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Original Article

Breast crawl at birth, effect on breastfeeding rate and infant growth in infants delivered at an urban tertiary care public hospital: A randomized controlled trial

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ABSTRACT

Introduction: Establishing successful breastfeeding within the first hour of infant's life has been shown to have an inverse relationship with maternal breastfeeding difficulties and decreased neonatal mortality.
Patients and Methods: We compared the effect of immediate breast crawl with standard care on maternal perception of breastfeeding, mother infant bonding and maternal satisfaction at hospital discharge, breastfeeding rates, infant weights at 6 weeks and at 6 months. Eligible pregnant women after birth were randomized. In the breast crawl group, immediate skin to skin contact was practiced till 1 hour or till the infant had the first breast feeding. In the control group no skin to skin contact was practiced.
Results: 200 mother infant dyads were enrolled in the study. Breast crawl was successful in 90% of the infants. No difference in breastfeeding rates was observed between the two groups at 6 weeks or at 6months age [94.8% (n = 97) vs. 95.7% (n = 95), OR 0.99, 95% CI: 0.93-1.05 and 92.7% (n = 97) vs. 94.6% (n = 93) OR 0.98 95% CI: 0.92-1.05]. The breastfeeding assessment score and maternal perception of breastfeeding and infant activity were significantly better in the crawl group (OR 10.2, 95% CI :5.12 -20). No difference in infant bonding scores was observed between the two groups. The mean weight at discharge was similar between the two groups. The mean infant weight at 6 months of age were significantly better in the crawl group [6767 ± 843 grams vs. 6475 ± 843 grams, p = 0.018)].
Conclusion: Breast crawl at birth improves the breastfeeding and maternal perception of breastfeeding at hospital discharge and the infant weights at 6 months of age.
Strength: Education and motivation of the mothers and labor room team, good breastfeeding rates in the control group are some of the unique features of this study.
Limitation: Consistent presence of the research assistant.

1. Introduction

Skin to skin contact (SSC) at birth involves placing the naked newborn infant prone on the mother's bare chest at birth or soon afterward for a minimum duration of at least 1 h. The healthy infant, placed in SSC after birth, crawls to the mother's breast and nipple and starts to suckle by about 1 h of age. While in immediate, continuous uninterrupted SSC with mother in the first hour after birth, babies progress through nine instinctive, complex, distinct, and observable stages((Widström et al., 1992) For the mother, the contact of the infant while in skin to skin induces a rise in the hormone oxytocin, which in turn leads to improved parenting behavior (Winberg, 2005). Any interruption during these stages, for non-emergent newborn care leads to decreased achievement of suckling and breast feeding (Robiquet et al., 2016).

The natural practice of skin-to-skin contact and breastfeeding soon after birth has robust evidence pointing to physiologic, social, and psychological benefits for both mother and infant (Moore et al., 2016). Establishing successful breastfeeding within the first hour of infant's life has been shown to have an inverse relationship with maternal breastfeeding difficulties and decreased neonatal mortality (Bramson et al., 2010) (Edmond et al., 2006). However, in the most recent Cochrane review on early skin-to-skin contact authors cited inconsistencies in the practice of Skin to Skin Contact (SSC), "inadequate evidence with

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respect to details dsuch as timing of initiation and dose". Nearly half of the studies were excluded as intervention group infants did not receive immediate SSC at birth.

We planned this study to compare immediate breast crawl with standard care in a randomized control trial at a large public health tertiary care hospital, to assess maternal perception of breastfeeding, mother infant bonding and maternal satisfaction at hospital discharge, breastfeeding rates, infants' weights at 6 weeks and at 6 months.

2. Methodology

This open label, two-arm parallel, randomized control trial was conducted in the labor and delivery unit at Niloufer Hospital, Hyderabad. It is a dedicated public hospital for women and children, having1000 beds and an average 7000 deliveries per annum. The study was approved by the institutional ethics committee. Pregnant women were considered eligible if they consented to participate in the study, had no pre-existing medical or psychiatric illness, were anticipated to have spontaneous vaginal delivery, and did not have peripartum complications, which precluded infant's immediate skin–skin contact with mother. Mother–infant pairs were excluded from the study if the infants were born before 37 weeks gestation, were delivered by lower segment caesarian section, if there were multiple births, if the babies had medical complications at birth that contraindicated breast crawl. When the mother was shifted to the labour room, written consent was obtained. Immediately after delivery, randomization was done to breast crawl or control group. Randomization was based on a computer-generated sequence and allocation concealment was achieved by using serially numbered sealed opaque envelopes. Demographic data were collected from the records and by personal interview, and outcome data were collected by a research assistant who was masked to group assignments. Gestational age assessment was done from mother's last menstrual period (LMP) or first trimester ultrasound report when available.

In Infants randomized to breast crawl group the following interventions were done.

- Delaying cord clamping for more than 1 min
- Placing the infant in prone position on mother's abdomen
- Assessment of difficulty in breathing, tone and activity
- Dry the infant except the palms, not doing oro-nasal suctioning
- Infant and mother were covered with a dry sheet
- Support the infant's back with mother's hand
- Breast crawl was terminated if the infant became sick
- The mother and infant were observed for 60 min or till completion of first breast feeding, whichever was earlier
- Assisting the infant to breast feed if the infant does not crawl within 60 min

In infants randomized to control group, as per the existing unit protocol, after assessing for breathing efforts, the infant was shifted under radiant warmer, cleaned and oral suction was done if needed. No immediate skin-to-skin contact was practiced. Infant was given the first breastfeed before shifting the mother from labor room to the post-natal ward. Although all infants in control group were encouraged for the first feed, the exact time of initiation and time of first breastfeed session was not recorded. The hospital protocol mandated all mothers to be shifted to post-natal ward 2 h after delivery of the infant.

In both the groups, mothers were explained about the benefits of breast-feeding and were encouraged to breast feed as frequently as possible and on demand schedule. All other management before shifting the newborn from labor room to postnatal ward like administration of vitamin k, temperature regulation and sickness management if any was carried out as per unit protocol.

Exclusive breastfeeding at 6 months was the primary outcome of the study. The secondary outcomes included.

- Infant temperature at the time of shifting infant from labor room to maternity ward
- Breastfeeding assessment (IFBAT) score at discharge
- Maternal perception of breastfeeding and Infant activity at discharge
- Mother and Infant bonding score at discharge
- Exclusive breastfeeding rate at 6 weeks of infant age
- Infant weight at 6 weeks and 6 months of infant age

2.1. Sample size

Assuming 40% exclusive breast feeding at six months, if breast crawl improved the breast-feeding rate by 20% at six months with an alpha error of 0.5% and beta error of 20% (power of 80%), the required sample for two-sided equality was 94 infants in each group. Assuming an attrition of 10–15 mother infant dyads, 100 infants were enrolled in each group.

2.2. Data analysis

Group comparisons for categorical variables were done using chi-square test, student *t*-test and non-parametric tests for continuous variables.

2.3. Results

In this study of 200 mother infant dyads(Fig. 1), baseline demographic and clinical features were comparable between the two groups (Table 1). Mean maternal age, maternal education, proportion of mothers receiving antenatal care and mean infant birth weights were similar between the two groups.

In the intervention group breast crawl was interrupted in 10 (10%) infants. Of the remaining 90 infants, 87 crawled to the mother's breast on their own while 3 required assistance. The mean duration of breast crawl was 38.59 (SD ± 7.5) minutes.

A total of eighteen infants were lost to follow up (3 in breast crawl and 5 in control group) at 6 weeks and ten infants (breast crawl n = 3 and Control n = 7) were lost to follow up at 6 months of age. The breastfeeding rates at 6 weeks were similar in both the groups, 94.8% (n = 97) in breast crawl infants versus 95.7% (n = 95) in the control group (OR 0.99, 95% CI: 0.93–1.05). Similarly, at 6 months of infant age no difference was observed in the breast-feeding rates, 92.7% (n = 97) in breast crawl infants versus 94.6% (n = 93) in the control group (OR 0.98 95% CI: 0.92–1.05) in the control group.

Average core body temperature of infants, when measured at the time of shifting out from the labor room was significantly higher in the breast crawl group when compared with the control group [97.8(SD ± 0.49) F vs. 96.9 (SD ± 0.47) F, $p < 0.001$]. The breastfeeding assessment (IBFAT score) and maternal perception of breastfeeding and infant activity were significantly better in the crawl group. Even after adjusting for maternal primi-gravida status and newborn gender, maternal perception of breastfeeding and infant activity (very satisfied) was better in the mothers whose infant's performed breast crawl (OR 10.2, 95% CI:5.12–20). No difference in infant bonding scores was observed between the two groups (Table 2).

There was a trend for less pre-lacteals usage among the infants in crawl group 14% (n = 100) versus 22% (n = 100) in the control group (OR 0.9 95% CI:0.6–1.4). At discharge infants who had performed breast crawl were more likely to have received satisfactory breastfeeding (breastfed > 6 times a day) 80% (n = 100) versus 55%(n = 100) in the control group (OR 3.27 95%: 1.75–6.74). They had more change in stool colour, more wet diapers (> =5 per day) and more stool output per day (> 2 per day). The mean weight at discharge was similar between the two groups. Duration of mother-infant hospital stay was similar in both the groups (Table 3). The mean infant weight at 6 weeks were comparable in both the cohorts (4436 ± 610 g in breast

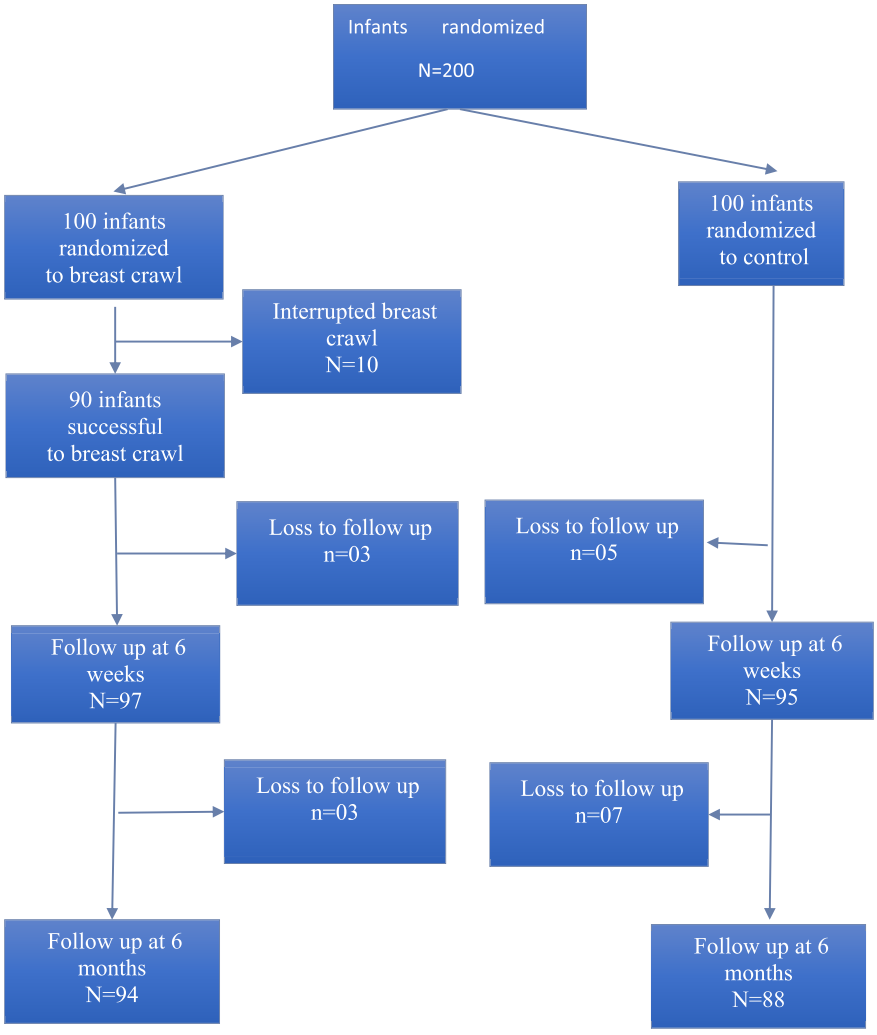

Fig. 1. Consort Flow diagram.

Table 1
Comparison of Baseline characteristics.

Variable	Control	Breast crawl	P value
	N = 100	N = 100	
Mean maternal age Years (SD)	22.90 (3.33)	23.25(4.2)	0.51
Education			
Illiterate	20	19	
Primary (< 7 grade)	19	27	
Secondary (7–12 grade)	51	47	
Graduate	08	07	
Post graduate	02	00	0.45
Occupation			
Homemaker	84	89	
Unskilled Worker	14	11	
Skilled Worker	02	00	0.286
Type of family			
Joint	53	47	
Nuclear	47	53	0.39
Antenatal care (> 4antenatal visits)	75	76	0.87
Primi-gravida	39	24	0.022
Maternal Complications (%)	17	23	0.29
PROM	03	09	0.07
Delayed cord clamping (> 1min)	92	98	0.18
Male	49	63	0.046
Mean Birth weight grams(SD)	2770 (378)	2737(405)	0.54
Head circumference in cm (SD)	33.68 (0.96)	33.5 (1.07)	0.24

Table 2
Breastfeeding assessment, Bonding and Maternal satisfaction score (at discharge from the hospital).

Variable	Breast crawl	Control	P value
Median IBFAT Score (IQR)	12 (11–12)	11 (8–11)	< 0.001
Median Maternal Satisfaction Score (IQR)	15 (13–15)	11 (11–13)	< 0.001
Bonding score (IQR)	123 (122–125)	123 (120–125)	0.39

Table 3
Comparison of outcomes (at the time of hospital discharge).

Variable	Breast crawl	Control	P value
	N = 100	N = 100	
Mother infant hospital stay			
< 48 h	4	6	
48–72 h	65	65	
> 72 h	31	29	0.79
Stool colour			
Persistent Meconium	81	96	0.002
Wet Diapers (> =5/day)	57	35	0.002
Stool frequency (> 2/day)	74	63	0.09
Mean Discharge Weight grams (SD)	2603 (405)	2576 (422)	0.65

crawl infants vs. 4324 ± 582 g, p = 0.19 in the control group) but at 6 months of age the infant weights were significantly better in the crawl group [6767 ± 843 g vs. 6475 ± 843 g, p = 0.018)].

2.4. Discussion

In our study nearly all the babies, who were given a chance, crawled towards the mother's breast instinctively. This is a testament to the newborn infant's ability to perform breast crawl. In our study, newborns performed breast crawl on their own with minimal assistance and nearly all could breast feed with no or minimal assistance. Mothers in both the groups exhibited optimum exclusive breastfeeding rates at 6 weeks and 6 months of follow-up, and no significant difference was found in breast feeding rates among the two groups. Our results are consistent to earlier studies where breast crawl was not found to significantly improve breast feeding rates in follow up (Mahmood et al., 2011) (Moore and Anderson, 2007) (Carfoot et al., 2005). Overall rates of successful breast feeding were higher than expected. This could be attributed to the high level of motivation of the participants, who all intended to breast feed. We feel that a large sample size is required to demonstrate any difference in breast feeding at follow-up, since both the groups had an exclusive breast-feeding rate of more than 90%.

Contrary to popular belief, no hypothermia was recorded in any of the infants in breast crawl group. Breast crawl resulted in better infant body temperatures. In a resource limited setting this is a boon to prevent neonatal hypothermia in at-risk babies. Mothers of the infants who performed breast crawl, had higher degree of satisfaction and satisfactory breast-feeding experience as measured on IBFAT. We believe that by breast crawl, a cycle is established in which early and effective feeds result in a strong oxytocin and prolactin response, causing better lactation and exclusive breast feeding there by ensuring prolonged lactation and an empowered and confident mother. There was a trend towards less pre-lacteal usage in infants of breast crawl group.

In both the groups, infants when followed up at 6 weeks had similar weight gain but at 6 months of age, infants who performed breast crawl had significantly better weight gain. This can be explained based on higher satisfaction and bonding levels translating to better empowerment and awareness of mothers for infant care.

Although the results in this study are very encouraging, there were certain limitations. Consistent presence of the research assistant, education and motivation of the mothers and labor room team, good breastfeeding rates in the control group are some of the unique features of this study.

3. Conclusions

The findings of this study show that mothers have a successful first breast-feeding after a period of skin-to-skin contact with their babies than with routine care. They also reported a higher degree of satisfaction. The study provides strong evidence that infant temperature is improved through skin to-skin care, although there was no evidence of any effect on breast feeding at 6 weeks and 6 months. Overall, we believe our study provides support for the scaling up the implementation of skin-to-skin care across the community. Such a widespread implementation of breast crawl will require.

1. Antenatal education of all potential mothers regarding benefits of breast feeding
2. Sensitizing obstetricians and labor room staff for the implementation of breast crawl.
3. Promoting birth companions in labor room to monitor infant and if required assist mother during breast crawl.

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SM designed the study, analysis and manuscript drafting.
SU and AS collected and analyzed data.
SK and AR drafted manuscript.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jnn.2019.04.008.

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Further reading

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