

Effect of Mother-Infant Early Skin-to-Skin Contact on Breastfeeding Status: A Randomized Controlled Trial

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ABSTRACT

Objective: To evaluate the effect of mother-infant early skin-to-skin contact on breastfeeding behavior of infants.

Study Design: A randomized controlled trial.

Place and Duration of Study: The study was conducted in the Department of Obstetrics of Pakistan Institute of Medical Sciences, Islamabad, from November to December 2009.

Methodology: Eligible mothers were assessed for the successful breastfeeding by using IBFAT tool. The time to initiate the first feed, time to effective breastfeeding, maternal satisfaction with the care provided, preference for the same care in future and level of exclusive breastfeeding at the age of one month were also noted. The data was compared by using X^2 and t-test. Significant p-value was taken as < 0.05 .

Results: A total of 183 mother-infant pairs (92 in skin-to-skin care [SSC] group and 91 in conventional care [CC] group) were analyzed for breastfeeding behavior of the infants. The first breastfeed was 26.25% more successful in SSC group (58.8% in SSC group as compared to 32.5% in CC group with p-value of 0.001). In SSC group, the mean time to initiate first breastfeed was 61.6 minutes shorter than CC group (40.62 vs. 101.88; $p < 0.001$). Mean time to achieve effective breastfeeding was 207 minutes earlier in SSC group (149.69 vs. 357.50; $p < 0.001$). The level of satisfaction in the mothers of SSC group was significantly high as compared to controls (56% vs. 6.2%). Similarly, 53.8% mothers of SSC group showed preference for similar care in future as compared to 5% in CC group. In SSC group 85.3% infants were exclusively breastfed at one month as compared to 65.7% in CC group ($p=0.025$).

Conclusion: Maternal-infant early skin-to-skin contact significantly enhanced the success of first breastfeed and continuation of exclusive breastfeeding till one month of age. It also reduced the time to initiate first feed and time to effective breastfeeding.

Key words: *Skin-to-skin care. Conventional care. Breastfeeding.*

INTRODUCTION

Breastfeeding is the healthiest and most natural way of infant feeding and successful lactation mainly depends on early initiation of breastfeeding. Unfortunately, breastfeeding rates in Pakistan are the lowest among South Asian countries. According to Pakistan Demographic and Health Survey 2006-07,¹ only 29% mothers initiate breastfeeding within 1 hour after delivery while exclusive breastfeeding rate up to 2 months of infant's age is only 55% and up to 6 months is just 37%. This dismal state of affairs is largely due to the practices of separating the mother and infant at the time of birth.

The first 2 hours postbirth, called the 'sensitive period',² is the optimal time for infant to initiate breastfeeding showing behaviors like mouthing, lip smacking movements, hand-to-mouth activity, vocal cues, etc. This period gives excellent opportunity for mothers and infants to develop a reciprocal relationship when kept

together in an intimate (skin-to-skin) contact. Maximum benefit of this period for successful breastfeeding can be achieved by applying skin-to-skin care (SSC) method.

'SSC method', a contact immediately after birth by holding the naked baby against the mother's skin, between the breasts, lasting until the first feed or for as long as the mother wishes.³ This method also known as Kangaroo Mother Care was first introduced in Bogota, Colombia and its effect on breastfeeding behaviors in healthy full-term infants is well documented.⁴⁻⁷ Skin-to-skin contact makes full-term infant able to move towards the mother's nipples and latch correctly.^{6,8} On the other hand, separation of infant from mother in immediate post-natal period causes failure of early initiation and effective breastfeeding.⁹

Despite the poor status of breastfeeding in Pakistan, there has been no endeavor to initiate SSC in the country. Although WHO/UNICEF and American Academy of Pediatrics encourage skin-to-skin contact at birth,^{3,10} yet this advocacy needs a body of evidence and acceptance of this intervention in our set-up.

This study was conducted to assess the effect of early SSC on success of first feed and acceptability of this intervention by mothers.

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METHODOLOGY

A randomized controlled trial (RCT) was conducted from 1st November to 31st December 2009 in the Obstetrics Department of Pakistan Institute of Medical Sciences (PIMS), Islamabad, after approval of institutional ethics committee. Three research assistants, all physicians, were especially trained in assessing breastfeeding by using the 'infant breastfeeding assessment tool' (IBFAT).^{11,12}

Eligible participants included healthy, full term mothers anticipating spontaneous vaginal delivery with intention to exclusively breastfeed their infants for at least one month. Infants who did not need resuscitation beyond oro-pharyngeal suction were included. Mothers were excluded if they had multiple pregnancy, pre-existing medical complications (diabetes, gestational diabetes, pregnancy induced hypertension, renal failure, heart disease, psychiatric illness, etc.), severe postpartum hemorrhage, caesarean section, severely retracted/inverted nipples, or passage of meconium during labor. Infants with gestation < 37 weeks, weight < 2500 grams, signs of respiratory distress after birth, major congenital anomalies, floppiness or birth trauma were also excluded.

After an informed written consent, eligible mothers were randomly assigned to either of the two groups i.e. SSC/conventional care (CC). During the second stage of labor, pre-mixed sealed envelopes with allocation cards were opened sequentially and mothers and research assistants were informed accordingly. One research assistant accompanied each mother in both groups from the start of 2nd stage of labor till effective breastfeeding was established.

The primary outcome variable, success of first breastfeed, was measured by IBFAT.^{11,12} Score of 10-12 was considered as successful feeding.^{11,12} Time to initiate first breastfeed was measured in minutes from birth till infant started first breastfeed. Time to effective breastfeeding was the time in minutes from birth till start of three consecutive successful feeds.^{13,14} Maternal satisfaction, with the prescribed care received, was rated as very satisfied, satisfied, fairly satisfied, unsatisfied, or very unsatisfied.¹⁵ Maternal preference for the same postdelivery care in future was rated as most certain, certain, quite certain, not certain, or certainly not.¹⁵ Breastfeeding status (exclusivity) at one month postbirth was measured by the index of breastfeeding status (IBS) as full, partial and token.¹⁶

In SSC group, infants were delivered on their mothers' abdomen and after drying, naked infants were placed prone against mothers' skin, between the breasts. Their heads were covered with dry caps and backs with pre-warm sheets to prevent heat loss. The mothers were helped to keep their infants in skin-to-skin contact uninterruptedly. Skin-to-skin contact was ended at any

time when infant had taken first feed and at least 45 minutes had passed. It was also designed to terminate skin-to-skin contact, if infant did not take feed within 120 minutes.

In CC group, infants were shifted to the radiant warmer immediately after cutting the cords. They were cleaned and wrapped with pre-warm sheets. They were transferred to the postnatal ward with mothers and first feed was started when mothers were ready.

In both groups, time from birth to start of first feed was noted. All breastfeeds were scored on IBFAT till the infant had successful breastfeeding and time to effective breastfeeding was noted. In each group, maternal satisfaction with the care received and preference for same post-delivery care in future was rated. After one month of delivery (day 30) mothers were contacted to determine the infant breastfeeding index.

Before actual trial, a pilot study was conducted to calculate the sample size. Fifteen mother-infants dyads were analyzed in each group. Success rate of first breastfeed was 33.3% and 60% in CC and SSC group respectively. Sample size of 72 mother-infant pairs in each group was calculated by using WHO sample size calculator by keeping level of significance at 5% and power of test at 90%.¹⁷

Data were analyzed using SPSS version 16. The differences between the groups were calculated using independent-samples t-test for continuous data and Pearson chi-square test for categorical data. Level of significance in terms of p-value was compared with 0.05.

RESULTS

Over a period of 2 months, 253 mothers were approached to assess the eligibility according to inclusion and exclusion criteria. Figure 1 shows a flow chart to depict the steps, through which the participants passed through this RCT. Demographic and clinical characteristics of the participants are given in Table I. No significant inter-group baseline difference was noted, except that multi-parous mothers with no previous experience of breastfeeding were more in CC group ($p=0.04$). Mean duration of skin-to-skin contact in SSC group was 63.37 ± 1.33 minutes with range of 45-100 minutes.

Forty-seven (58.8%) infants in SSC group had score of 10-12 (successful) on IBFAT as compared to 26 infants (32.5%) in CC group during the first breastfeed (Table II). Twenty-two infants (27.5%) in SSC group scored 7-9 as compared to 39 infants (48.8%) in CC group. Similarly, 11 (13.8%) infants in SSC group scored 4-6 as compared to 15 infants (18.8%) in CC group. Mean IBFAT score in SSC group was 8.87 ± 1.87 as compared to 8.27 ± 1.76 in CC group. Mean time to initiate first feed in SSC group was 61.26 minutes earlier

as compared to CC group. Similarly, mean time to effective breastfeeding in SSC group was 207.81 minutes earlier as compared to CC group.

Maternal levels of satisfaction (very satisfied, satisfied and fairly satisfied) were high 78/80 (97.5%) in SSC

group as compared to 68 (85%) in CC group. More mothers 74/80 (92.5%) in SSC group were certain (most certain, certain and quite certain) to prefer the same postdelivery care in future as compared to 43/80 (53.7%) in CC group. We were able to contact 68/80

Table I: Demographic and clinical characteristics of participants in two groups.

| Variable | SSC (n=80) | CC (n=80) | Test | df | p-value |
|--|----------------------------|----------------------------|---------------------------------------|-----|---------|
| Maternal | | | | | |
| Age (years) | 25.31 (mean) 4.37 (SD) | 25.97 (mean) 4.60 (SD) | t-test (2-tailed) = 0.93 | 158 | 0.35 |
| Education (years) | 9.27 (mean) 5.13 (SD) | 9.13 (mean) 5.52 (SD) | t-test (2-tailed) = 0.16 | 158 | 0.87 |
| Primigravidae | 29 (n), 36.2 (%) | 23 (n), 28.8 (%) | X ² -test (2-sided) = 1.02 | 1 | 0.31 |
| Multiparae: no previous breastfeeding experience | 4 (n), 5 (%) | 14 (n), 17.5 (%) | X ² -test (2-sided) = 6.42 | 2 | 0.04 |
| Multiparae: duration of previous breastfeeding experience (days) | 829.11 (mean), 695.59 (SD) | 962.12 (mean), 778.09 (SD) | t-test (2-tailed) = 0.85 | 88 | 0.39 |
| Induction / augmentation of labor | 39 (n), 48.8 (%) | 36 (n), 45.0 (%) | X ² -test (2-sided) = 0.22 | 1 | 0.63 |
| Experience of conventional care in the past | 47 (n), 58.8 (%) | 48 (n), 60.0 (%) | X ² -test (2-sided) = 0.02 | 1 | 0.87 |
| Infant | | | | | |
| Female infants | 34 (n), 42.5 (%) | 32 (n), 40.0 (%) | X ² -test (2-sided) = 0.10 | 1 | 0.74 |
| Birth weight (grams) | 3058 (mean), 340.7 (SD) | 3036 (mean), 350.8 (SD) | t-test (2-tailed) = 0.41 | 158 | 0.68 |
| Gestational age (weeks) | 38.92 (mean), 1.27 (SD) | 38.93 (mean), 1.21 (SD) | t-test (2-tailed) = 0.06 | 158 | 0.94 |
| Airway suction done | 13 (n), 16.2 (%) | 16 (n), 20.2 (%) | X ² -test (2-sided) = 0.37 | 1 | 0.53 |

Table II: Results of outcome variables between the two groups.

| Variables | SSC | CC | Absolute difference between groups | Test | df | p-value |
|---|------------------------------|------------------------------|------------------------------------|--|-----|---------|
| Success of first breastfeed (IBFAT score ≥ 10) | 47 (n) 58.8 (%) | 26 (n) 32.5 (%) | 21 (n) 26.25 (%) | X ² -test (2-sided) = 11.10 | 1 | 0.001 |
| Maternal satisfaction with the care received: | | | | | | |
| Very satisfied | 45 (n), 56 (%) | 5 (n), 6.2 (%) | 40 (n), 50 (%) | X ² -test (2-sided) = 57.89 | 3 | < 0.001 |
| Satisfied | 24 (n), 30.0 (%) | 24 (n), 30.0 (%) | 0 | | | |
| Fairly satisfied | 9 (n), 11.2 (%) | 39 (n), 48.8 (%) | -30 (n) -7.5 (%) | | | |
| Unsatisfied | 2 (n), 2.5 (%) | 12 (n), 15.0 (%) | 10 (n), -2.5 (%) | | | |
| Very unsatisfied | 0 | 0 | 0 | | | |
| Preference for same post-delivery care in future: | | | | | | |
| Most certain | 43 (n), 53.8 (%) | 4 (n), 5.0 (%) | 39 (n), 48.75 (%) | X ² -test (2-sided) = 70.22 | 4 | < 0.001 |
| Certain | 25 (n), 31.2 (%) | 14 (n), 17.5 (%) | 11 (n), 13.75 (%) | | | |
| Quite certain | 6 (n), 7.5 (%) | 25 (n), 31.2 (%) | -19 (n), -3.75 (%) | | | |
| Not certain | 6 (n), 7.5 (%) | 29 (n), 36.2 (%) | -23 (n), -8.75 (%) | | | |
| Certainly not | 0 | 8 (n), 10.0 (%) | -8 (n), -10.0 (%) | | | |
| Index of breastfeeding status (IBS): | | | | | | |
| Full | 58 (n), 85.3 (%) | 44 (n), 65.7 (%) | 14 (n), 7.5 (%) | X ² -test (2-sided) = 7.41 | 2 | 0.025 |
| Partial | 10 (n), 14.7 (%) | 22 (n), 32.8 (%) | -12 (n), -15 (%) | | | |
| Token | 0 | 1 (n), 1.5 (%) | -1 (n), -1.25 (%) | | | |
| Time to initiate first breastfeed (minutes) | 40.62 (mean) 10.56 (SD) | 101.88 (mean) 67.94 (SD) | -61.26 (mean) | t-test (2-tailed) = 7.96 | 158 | < 0.001 |
| Time to effective breastfeeding (minutes) | 149.69 (mean) 189.15 (SD) | 357.50 (mean) 270.11 (SD) | -207.81 (mean) | t-test (2-tailed) = 5.63 | 158 | < 0.001 |

Appendage. Infant Breastfeeding Assessment Tool (IBFAT).

| Score | 3 | 2 | 1 | 0 |
|-------------------|------------------------------------|---|---|---------------------|
| Readiness to feed | Starts feed readily without effort | Needs mild stimulation to begin | Needs more stimulation to rouse and begin feeding | Cannot be aroused |
| Rooting | Roots effectively at once | Needs some coaxing, prompting, or encouragement | Roots poorly even with coaxing | Did not try to root |
| Fixing (latch on) | Feeds immediately | Takes 3-10 minutes to start | Takes over 10 minutes to start | Did not feed |
| Sucking pattern | Sucks well on both breasts | Sucks on and off but needs encouragement | Weak suck, sucks on and off for short periods | Did not suck |
| Maximum possible | 12 | 8 | 4 | 0 |

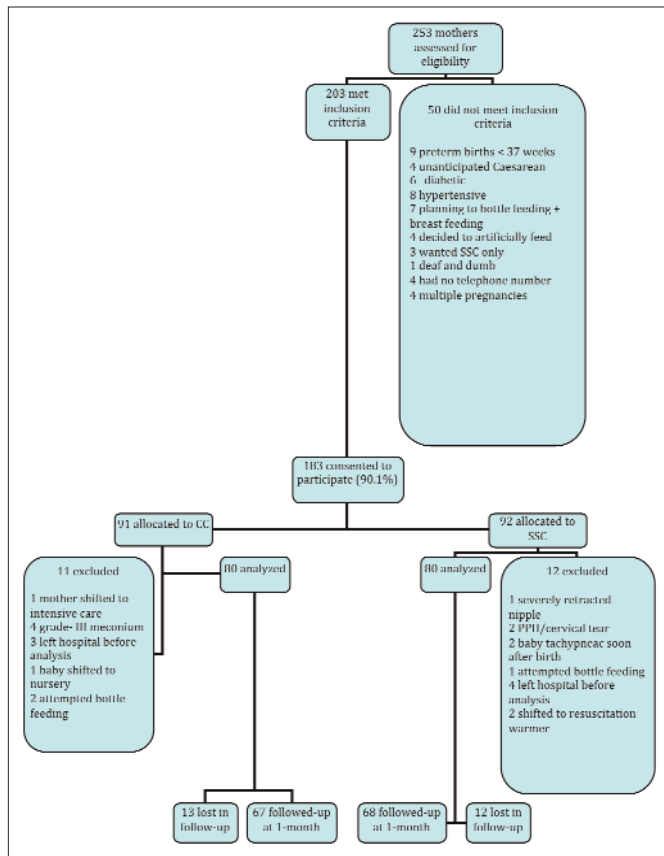


Figure 1: Participants flow chart.

(85%) mothers in SSC group to assess IBS as compared to 67/80 (83.75%) in CC group due to communication problems. Fifty-six out of 68 (82.4%) infants had exclusive breastfeeding in SSC group as compared to 39 out of 67 (58.2%) in CC group. Two (2.9%) infants had almost exclusive breastfeeding in SSC group as compared to 5 (7.5%) in CC group. No infant was weaned in SSC group as compared to one in CC group.

DISCUSSION

Infants should be exclusively breastfed for first 6 months of life to achieve an optimal growth and development. Early mother-infant skin-to-skin contact is well known to increase the rate of exclusive breastfeeding. A recent Cochrane systemic review showed significant positive effects of early and longer skin-to-skin contact on exclusive breastfeeding.⁷ In this study, early skin-to-skin contact significantly increased the rate of exclusive breastfeeding which is comparable to other studies.^{18,19} This trial showed that SSC has significant positive effect on success of first breastfeed i.e. 26% more infants in SSC group had successful first breastfeed as compared to those in CC group. It is comparable with a trial by Moore that showed almost similar results.¹⁴ Carfoot from North England showed no

significant effect of SSC on the success of first feed.¹⁵ This could be due to use of BAT instead of IBFAT as an assessment tool in this study.

Different studies show that infants who were provided uninterrupted early skin-to-skin contact developed attachment behavior early and effectively.²⁰ In Moore's trial,¹⁴ SSC group infants demonstrated effective breastfeeding almost twice earlier. In the present study, infants in SSC group achieved effective breastfeeding much earlier than those in CC group. In Moore's trial, time to initiate first feed was almost equal in both the groups while it was shorter in SSC group in this study. This could be due to the fact that in Moore's trial, infants with CC were handed over to mothers as early as possible and mothers were motivated for breastfeeding whereas in our set-up, infants are first generally handed over to relatives before breastfeed is offered.

During skin-to-skin contact, mothers are excited to provide tactile and verbal communication to their infants, which is not possible if they are separated. This present results showed very high levels of maternal satisfaction (97.5%) with SSC as compared to CC (85%), which is comparable to the North England trial.¹⁵ Similarly, maternal preference for the same care was high in SSC group (92.5%) as compared to CC group (53.8%). In North England trial, it was 100% in SSC group as compared to 81% in CC group.

Multiple studies have proved the positive long-term effects of SSC on exclusivity and duration of breastfeeding.^{21,22} Significantly high rates of full breastfeeding were found (exclusive and almost exclusive) in SSC group (85.3%) as compared to CC group (65.7%), whereas North England and Moore's trial showed no difference in breastfeeding outcome at four and one month postbirth respectively. In North England trial, mothers described multiple reasons like working women, husbands' objection for breastfeeding, etc.¹⁵ While in Moore's trial, only 10 primiparous mothers were recruited in each group.¹⁴

The present study is a pioneer work of its kind in Pakistan. Most of the mothers were very pleased and enjoyed the experience of SSC and wished to prolong its duration but increased load in busy obstetric unit was an important limitation. It had to be discontinued when infant had taken the first feed, to accommodate next pregnant mother on the delivery table. Although the sample size in our trial is comparable to any large trial, our follow-up to assess exclusivity at 1 month postbirth is short and prolonged follow-up may show different results.

CONCLUSION

Despite above mentioned limitations, findings of this trial showed that skin-to-skin care is acceptable and applicable in our set-up. This study provides enough evidence to support the implementation of this safe,

promising and human intervention for healthy term infants in our country.

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