

Improving First-hour Breastfeeding Initiation Rate After Cesarean Deliveries: A Quality Improvement Study

SANKALP DUDEJA¹, POOJA SIKKA², KAJAL JAIN³, VANITA SURI² AND PRAVEEN KUMAR¹

From Departments of ¹Pediatrics, ²Obstetrics and Gynecology, and ³Anesthesia and Intensive Care, PGIMER, Chandigarh, India. Correspondence to: Dr Praveen Kumar, Professor and Head, Division of Neonatology, Department of Pediatrics, PGIMER, Chandigarh 160 012 India. drpkumarpgi@gmail.com

Received: November 14, 2017; Initial review: December 04, 2017; Accepted: June 13, 2018.

Objective: To improve the rates of first hour initiation of breastfeeding in neonates born through cesarean section from 0 to 80% over 3 months through a quality improvement (QI) process.

Design: Quality improvement study.

Setting: Labor Room-Operation Theatre of a tertiary care hospital.

Participants: Stable newborns ≥ 35 weeks of gestation born by cesarean section under spinal anesthesia.

Procedure: A team of nurses, pediatricians, obstetricians and anesthesiologists analyzed possible reasons for delayed initiation of breastfeeding by Process flow mapping and Fish bone analysis.

Various change ideas were tested through sequential Plan-Do-Study-Act (PDSA) cycles.

Outcome measure: Proportion of eligible babies breast fed within 1 hour of delivery.

Results: The rate of first-hour initiation of breastfeeding increased from 0% to 93% over the study period. The result was sustained even after the last PDSA cycle, without any additional resources.

Conclusions: A QI approach was able to accomplish sustained improvement in first-hour breastfeeding rates in cesarean deliveries.

Key words: Plan-do-study-act cycle, Strategy, Neonatal survival, Operative delivery.

Neonatal deaths contribute to nearly half of under-5 deaths [1]. To reduce neonatal mortality, various strategies have been employed globally, one of which is early initiation of breastfeeding. Analysis of a large cohort of almost 100,000 newborns from three large trials conducted in India, Ghana and Tanzania has shown that the risk of neonatal death was 41% and 79% higher among children in whom breastfeeding was initiated between 2-23 hours and 24-96 hours after birth, respectively as compared to infants in whom breastfeeding was initiated within the first hour of life [1]. Another systematic review revealed that breastfeeding after one hour doubles the risk of neonatal mortality [2]. Initiating breastfeeding within first hour reduced deaths by 19% in Nepal [3] and by 22% in Ghana [4]. Therefore, initiating breastfeeding within one hour of delivery is an evidence-based high-impact intervention for improving neonatal survival. WHO recommends that breastfeeding should be initiated in all newborns within one hour of life [5].

National Family Health Survey (NFHS-4), revealed that only 41.6% of newborns in India were breastfed

within one hour of birth, which is an improvement from its last round (NFHS-3; 23.4%) but is far from ideal [6]. Cesarean sections are one of the biggest hurdles in initiation of breastfeeding in hospital-born babies [7]. Various studies have shown that infants born by cesarean section are four times less likely to receive breastfeeding within first hour of birth than vaginally delivered infants [8]. After cesarean section, mothers and babies are frequently monitored for several hours, often in separate rooms. This deprives them from the opportunity of breastfeeding and bonding.

In India, the rates of institutional deliveries are now more than 80% and number of cesarean sections is increasing at an alarming rate [6]. The rates of cesarean section vary from 11% to as high as 74% [6]. Hence, it is logical to make efforts to remove this barrier to early initiation of breastfeeding. For implementation of any new practice, conventional techniques like creating policies, sending circulars, spreading awareness and training are effective only to a limited extent [9]. For a more successful and sustained practice change, one needs to study local contextual factors, brain-storm change ideas, test them on small scale and then systematically

expand, with simultaneous monitoring of processes and outcomes [9]. With this premise, we planned a quality improvement process involving a series of Plan-Do-Study-Act (PDSA) cycles to improve the rates of first hour initiation of breastfeeding in babies born through cesarean section.

METHODS

The study was conducted in Labor Room-Operation Theatre (LR-OT) of our hospital over a period of three months (July-September, 2017). Our labor room caters to about 6000 deliveries a year. About 8-10 cesarean sections are conducted per day, which account for 40% of total deliveries. For all cesareans, a pediatrician and nurse from LR go to LR-OT for resuscitation and initial assessment of the baby.

The target population comprised of all newborns ≥ 35 weeks of gestation born by cesarean section under spinal anesthesia. The babies who were hemodynamically unstable, had respiratory distress or encephalopathy - in whom feeding would be risky - were excluded. Also, dyads in whom mother was sick (*e.g.*, eclampsia, or comatosed) or where breastfeeding was otherwise contraindicated (*e.g.*, suspected gastrointestinal malformations, mother on certain drugs, or HIV-infected who had opted for top feeds) were excluded.

The Institute Ethics Committee (IEC) approved the study and granted a waiver of individual consent. The study did not involve any alteration in investigations or treatment of any patient. Rather, changes were made in our care pathways so as to implement early initiation of breastfeeding more effectively. The study followed the model for improvement propagated by Institute for Healthcare Improvement (IHI) [10]. Broadly, the steps were as follows: (a) Measuring baseline rates of first hour breastfeeding in cesarean deliveries, (b) Forming a team of obstetricians, pediatricians, anesthetists and nurses, (c) Eliciting possible reasons for delayed initiation by process flow mapping and fish bone analysis, (d) Conducting a series of Plan-do-study-act (PDSA) cycles to test change ideas generated by the team on a small scale initially and then expanding to a larger scale. The effect of change ideas was assessed by recording the proportion of eligible newborns receiving breast feeds during first hour of life, apart from measuring the process. Simultaneously, qualitative experiences of mothers, family, nurses and doctors were collected from a randomly selected subset, and reasons were sought in newborns not receiving first hour breastfeed. Descriptive statistics were used to describe baseline variables. Run-charts were used to display and interpret the serial measurement of indicators and to study the impact of changes.

RESULTS

We observed that the median time of initiation of breast feeds was 50 minutes in babies born vaginally, while in cesarean sections it was 99 minutes (range: 67-194 minutes). None of the eligible babies delivered by cesarean section, had been put to breast within the first hour. A team of obstetricians, pediatricians, anaesthetists and nurses was made to analyze the problem and come up with change ideas. A series of cesarean sections were observed to understand and map every step preceding the initiation of breastfeeding. A process map indicating all the steps and a fish bone diagram highlighting the possible root causes of delay in initiation of feeds were made (*Web Fig. 1* and *2*). We realised that after initial care, the baby goes to LR observation nursery, while the cesarean is yet to be completed. In LR observation nursery, baby is weighed, clothed and given vitamin K injection. After cesarean is complete, and the mother reaches the postnatal ward, baby is brought to her for breastfeeding. This process takes more than one hour resulting in delay in initiation of breastfeeding.

When the current process 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 are shifted out. There could be two ways of doing this. Breastfeeding could be initiated in the transition room outside LR-OT or during cesarean section itself, within the OT. As the team was divided in their opinion about the feasibility, both these methods were separately tested in PDSA-1 and 2. Initiating breast feeds in the transition room outside OT was found to be difficult as the LR nurse had to wait till the end of cesarean section for the mother to come out, the patient trolley was not wide enough to be comfortable and safe and also, it was difficult to maintain privacy for mother. On the other hand, initiating breastfeeding on the OT table during cesarean was found to be feasible and acceptable to all. Therefore, this change idea was further tested in subsequent PDSA cycles. It was planned that, after routine care, all eligible babies would be put to mother's breast for feeding during cesarean section itself. 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, were rectified in the subsequent cycles (*Web Table 1*).

Through the course of the study, the rate of early initiation of breastfeeding increased from 0% (baseline)

WHAT IS ALREADY KNOWN?

- Early initiation is the key to successful breastfeeding but its implementation after cesarean section is sub-optimal.

WHAT THIS STUDY ADDS?

- It is possible to improve first-hour breastfeeding initiation rate after cesarean deliveries through a collaborative quality improvement process, without any additional resources.

to 93% (PDSA-5) (*Web Fig. 3a*). The details of each PDSA cycle are given in *Web Table 1*. After completion of PDSA-5, we observed that compliance to first hour breastfeeding was sustained at 95% (*Web Fig. 3b*). Following this, a policy statement was developed with clear standard operating procedure (SOP) of how, in whom, when and who will initiate feeds after cesarean deliveries. The same was approved by the in-charges of obstetrics, neonatology, anesthesia and nursing. The documentation of early initiation of feeding was incorporated in the routine care of a baby. To keep a track of ongoing rates of early initiation of breastfeeding, recording of feed initiation was incorporated in the nurses' routine. Color-coded stickers were provided, for putting in the birth register to indicate whether baby was put to breast within first hour or not.

Qualitative data: The mothers gave a feedback that they were very happy in having been able to touch and feed their babies immediately after birth. “*I was feeling some pain at the end of surgery, but when they put the baby in my arms I forgot about the pain as I was so happy to hold him*”, said one mother. Mothers said that they would like to feed their babies like this if they were to undergo cesarean again. Multiparous women felt that their milk output in subsequent feeds was better as compared to their previous deliveries. The operating team (Obstetricians and Anesthetists) did not feel that it hampered the surgical field in any way. Rather, anesthetists facilitated the process by ensuring that one arm of mother was always free of any lines or splints, to hold the baby. The circulating nurses also did not feel that this increased their workload and were keen on helping the mother in holding the baby.

DISCUSSION

We demonstrated a significant and sustained improvement in first-hour breastfeeding initiation rates in neonates born by cesarean delivery in a busy government hospital, by using sequential PDSA cycles and the model for improvement, but without any additional resources. As with any change in practice, initially there was reluctance and inertia to adapt to this change among staff

members. However, by various techniques- telephonic/ What's app reminders, posters, group discussions and one-to-one discussions-doubts were clarified and staff members gradually adapted the change idea.

Breastfeeding has multiple benefits for both the baby and the mother [11]. 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 [12]. In addition to the benefits of breastmilk, putting the baby on breast also confers the other benefits of early skin to skin contact [13]. As per latest NFHS, rate of early initiation of breastfeeding in India is quite low (41.6%) [6]. Cesarean sections are the biggest hurdle to early initiation in hospital-born babies [8]. The experience of cesarean birth can be stressful to a mother who is unable to watch her baby enter the world [14]. Providing her the opportunity to hold and feed the baby soon after birth can give a sense of empowerment and control. Parenting skills are enhanced, as the mother holds and feeds the baby herself and in turn, the neurodevelopment of the baby is better [15]. The present study corroborates the findings of others that show that putting the babies on mother's breast for skin to skin contact/feeding during cesarean section is feasible [16].

Traditional methods for incorporating new changes without involving frontline workers only have a limited success [10]. Thus, in practice, there are always wide gaps between evidence and practice. In this quality improvement initiative, we involved representatives of all stakeholders and frontline staff right from the beginning and used scientific methods to first diagnose the root causes of the problem in the local context. We engaged the frontline staff to bring out possible solutions from within themselves and tested them objectively on a small scale as a team, to learn about the challenges of implementation. This helped us tweak and adapt our approach to make it more acceptable and practically doable. We were able to integrate the change within the existing processes, without increasing the workload. We believe this helped us achieve sustained improvement. The study is relevant to all health facilities where babies

are delivered by cesarean route. The ideas described here do not require too many resources and be easily tested in various health set-ups to achieve early initiation of breastfeeding in cesarean born or even vaginally born infants. Though we have demonstrated sustained success over a short time span, it remains to be seen whether the improvement will be long-lasting. The delivery loads in hospitals fluctuate from day-to-day and it remains to be seen if the new process would withstand the pressures of peak delivery loads. We realize that the measurement of the target outcome will have to continue and any significant drop in performance may require a re-look into the reasons and appropriate actions.

Acknowledgements: Mrs Kamlesh, Assistant Nursing Superintendent and nursing staff of labour room-operation theatre and labour room for their cooperation and support. We are also thankful to Dr Neelam Choudhary and Dr. Anju Singh, Department of Obstetrics and Gynecology, for their guidance and valuable inputs during the study.

Contributors: PK: conceptualization; PK, SD, VS, PS: methodology; SD,PK,PS: data acquisition and interpretation; PK,VS,KJ: supervision; PK,VS: validation; SD,PK,VS, KJ,PS: writing, review and editing.

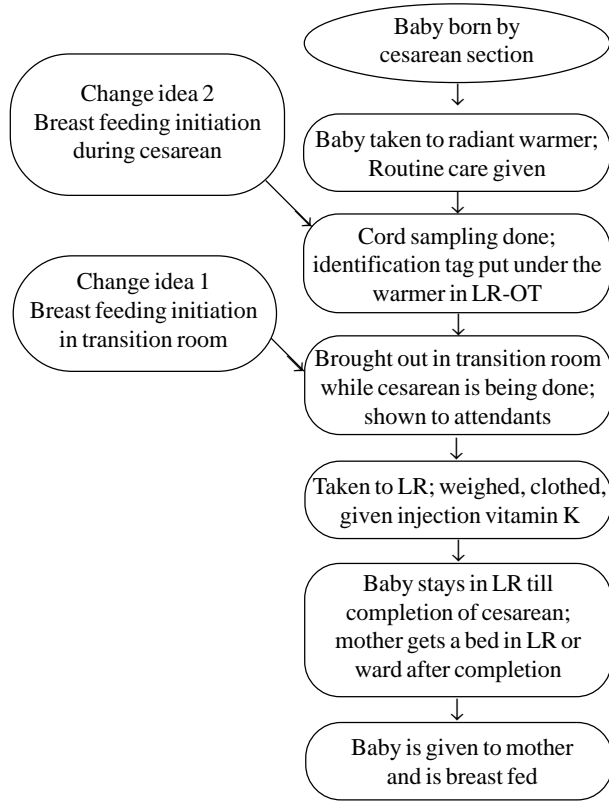
Funding: None; *Competing interest:* None stated.

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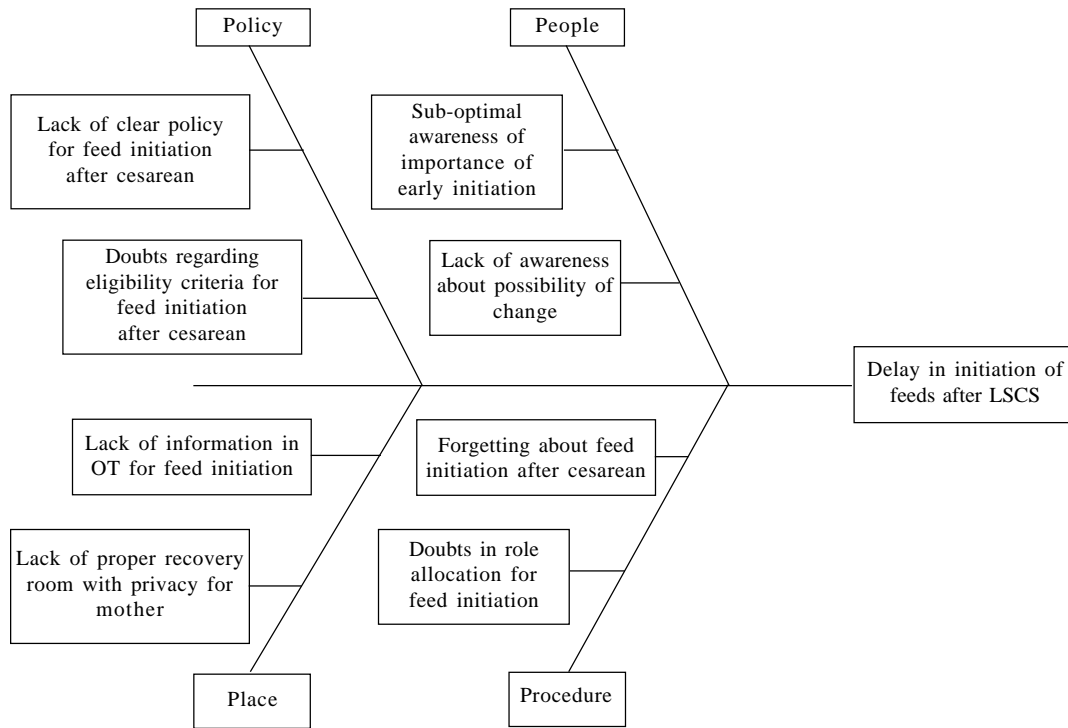
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WEB TABLE I DETAILS OF ALL PLAN-DO-STUDY-ACT CYCLES

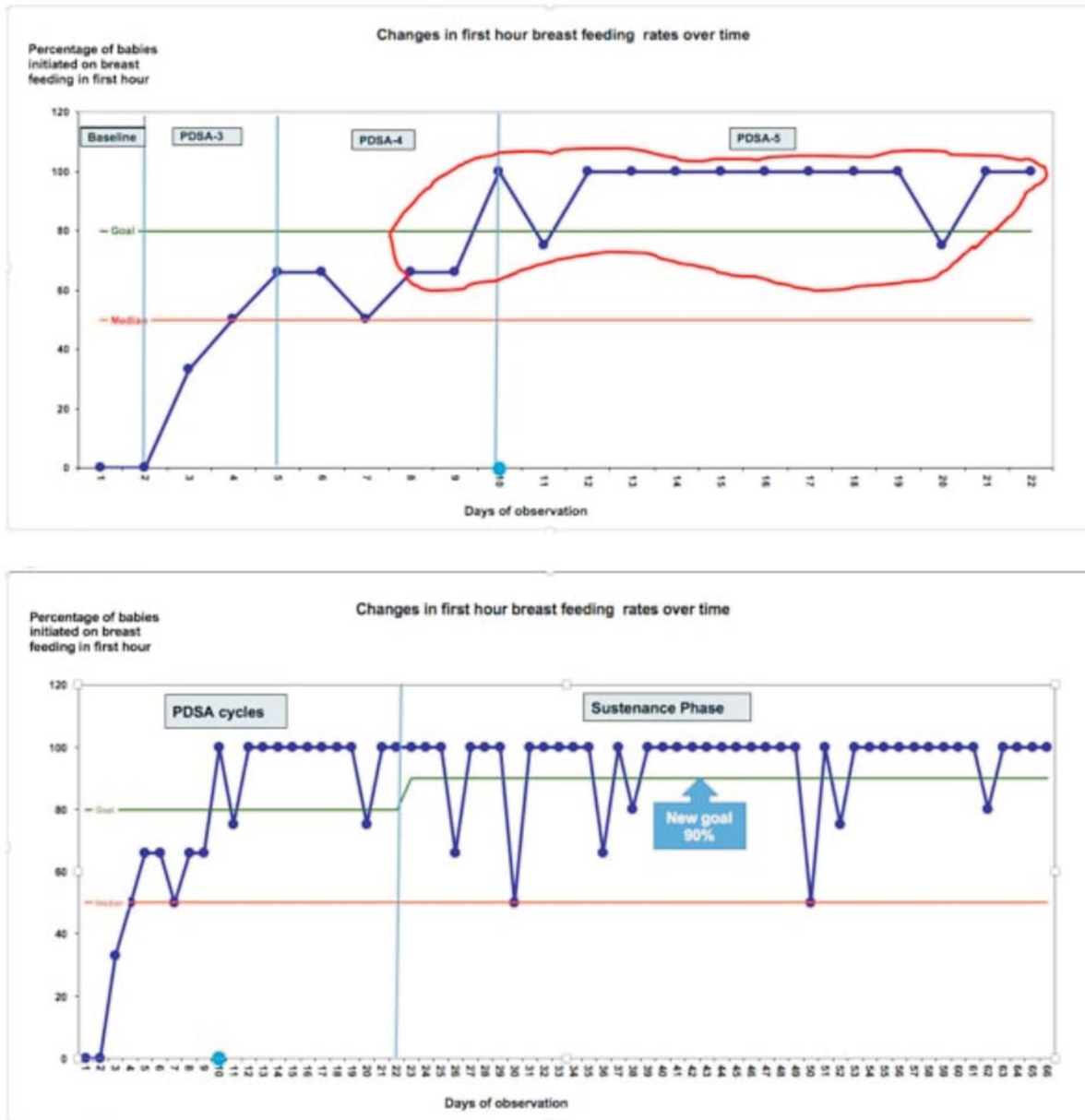
<i>PDSA</i>	<i>Plan</i>	<i>Do</i>	<i>Study</i>	<i>Act</i>
1 (<i>n</i> =1)	Assess feasibility of initiation of breast feeds in transition room outside OT	Baby put to breast in transition room outside OT, on trolley by female attendant, assisted by LR nurse.	Exposing mother difficult, privacy concerns, LR nurse had to wait till the end, mother's trolley small- safety concerns	Try feeding inside the OT in next PDSA
2 (<i>n</i> =2)	Assess feasibility of initiation of breast feeds on the OT table, during caesarean section	Baby put to mother's breast by circulating nurse during caesarean section at the time of suturing	Feasible and did not hamper the surgical space; mother enjoyed holding the baby; nurses did not feel it increased their workload	This change idea can be applied to more number of cases & studied further
3 (<i>n</i> =8)	Assess the rate of early initiation in babies born by elective caesareans for 3 consecutive days after spreading awareness about the new process	Information pamphlets distributed, What's app messages circulated among nurses and doctors about the new process	Rate of early initiation 50%; reasons for non-compliance were 'forgot' and lack of clarity about eligibility criteria	More reminders needed; eligibility criteria need to be clarified. Expand to emergency caesareans as well on weekdays
4 (<i>n</i> =11)	Assess the rate of early initiation of breast-feeding in babies born by elective/emergency caesareans for 4 consecutive days after putting reminders and clarifying eligibility criteria	Separate reminders on anesthetists' trolley, radiant warmer, nursing station. Eligibility criteria also displayed.	63% of eligible babies put to breast during caesareans; some confusion among nurses with regard to roles and responsibilities	Role allocation clarified. Implementation expanded over more number of days including weekends
5 (<i>n</i> =28)	Assess the rate of early initiation of breast-feeding in babies born by elective/emergency cesarean for 4 days including weekend after clarification of roles and responsibilities	One to one and group discussion with nurses for clarification of roles and responsibilities	93% compliance; mothers felt satisfied and confident.	Written policy and SOP of initiation of feeds in babies born by caesarean route



WEB FIG. 1 Flow diagram showing process of cesarean deliveries till breastfeeding initiation with change ideas.



WEB FIG. 2 Fish bone diagram of possible reasons of delayed initiation of breast feed after cesarean delivery.



WEB FIG. 3 (a) Run-chart showing compliance to first hour breast feed initiation gradually increased from a baseline of zero to well above our goal by PDSA-5. From near the end of PDSA-4, 16 data points are above the median indicating a significant shift; (b) Extended run chart during sustenance phase showing that first hour breastfeeding initiation rates have continued to be near 95-100% on most of the days. We revised our goal to 90% in this phase.