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RESEARCH ARTICLE

A quality improvement study on breast feeding within first hour of caesarean delivery in a tertiary care centre

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ABSTRACT

Objective: To improve the rate of breast feeding within first hour of caesarean delivery over a period of 3 months through quality improvement process. **Methods:** Baseline rate of breast feeding within first hourof caesarean delivery was measured.Fish bone analysis and Process flow mapping was done to elicit the possible reasons for delay in initiating breast feeding. A series of Plan-Do-Study-Act (PDSA) Cycle was conducted to test change ideas brought forth by forming a team of paediatrician, obstetrician and nurse. **Result:** The rate of first-hour initiation of breastfeeding increased from 0% to 82% over the study period. The average time at of breastfeeding at the end of PDSA4 was found to be 52 minutes. The results were sustained after the last PDSA cycle. **Conclusion:** A quality improvement study focussing on health promotion, appropriate intervention and nursing staff's support in providing early skin to skin contact with initiation of breast feeding for patients undergoing caesarean section, was able to accomplish sustained improvement in breastfeeding rates within 1st hour of caesarean deliveries.

Keywords: Plan-Do-Study-Act (PDSA) cycle, fish bone analysis, neonatal survival, early breast feeding in caesarean section, early initiation of breast feeding.

WHO and the United Nations Children's Fund (UNICEF) recommend that breastfeeding be initiated within the first hour after birth [1-3]. The WHO defines early initiation of breast feeding as "breastfeeding within the first hour after delivery", which is considered an indicator of infants' health [4]. Immediate and uninterrupted skin-to-skin contact and initiation of breastfeeding within the first hour after birth are important for the establishment of breastfeeding, and for neonatal and child survival and development. Breastfeeding is associated with direct short and long term benefits for both the infant and the mother [5]. Evidence from developing countries showed that the overall morbidity such as hospitalization and rate of acute illness and mortality were much lower among infants who initiated timely breastfeeding [6, 7]. It has also familial and societal benefits in terms of reduction in expenses of infant formula feed and hospitalization [8].

The risk of dying in the first 28 days of life is 33% higher for newborns who initiated breastfeeding 2 – 23 hours after birth, and more than twice as high for those who initiated 1 day or longer after birth, compared to newborns who were put to the breast within the first hour after birth [5]. Delayed initiation of breastfeeding increases the risk of both neonatal mortality and morbidity [9, 10].

In spite of the strong evidence supporting immediate and long term health benefits, early initiation of breastfeeding in South Asia remains low with varying rate with 36.4% in India [11]. Several barriers to initiation and duration of breastfeeding were reported in different countries, such as mother's age, education, insufficient milk production, breastfeeding problems, e.g. nipple problems, sickness, and pregnancy soon after giving birth, delivery by caesarean section (CS), not being counselled about breastfeeding initiation, and nonrooming – in [12]. The association between CS and delayed initiation of breastfeeding has been documented both in India and other countries [13]. As the

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global rate of caesarean section was increased, its impact on timely initiation of breastfeeding became a major concern [14].

Evidence from secondary analysis of WHO global survey showed that only 39.7% of infants delivered through caesarean section initiated breastfeeding within one hour of birth [14]. This lower rate of timely initiation of breastfeeding associated with caesarean section might be related to physical separation of infant and mother during recovery time, anaesthesia effect, restricted mobility, and distressful condition of neonate and critical condition of the mother after caesarean delivery [15]. Caesarean section can negatively affect the physiology of lactation [16].

An estimated 11.6% of infant deaths and 21.9 million disability-adjusted years could be prevented by large-scale breastfeeding promotion programmes [17]. The global breastfeeding recommendations are to place all newborns in skin-to-skin contact with their mothers immediately after birth, to support the initiation of breastfeeding (BFI) within 1 hour after birth (defined as early initiation of breast feeding or EIBF) and to exclusively breastfeed the child until 6 months of age [18]. In the year 2016, the Government of India launched the National Breastfeeding Promotion Programme MAA (mothers' absolute affection) to ensure adequate awareness is generated among the masses, especially mothers, on the benefits of breastfeeding [19].

However, a gap in research exists to define precisely the trends and factors associated with non-initiation of early breastfeeding especially in women delivered by caesarean section and definite measures to correct it. Moreover, with the current rise in number of caesarean section and equal decrease in early breast feeding, a quality improvement study was planned to improve the rates of first hour initiation of breastfeeding in babies born through caesarean section.

Materials and methods

Approval for the study was taken from the Institute Ethics Committee (IEC). The study was a quality improvement study involving a series of Plan-Do- Study-Act (PDSA) cycles. It was conducted in the labour room OT complex of AMCH over a period of 3 months from May, 2022 to July, 2022. All stable newborns ≥34 weeks of gestation born by caesarean section under spinal anaesthesia were included in the study. Unstable newborns ≥34 weeks who needed urgent resuscitation and all stable newborns with unconscious mothers (e.g. eclampsia patients) were excluded from the study. Also, newborns in whom breast feeding was contraindicated (Cleft palate, GI Malformations) were also excluded from the study.

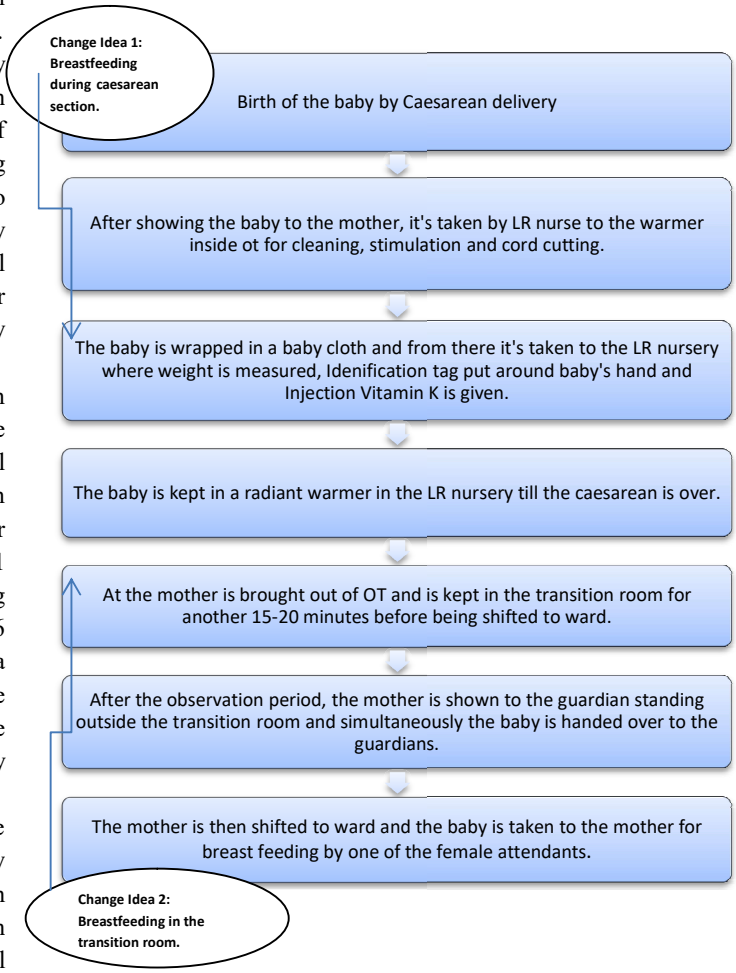


Figure 1: Process flow diagram showing process of caesarean deliveries till breastfeeding initiation along with change ideas

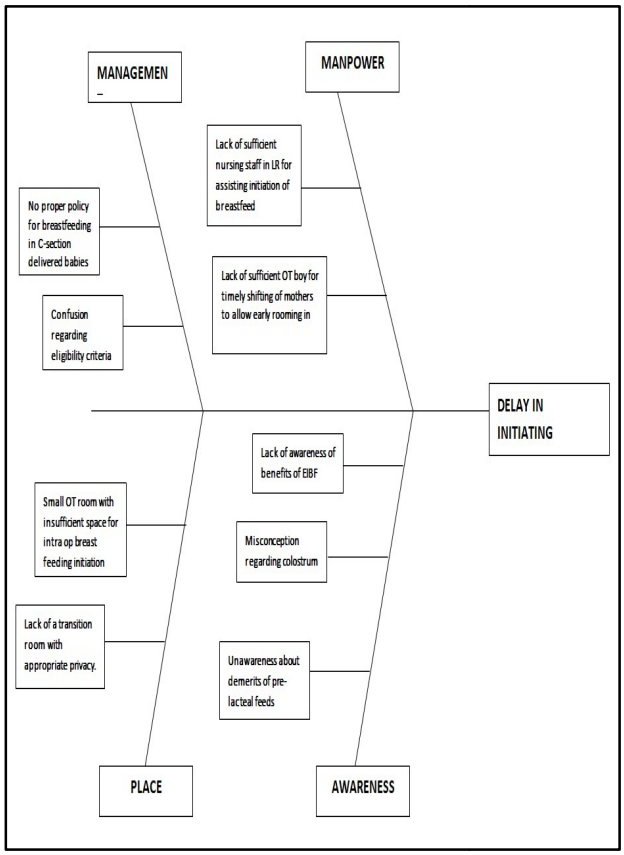
Methodology -

1. Baseline rate of breast feeding within first hour of caesarean delivery was measured.
2. Process flow mapping and Fish bone analysis was done to elicit the possible reasons for delay in initiating breast feeding.
3. A team of obstetricians, paediatricians, and nurses was formed to analyse the problem and to come up with change ideas.
4. A series of Plan-Do-Study-Act (PDSA) Cycle was conducted to test change ideas brought forth by the team.

5. The effect of change ideas was assessed by run charts to interpret the serial measurements of indicators and to study the impact of change ideas.
6. The documentation of early initiation of breast feeding was incorporated in the routine care of a baby. To keep a track of on-going rates of early initiation of breastfeeding, recording of feed initiation was incorporated in the nurses' routine.
7. Qualitative experience of mothers, nurses and doctors was collected from randomly selected assets to understand reasons for failure of early initiation of breast feeding and benefits of the changes.
8. Necessary action to sustain the positive change was taken.

Statistical analysis: For describing baseline variables, we used descriptive statistics. We used runchart to observe the impact of change ideas.

Figure 2: Fish bone analysis of possible reasons of delayed initiation of breast feeding in babies born by caesarean section.



Results

Through this study we found that none of the eligible babies born through caesarean section were given breast feeding within one hour of delivery which means baseline rate of breast feeding in caesarean delivery was zero. The median time of initiation of breast feeding in caesarean section patients was found to be 105 minutes (table 1).

Table 1: Baseline average time for breastfeeding initiation in babies born by caesarean section.

Days	Number of caesarean sections observed	Average time of breast feeding (minutes)
Day 1	10	120
Day 2	8	100
Day 3	6	98
Day 4	9	100
Day 5	11	112
Day 6	5	115
Day 7	7	90
Average time for breast feeding		105

A series of caesarean sections were observed to understand and map every step preceding the initiation of breastfeeding. A process flow map indicating all the steps and a fish bone diagram highlighting the possible root causes of delay in initiation of feeds were made (figure 1 and 2). We realised that after initial care, the baby was taken to LR observation nursery, while the caesarean was yet to be completed. In LR observation nursery, baby was weighed, clothed and given vitamin K injection. After completion of caesarean section, the mother reached the postnatal ward, baby was brought to her for breastfeeding. This process took more than one hour resulting in delay in initiation of breastfeeding.

When the current process flow map was discussed in the team meeting, it was obvious that the only way to initiate breastfeeding within first hour in our set-up was to do it within the LR - OT complex itself, before mother and baby were shifted out. There could be two ways of doing this. Breastfeeding could be initiated during caesarean section itself within the OT or in the transition room outside LR - OT. As the team was divided in their opinion about the feasibility, both these methods were tested in 2 separate cycles PDSA-1 and 2 (table 2).

Initiating breast feeds on the OT table during caesarean was found to be difficult due to very less space for the LR nurse to stand near the head end of the anaesthetised patients. Putting the baby to breast was another struggle due to the BP cuff, iv fluid drip sets. Moreover, many mothers didn't feel it comfortable to breastfeed amidst the whole staff inside the OT. Out of 3 women who were enrolled in PDSA1 cycle none could breast feed successfully.

Table 2: Details of all 4 Plan Do Study Act Cycle

PDSA Cycle	Plan	Do	Study	Act
1(n=3)	Assess feasibility of EIBF inside the OT	Baby put to mother's breast by LR nurse on OT table during closure of the abdomen.	Breast feeding was difficult due to very less space at the head end of the OT table, BP cuff, pulse oximeter, O2 pipes and IV drip sets made holding the baby very cumbersome, mother felt uncomfortable amidst all the staff inside OT to breastfeed.	Try feeding in the transition room in next PDSA
2(n= 3)	Assess feasibility of EIBF in the transition room.	Baby put to mother's breast in the transition room by LR nurse accompanied by a female attendant. The nurse also provides necessary information regarding Do's and Dont's of breastfeeding to the mother and female attendant.	Feasible, Mother felt happy to hold their baby specially when accompanied by her relative, nurses didn't have to wait inside the OT complex till closure of the abdomen began, process of breastfeeding was not hindered by nausea/vomiting/rarely experienced pain by the mother during OT.	This change idea will be applied to more no. of cases in next PDSA Cycle
3(n=35)	Assess the rate of EIBF in babies born by Caesarean section(emergency or elective) over 7 consecutive days after spreading awareness about the new process and defining clear eligibility criteria	Whatsapp message circulated among the nurses and doctors regarding the new process and one to one explanation to staff nurses by Sister in charge of labour room and on duty doctors. Charts of eligibility criteria displayed in transition room and LR nursery.	Rate of early initiation was 40%. Reasons were no accompanying female attendant to continue breastfeeding after the nurse shows the initial process, postoperative pain/discomfort felt by mother.	More reminders needed. Nursing staff to be encouraged for helping the mothers.
4(n= 75)	Assess the rate of EIBF in babies born by Caesarean section (emergency or elective) over 14 consecutive days after repeat reminders and clarification regarding roles and responsibilities	Repeat Whatsapp messages and one to one discussion with the staff nurses and doctors in labour room regarding roles and responsibilities and health benefits of both mother and baby in terms of EIBF	82% rate of EIBF. Due to heavy load in LR and being understaffed, it wasn't always possible for LR nurse to always assist in EIBF.	SOP for EIBF in babies born by Caesarean section.

On the other hand, initiating breastfeeding in the transition room outside OT, out of the 3 women who were enrolled in the study, 1 could breastfeed successfully whereas the other 2 women started the feed but couldn't complete it due to minor complaints like shivering or inadequate privacy. Therefore, this change idea was further tested in subsequent PDSA cycles with more number of deliveries. After the routine care was given to the baby, the baby was brought back to the mother and helped by a nurse to breastfeed. Screens were used in the transition room to provide privacy to the mother. The LR nurse also took that opportunity to explain the correct procedure and timing of breast feeding to the mother, about rooming in and encouraged breastfeeding on demand.

This change idea was found to be feasible and acceptable to all. Therefore it was planned that, after routine care, all eligible babies would be put to mother's breast for feeding after caesarean section in the transition room. The circulating nurse would help the mother in holding the baby. A flowchart was drafted about the suggested new process and circulated among the doctors and nurses. The change idea was, thereafter, systematically expanded to include more number of deliveries in subsequent PDSA cycles. Various hurdles to compliance which were noted in each PDSA cycle were rectified in the subsequent cycles (table 2).

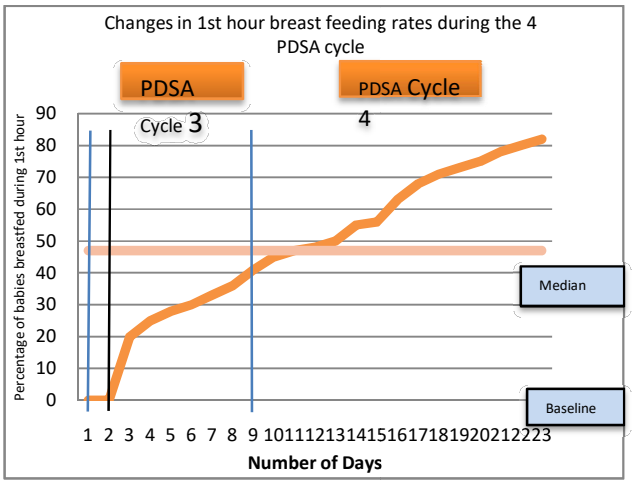


Figure 3: Run-chart showing increase in first hour breast feed initiation in babies delivered by C-Section, gradually from a baseline of zero to 82% by PDSA4 cycle.

Through the course of the study, the rate of early initiation of breastfeeding increased from 0% (baseline) to 82% (PDSA-4) (figure 3) and the average time for breastfeeding at the end of PDSA4 was found to be 52 minutes (table 4). After completion of PDSA-4, we observed that compliance to first hour breastfeeding was sustained over 80%.

Table 3: Percentage of babies breastfed within 1 hour in the PDSA cycles

PDSA cycles	Total no. of patients	Babies breastfed within 1 hour	
		Number	%
PDSA 1	3	0	0
PDSA 2	3	1	33
PDSA 3	35	14	40
PDSA 4	75	62	82

We received feedbacks from mothers that they were very happy to hold their babies and feed immediately after birth. One mother said, "Holding my baby made me forget all the pain and I was overwhelmed with joy." The LR nurses did not feel that their workload wasincreased and were happy in helping the mothers in holding their babies. The OT boy waited patiently while the mother breastfed her baby and made adequate privacy arrangements with screen. They were happy to help them.

Table 4: Average time of breast feeding in the PDSA cycles

PDSA cycles	No. of babies breastfed	Average time of breast feeding (minutes)
PDSA 1	0	0
PDSA 2	1	50
PDSA 3	14	48
PDSA 4	62	52

Discussion

The main finding of the current study was the estimation of proportion of eligible babies who could be started on early breastfeeding among the studied participants. We found a significant improvement in rates of initiation of breastfeeding in 1st hour in neonates born by caesarean section in a busy government hospital like AMCH by using sequential PDSA cycles without any additional resources.

Through the 4 PDSA cycles many hurdles were met and handled by continuous reminders regarding the benefits of EIBF and constant motivation of LR Nursing staff through Whatsapp reminders and one-to-one discussion and doubt clarification. We used quality improvement methods like process flow mapping and PDSA cycle in our study. Quality improvement is a systematic approach to data collection for the purpose of achieving immediate improvements in process and outcomes in specific healthcare settings. These are cyclical in nature, with the results of one initiative used to direct the next activity [20].

The Plan-Do-Study-Act (PDSA) methodology is one of the most commonly used tool in quality improvement. These quality improvement concepts were initially utilised in industries, have been applied to healthcare to reduce error and variation in outcomes. PDSA cycle is a 4 step process. The first step "Plan" is the development of a plan in which tasks are assigned and probable outcomes are stated. In the second step "Do" the plan is implemented. In the "Study" step analysis of the data and results obtained is done. In the last step "Act" the plan is either adopted, adapted or abandoned based on the data evaluation in study step. Inferences from the first cycle guide the cycles that follow [20].

To study the effect and the impact of change ideas, we used run charts. Run charts allow us to understand objectively if the changes we make to the process or system over time lead to improvements with minimal mathematical complexity. Run charts have wide potential application in healthcare for practitioners and decision-makers due to its utility and simplicity [21].

The WHO recommends that mothers with healthy full-term babies, regardless of the mode of delivery, stay in the same room together for the full 24 hours, except for periods of up to an hour for hospital procedures, starting from the time mothers come to their room after delivery, or as soon as mothers are able to respond to their babies in case of delivery via CS [22]. Studies have reported that mothers who room-in with their babies, breastfeed for longer periods, have more milk production, and are more likely to breastfeed exclusively compared to mothers who have less contact with their infants, for example, those with babies in the nursery [23]. Keys to successful breastfeeding include maternal-infant skin to skin (STS) contact soon after birth, initiation within first hour of birth, limiting maternal-infant separation and frequent on demand feeds [24].

As per latest NFHS, rate of early initiation of breastfeeding in India is quite low (41.6%) [25]. Caesarean sections are the biggest hurdle to early initiation in hospital-born babies [15]. Providing the mother the opportunity to hold and feed the baby soon after birth can enhance parenting skills and in turn, the neurodevelopment of the baby is better [26].

The present study corroborates the findings of others that show that putting the babies on mother's breast for skin to skin contact/feeding immediately after caesarean section is feasible [27].

The methods incorporated in the study do not require too many resources and can be easily tested in various health set-

ups to achieve early initiation of breastfeeding in caesarean born infants. Involvement of nursing staff and usage of scientific methods to first diagnose the root causes of the problem helped us to achieve our goal and made it more acceptable to all. We were able to integrate the change within the existing processes, without increasing manpower or workload.

Conclusion

The results of this study call for prompt policy changes to improve the rates of early initiation of breastfeeding in mothers who undergo Caesarean section in a tertiary care hospital. We were able to bring forth the change within the existing processes, without increasing the workload or manpower. This has helped us to achieve the sustained improvement. The ideas described here do not require any additional resources and are easy to test in various health care settings to improve early initiation of breastfeeding in caesarean born babies.

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