoing breast feeding support by the hospital staffs during the post-partum period.[20]

In our study, though there was no statistically significant association between the feeding practices and the educational supports, 86% said the breast-feeding education was given by verbal method only and only 48% received such education and support pre partum. We also found that 33% mothers preferred formula milk for nighttime feeding and for feeding during travel. Haroon et al found that breastfeeding education and/or support increased exclusive breast-feeding rates and decreased no breastfeeding rates at birth, <1 month and 1-5 months after doing a systematic literature review. [21] Chapman et al after a systematic review concluded that breastfeeding peer committee initiatives are effective and can be scaled up in both developed and developing countries, as part of well-coordinated national breastfeeding promotion or maternal-child health programs.[22] WHO advocates that formal breastfeeding education is that which is provided over and above the breastfeeding information given as part of standard antenatal care, and which may include individual or group education sessions led by peer counsellors or health professionals, lactation consultation, distribution of written materials, video demonstrations and inclusion of prospective fathers in learning activities.[23] Sriram et al reported that despite having good knowledge there are lacunae in the practices of mothers due to social and economic reasons.[24]

Strengths And Limitations

This study shows prospective reliable data regarding the breast-feeding rates at the time of NICU discharge from a level II NICU in Qatar. The study findings prompt the need for implementation of dedicated follow up education and support for breast feeding mothers through breast feeding units or clinics after NICU discharge apart from the well-baby clinics and raises need for alternative methods of motivation and promotion for breast feeding utilizing audio-visual methods. Though this study population has varying nationalities, it's not a true representation of the country as it's a level II NICU catering to a select area of the country. The limited follow up of 8 weeks substantially impacted the true assessment of feeding practices among the population. The observed decreasing trend in the breast-feeding rates during the follow up period, was statistically not significant and extended follow up data would give a clearer understanding. Much of the follow up data was collected as telephonic interview due to the covid impact and many mothers could not be interviewed by face to face. The study did not look at the method of breast milk expression such as by breast pumps, utilization of Kangaroo mother care and its impact on the duration of breast feeding during the follow up.

Conclusions

The overall breast-feeding rates from this single center level II NICU from Qatar showed better breast-feeding rates compared to previously available data mainly due to the NICU staffs providing constant encouragement and breast-feeding support. The tendency to add formula feeding to breast feeding after NICU discharge due to the feeling of reduced amount of breast milk is concerning. Such mothers and mothers resorting to exclusive formula feeds during nighttime, working hours and during travel need on going educational support by establishing breast feeding clinics with dedicated lactation facilitating team and peer groups to encourage exclusive and direct breast feeding. Further studies with extended follow up and assessment of intervention methods are suggested to better understand the findings of this study.

Abbreviations

WHO: World Health Organization

NCD: Non communicable diseases

NICU: Neonatal intensive care unit

NCD: Non communicable diseases

Declarations

Ethical considerations

Ethical approval was obtained from the Institution review board and medical research department of Qatar. Participants were included in the study after a signed parental consent with permission for telephonic interview.

Consent for publication

Not applicable.

Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due privacy protection and ethical obligations but are available (in deidentified form) from the corresponding author on reasonable request.

Competing interests

There are no competing interests.

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Author information

Affiliations

NICU, AL Wakra Hospital¹

Hamad Medical Corporation, Doha, Qatar.

Dr. Brijroy Viswanathan¹ MD, MRCPCH, Dr. Rajai Al-Bedaywi¹ MD, Dr. Ahmed Tomerak¹ MD, FRCPCH, and Dr. Sarfrazul Abedin¹ MD.

Contributions

BV – Design of study, formulating research questions, writing and editing drafts, data collection/analysis, writing of manuscript. RA – Data collection, review and editing of manuscript drafts. AT – Conceptualization/design of the study, review and editing of the manuscript. SA – Analysis and editing of manuscript drafts. The author(s) read and approved the final manuscript.

Corresponding author

Correspondence to Dr. Brijroy Viswanathan.

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Tables

Table 1 : Baseline baby and maternal data.

Gestation age week, mean (SD)			37.33 (2.78) range 27-41
Weight Kg, mean (SD)			2.954 (0.795) range 1.12 – 4.97
Sex	male	No. (%)	210 (57.7%)
	Female	No. (%)	154 (43.3%)
NICU duration days, median (range)			3 (1 -55)
Parity	Primi	No. (%)	146 (40.1%)
	Multi	No. (%)	218 (59.9%)
Education mother	secondary	No. (%)	71/360 (19.5%)
	College	No. (%)	217/360 (59.6%)
	UniveTarsity	No. (%)	72/360 (19.9%)
Occupation	Home work	No. (%)	251 (69%)
	Outside work	No. (%)	113 (31%)
Income	less than 5000	No. (%)	39/327 (11.9%)
	5000-15000	No. (%)	213/327 (65.13%)
	More than 15000	No. (%)	75/327 (22.9%)
Nationality	Qatari	No. (%)	14 (3.8%)
	GCC	No. (%)	46 (12.6%)
	Indian sub continent	No. (%)	187 (51.5%)
	South east Asia	No. (%)	36 (9.9%)
	Africa and related	No. (%)	81 (22.3)

Table 2: Feeding practices and neonatal & maternal parameters.

Parameters: Numbers	feeding practices at discharge number (%)				feeding practices at 4 week number (%)				feeding practices at 8 weeks number (%)				
	Ex breast fee	formula	mixed	P value	Ex breast fee	formula	mixed	P value	Ex breast fee	formula	mixed	P value	
Sex													
male	210	36 (17.1)	35 (16.7)	139 (66.2)	0.268	114 (54.3)	13 (6.2)	83 (39.5)	0.906	92 (43.8)	35 (16.7)	83 (39.5)	0.224
female	154	37 (24)	23 (14.9)	94 (61)		83 (53.9)	8 (5.2)	63 (40.9)		61 (39.6)	19 (12.3)	74 (48.1)	
Gestation age, weeks													
27-31,	19	14 (73.7)	10 (5.3)	4 (21.1)	<0.001	7 (36.8)	1 (5.3)	11 (57.9)	0.019	4 (21.1)	4 (21.1)	11 (57.9)	0.53
32-34,	28	17 (60.7)	3 (10.7)	8 (26.8)		18 (64.3)	4 (14.3)	6 (21.4)		11 (39.3)	5 (17.9)	12 (42.9)	
35-36,	58	10 (17.2)	9 (15.5)	39 (67.2)		28 (48.3)	0 (0)	30 (51.7)		22 (37.9)	8 (13.8)	28 (48.3)	
37-41,	259	32 (12.4)	45 (17.4)	182 (70.3)		144 (55.6)	16 (6.2)	99 (38.2)		116 (44.8)	37 (14.3)	106 (40.9)	
NICU stay duration, days													
1 to 3 days,	188	14 (7.4)	47 (25)	127 (67.6)	<0.001	109 (58)	11 (5.9)	68 (36.2)	0.011	84 (44.7)	23 (12.2)	81 (43.1)	0.109
4 to 7 days,	110	18 (16.4)	9 (8.2)	83 (75.5)		63 (57.3)	7 (6.4)	40 (36.4)		51 (46.4)	16 (14.5)	43 (39.1)	
8 to 14 days,	29	14 (48.3)	10 (3.4)	14 (48.3)		6 (20.7)	2 (6.9)	21 (72.4)		6 (20.7)	8 (27.6)	15 (51.7)	
>14 days,	37	27 (73)	1 (2.7)	9 (24.3)		19 (51.4)	1 (2.7)	17 (45.9)		12 (32.4)	7 (18.9)	18 (48.6)	
Mode of delivery													
vaginal	177	34 (19.2)	16 (9)	127 (71.8)	0.001	100 (56.5)	10 (5.6)	67 (37.9)	0.668	79 (44.6)	26 (14.7)	72 (40.7)	0.595
LSCS	187	39 (20.9)	42 (22.5)	106 (56.7)		97 (51.9)	11 (5.9)	79 (42.2)		74 (39.6)	28 (15)	85 (45.5)	
PARITY													
primy	146	30 (20.5)	17 (11.6)	99 (67.8)	0.183	70 (47.9)	7 (4.8)	69 (47.3)	0.073	57 (39)	21 (14.4)	68 (46.6)	0.543
multi	218	43 (19.7)	41 (18.8)	134 (61.5)		127 (58.3)	14 (6.4)	77 (35.3)		96 (44)	33 (15.1)	89 (40.8)	
Language													
arabic	194	39 (20.1)	31 (16)	124 (63.9)	0.966	101 (52.1)	10 (5.2)	83 (42.8)	0.571	83 (42.8)	37 (19.1)	74 (38.1)	0.02
non arabic	166	33 (19.9)	25 (15.1)	108 (65.1)		94 (56.6)	10 (6)	62 (37.3)		69 (41.6)	16 (9.6)	81 (48.8)	
Mother age group													
< 25year,	52	10 (19.2)	6 (11.5)	36 (69.2)	0.433	29 (55.8)	1 (1.9)	22 (42.3)	0.062	23 (44.2)	9 (17.3)	20 (38.5)	0.109
25 to 35,	273	53 (19.4)	43 (15.8)	177 (64.8)		154 (56.4)	15 (5.5)	104 (38.1)		121 (44.3)	36 (13.2)	116 (42.5)	
> 35 year,	39	10 (25.6)	9 (23.1)	20 (51.3)		14 (35.9)	5 (12.8)	20 (51.3)		9 (23.1)	9 (23.1)	21 (53.8)	
Father age group													
< 30 year,	83	15 (18.1)	11 (13.3)	57 (68.7)	0.482	40 (48.2)	3 (3.6)	40 (48.2)	0.091	35 (42.2)	14 (16.9)	34 (41)	0.659
30-50 ,	243	52 (21.4)	43 (17.7)	148 (60.9)		140 (57.6)	13 (5.3)	90 (37)		106 (43.6)	34 (14)	103 (42.4)	
>40 year,	38	6 (15.8)	4 (10.5)	28 (73.7)		17 (44.7)	5 (13.2)	16 (42.1)		12 (31.6)	6 (15.8)	20 (52.6)	
Education mother													
secoundary	71	11 (15.5)	13 (18.3)	47 (66.2)	0.481	32 (45.1)	7 (9.9)	32 (45.1)	0.239	25 (35.2)	18 (25.4)	28 (39.4)	0.068
college	217	45 (20.7)	37 (17.1)	135 (62.2)		124 (57.1)	12 (5.5)	81 (37.3)		97 (44.7)	29 (13.4)	91 (41.9)	
university	72	16 (22.2)	7 (9.7)	49 (68.1)		40 (55.6)	2 (2.8)	30 (41.7)		30 (41.7)	7 (9.7)	35 (48.6)	
Occupation mothers													
homework	251	48 (19.1)	44 (17.5)	159 (63.3)	0.428	142 (56.6)	13 (5.2)	96 (38.2)	0.352	118 (47)	36 (14.3)	97 (38.6)	0.013
working	113	25 (22.1)	14 (12.4)	74 (65.5)		55 (48.7)	8 (7.1)	50 (44.2)		35 (31)	18 (15.9)	60 (53.1)	
Income family													
< 5k,	39	6 (15.3)	9 (23)	24 (61.5)	0.272	17 (43.5)	5 (12.8)	17 (43.5)	0.038	16 (41)	11 (28.2)	12 (30.7)	0.005
5 to 15k ,	213	41 (19.2)	36 (16.9)	136 (63.8)		128 (60)	11 (5.1)	74 (34.7)		102 (47.8)	28 (13.1)	83 (38.9)	
>15,	75	14 (18.6)	11 (14.6)	50 (66.6)		33 (44)	5 (6.6)	37 (49.4)		25 (33.4)	12 (16)	38 (50.6)	

Table 3: Feeding practices and breast-feeding education & breast feeding supports.

Parameters Numbers (%)	feeding practices at discharge number (%)				feeding practices at 4 week number (%)				feeding practices at 8 weeks number (%)				
	Ex breast fee	formula	mixed	P value	Ex breast fee	formula	mixed	P value	Ex breast fee	formula	mixed	P value	
BF advice done	347/364 (95.3)	70/73 (95.8)	56/58 (96)	221/233 (95)	0.833	188/197 (95)	20/21 (95)	139/146 (95)	0.995	145/153 (95)	51/54 (94)	151/157 (96)	0.796
Advised by Doctor	242/364 (66.4)	47/73 (64.3)	34/58 (59)	161/233 (69)	0.291	127/197 (64)	14/21 (67)	101/146 (69)	0.659	93/153 (61)	37/54 (68)	112/157 (71)	0.136
Advised by nurse	327/364 (89.8)	68/73 (93.1)	52/58 (90)	207/233 (89)	0.568	178/197 (90)	18/21 (86)	131/146 (90)	0.798	135/153 (88)	45/54 (83)	147/157 (94)	0.067
Timing of education													
prepartum	167/347 (48)	30/70 (42.8)	29/56 (52)	108/221 (49)	0.184	97/188 (51)	10/20 (50)	60/139 (43)	0.296	75/145 (52)	21/51 (41)	71/151 (47)	0.231
postpartum	170/347 (50)	35/70 (50)	26/56 (46)	109/221 (49)		84/188 (45)	9/20 (45)	77/139 (55)		67/145 (46)	30/51 (59)	73/151 (48)	
both	10/347 (2.8)	5/70 (7.1)	1/56 (1.7)	4/221 (1.8)		7/188 (3.7)	1/20 (5)	2/139 (1.4)		3/145 (2)	0/51 (0)	7/151 (4.6)	
Mode of education													
verbal	301/348 (86.4)	61/70 (87.7)	50/56 (89)	190/222 (85)	0.96	165/188 (88)	13/20 (65)	123/140 (88)	0.01	123/145 (85)	47/51 (92)	131/152 (86)	0.643
written	9/348 (2.5)	2/70 (2.8)	1/56 (1.7)	6/222 (2.7)		6/188 (3.2)	0/20 (0)	3/140 (2.1)		5/145 (3.4)	0/51 (0)	4/152 (2.6)	
both	38/348 (10.9)	7/70 (10)	5/56 (8.9)	26/222 (11.7)		17/188 (9)	7/20 (35)	14/140 (10)		17/145 (12)	4/51 (7.8)	17/152 (11)	
Follow Up education BF	220/364 (60.4)	45/73 (61.6)	31/58 (53)	144/233 (62)	0.494	128/197 (65)	15/21 (71)	77/146 (53)	0.041	96/153 (63)	28/54 (52)	96/157 (61)	0.361
BF support by family	333/364 (91.5)	67/73 (91.7)	55/58 (95)	211/233 (90)	0.578	181/197 (92)	16/21 (76)	136/146 (93)	0.032	138/153 (90)	49/54 (91)	146/157 (93)	0.663
BF support by friend	72/364 (19.8)	16/73 (21.9)	10/58 (17)	46/233 (19.7)	0.8	46/197 (23)	1/21 (4.7)	25/146 (17)	0.074	31/153 (20)	8/54 (15)	33/157 (21)	0.603
BF support by staff	222/364 (61)	46/73 (63)	27/58 (46)	149/233 (64)	0.048	119/197 (60)	10/21 (48)	93/146 (64)	0.358	86/153 (56)	26/54 (48)	110/157 (70)	0.005
Visit from NICU to encourage BF	183/364 (50)	40/73 (54.7)	31/58 (53)	112/233 (48)	0.526	95/197 (48)	12/21 (57)	76/146 (52)	0.634	67/153 (44)	28/54 (52)	88/157 (56)	0.094

Table 4 : Breast feeding attitudes

Breast feeding attitudes	
	Frequency N (%)
Crying due to low breast milk	46 (12.6)
Formula healthier	58 (15.9)
Formula can overfeed	296 (81.8)
Formula milk better for working	60 (16.5)
Formula milk for nighttime	120 (33.1)
Formula milk for travel	120 (33.1)

Figures

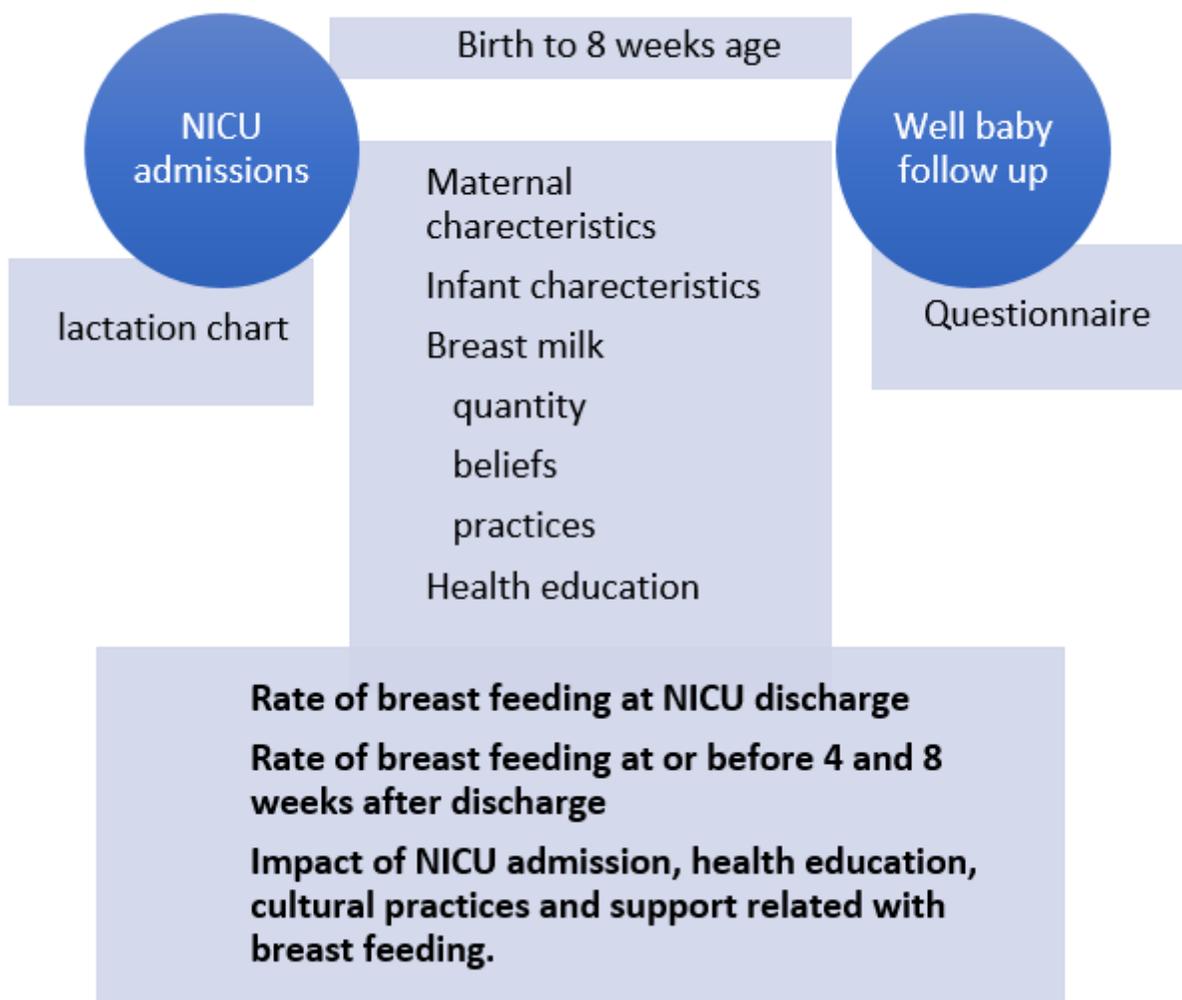


Figure 1

Study plan.

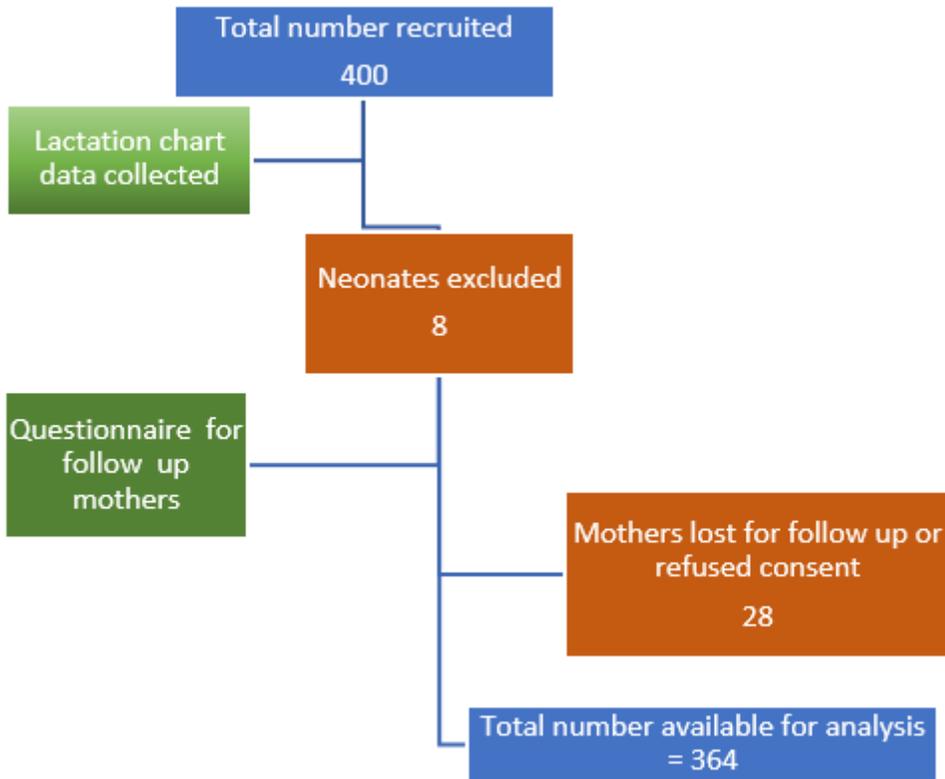


Figure 2

Patient flow chart.

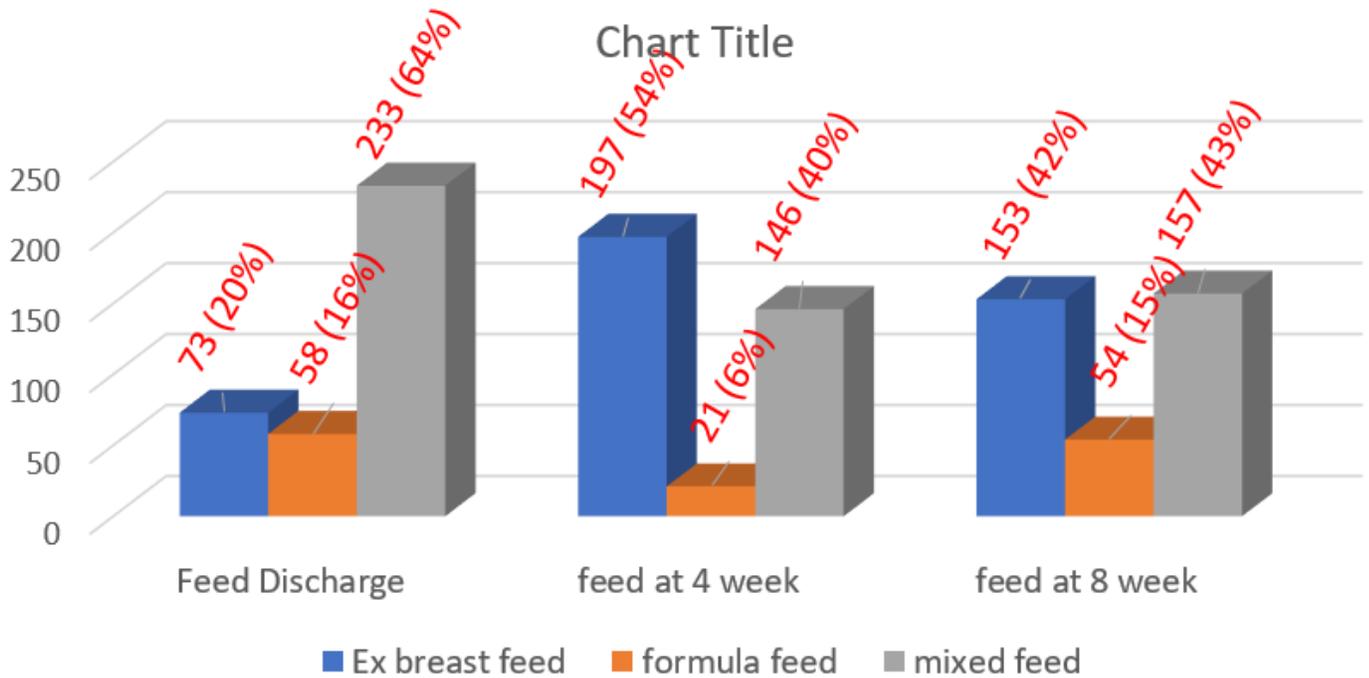


Figure 3

Chart 1: Feeding practices at discharge, at 4 weeks follow up and at 8 weeks follow up.