RESEARCH PAPER

Achieving Early Mother-baby Skin-to-skin Contact in Caesarean Section: A Quality Improvement Initiative

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Objective: To improve rate of skin-to-skin contact for early initiation of breastfeeding at birth on operation table among healthy term and late pretem babies born by caesarean sections from 0% to 80% in eight weeks.

Methods: A quality improvement initiative was undertaken at maternity-newborn care unit of a tertiary-care hospital. A team involving Neonatologists/Pediatricians, Obstetricians, Anaesthesiologists, and Nurses in concerned areas identified problem areas using Fish bone analysis. Situational analysis was done through process flow mapping. Three Plan-do-study-act cyles were undertaken. Firstly, sensitization of personnel was done and a written policy was made. Secondly, maternal counselling and procedural modifications were done. Lastly, efforts were made to improve duration of contact.

Results: Rate of early skin-to-skin contact after Plan-do-study-act cycle 1, 2 and 3, respectively was 87.5%, 90% and 83.3%. It was 100% after sustainability phase after four months.

Conclusion: Early skin-to-skin contact was achievable through sensitization of all persons involved and simple procedural changes. Prolonging duration of contact remained a challenge.

Keywords: *Breastfeeding, Baby-friendly hospital, PDSA cycle*.

Immediate to early skin-to-skin contact (SSC) of the newborn baby with mother is recommended in all deliveries, including caesarean sections [1,2]. SSC culminates to early initiation of breastfeeding (EIBF) by one hour after birth and leads to successful initiation of lactation [3,4]. EIBF reduces neonatal and infant mortality rate by achieving higher rates of sustained exclusive breast feeding [3,5]. EIBF in India is low at 41.6% of all live births [6]. No national data is available on SSC and EIBF rates in caesarean sections where it is definitely not a standard of care. Caesarean sections are also associated with lower exclusive breast feeding rates at six months as compared to vaginal births (VD), but these rates are similar to vaginal delivery if EIBF is achieved [7]. Therefore, the present quality initiative was undertaken to improve rate of SSC at birth among babies born by caesarean sections at our hospital.

METHODS

This Quality improvement (QI) initiative was undertaken by maternity-newborn units of from May 5 to June 30, 2017. Approval was taken from Institutional ethics committee. There are four Operation theatres (OT) and one labour room (LR) at the facility located at five distant places. The unit sees about 120 deliveries per month, of which approximately 30% are caesarean sections. Sequential Plan-do-study-act (PDSA) cycles were undertaken as per Point of Care Quality Improvement (POCQI) approach [8]. Inclusion criteria were: For mother: any mother who was alert and responsive (in case of general anaesthesia- when mother regained alertness); and for newborn: term and late preterm (>34 wk/>1.8 Kg estimated weight) with good breathing/crying and tone at birth. Early preterms and babies with gross congenital anomalies were excluded. The intervention used was initiating SSC at birth among caesarean section births (immediately or within 5 min) by placing baby on mother's chest (any duration). The aim of the study was to improve rate of SSC at birth among eligible healthy term and late preterm babies born by caesarean section from 0% to 80% over eight weeks.

Problem identification and team formulation: A consultation meeting was organized to sensitize the personnel regarding SSC and EIBF. Doctors from Obstetrics, Anaesthesia and Neonatology along with nursing head and staff nurses from concerned areas, government representatives from maternal and child health department, and prominent non-governmental organizations participated. All participants actively discussed the available evidence; doubts and misconceptions were clarified. This meeting effectively

sensitized all concerned people towards SSC and during consultation meeting the core team led by Neonatology department was formed. Team involved nursing officers one from each of the five delivery areas, one from each of the two postnatal wards and one immunization/lactation nurse; additionally one doctor each from Obstetrics and Anaesthesia constituted the rest of the team. Problem assessment was done using Fish Bone Analysis (***Web Fig.* 1**). Lack of policy and awareness was considered the foremost reason for no SSC at birth. There was a perceived lack of staff and doubts were there about new changes in OT procedures and any potential harms to mother and baby. Baseline data was collected for seven consecutive deliveries before intervention and subsequently for every delivery post-intervention. PDSA Cycles ***(Web Table* I)** were as follows*:*

PDSA 1: First intervention made at consultation meeting was formulation of a policy and sensitization of concerned personnel. It was noticed that SSC could be initiated by Pediatrician without need of additional staff. This immediately led to change in practices in OT but more streamlining was required.

PDSA 2: Next focus was smoothening processes inside OT. We began with process flow mapping. It was noticed that acceptability from mothers for keeping baby on their chest was difficult to gain due to lack of information. Another perception among Anaesthetists and Obstetricians was that placing baby on mother would hamper her monitoring and endanger surgical site sterility. So it was decided to counsel the mother using a template at the time of admission to LR by Obstetrician/ nurse and also at time of OT entrance by Pediatrician. Various positions of pediatrician around the table and that of baby on mother's chest were tried and an approach with resident standing at head end and holding the baby across mother's chest was found best. Chest electrodes for monitoring mother's vitals were shifted to sides of chest to ease placement of the baby while allowing for monitoring mother. Temperature of baby could easily be maintained by mother's warmth and covering from above with pre-warmed linen.

PDSA 3: Upon revisiting WHO guidelines along with newly found knowledge of 'Nine Instinctive Stages of Newborn', (which state that ideal duration of contact should be one hour), we started to stress more on increasing duration of SSC rather than actively trying to put baby on breast [1,9]. This posed a challenge to identify a person responsible for monitoring baby-mother dyad for one hour owing to staff shortage in OT/LR. This job was assigned to the lactation nurse who would double up as a transition nurse till baby reached post-natal ward. This intervention was not very effective as it led to increased workload on a single person.

Towards the end of study period we also coupled delayed cord clamping with SSC, for this Pediatrician received baby near foot end of OT table, over draped legs of mother with cord intact and then took the baby to mother's chest after drying. A video on operationalization of SSC and EIBF in OT was also developed. An algorithm of steps of SSC has also been put up at delivery places (***Web Fig.* 2**). The video and algorithm were helpful for sensitizing newly joining doctors/nurses to keep up SSC rates during sustainability phase.

RESULTS

During the study period, 64 babies were born through caesarean section, of which 60 were eligible to receive SSC and 52 babies actually received. Number of babies receiving SSC at birth rose from nil to 87.5% (14/16) over 15 days following consultation meeting (PDSA 1, ***Web Table* I**). It improved to 90% (18/20) after maternal counselling and re-planning procedures around OT table (PDSA 2). After assigning lactation nurse for monitoring mother-baby during SSC (PDSA 3), the number of babies receiving SSC remained high but the intervention had limited impact on duration of SSC. At the end of intervention phase, 83.3% (20/24) of eligible babies were receiving SSC which increased to 100% (34/34) after sustainability phase, till October 31st, 2017 (***Web Fig.* 3**). Babies receiving SSC above 40 minutes were 8% (2/24) at the end of intervention phase and 26% (9/34) at the end of sustainability phase.

DISCUSSION

Present study showed that SSC in caesarean section was achievable by making a written policy, sensitizing doctors/nurses, sharing knowledge and evidence and involvement of mothers. Simple procedural changes around OT Table were instrumental in bringing about a paradigm shift.

A major limitation was not being able to achieve recommended duration of contact of one hour. We reported any duration of SSC as acceptable contact because it was a novel initiative which would give a head start to our future endeavours. Solutions for prolonging SSC could be allowing a birth companion (Doula) or husband/partner/relative inside OT for prolonged stay with mother.

A few similar studies from around the world were found on this topic; [10,12] most were undertaken in similar premise with similar interventions but most were on a larger scale, involving big teams. The time of

WHAT THIS STUDY ADDS?

- Early Skin-to-skin contact among caesarean born babies is achievable by sensitizing staff and doctors, sharing knowledge and evidence, and involvement of all stakeholders along with simple procedural changes in operation theatre.

initiation and duration of SSC varied; two studies defined SSC as within 90 min of birth with interruptions [9,10]. It shows that this intervention though well defined by WHO is still in nascent stages in practice.

Establishing SSC at birth in caesarean section at our centre was feasible through a team work of Pediatric-Obstetric and Anaesthetic colleagues. Sensitisation regarding the intervention and its benefits, both among providers and receivers of care, was critical to achieving success of this initiative. However, achieving SSC for one hour is challenging.

Contributors: AM: conceptualized and designed the study; AS**:** provided intervention, collected data, data analysis and drafted the initial manuscript; RW**:** collected and analyzed data; BK: provided intervention and collected data; BS: provided intervention; MK**:** provided intervention; All authors reviewed and reapproved the final manuscript, and agree to be accountable for all aspects of work.
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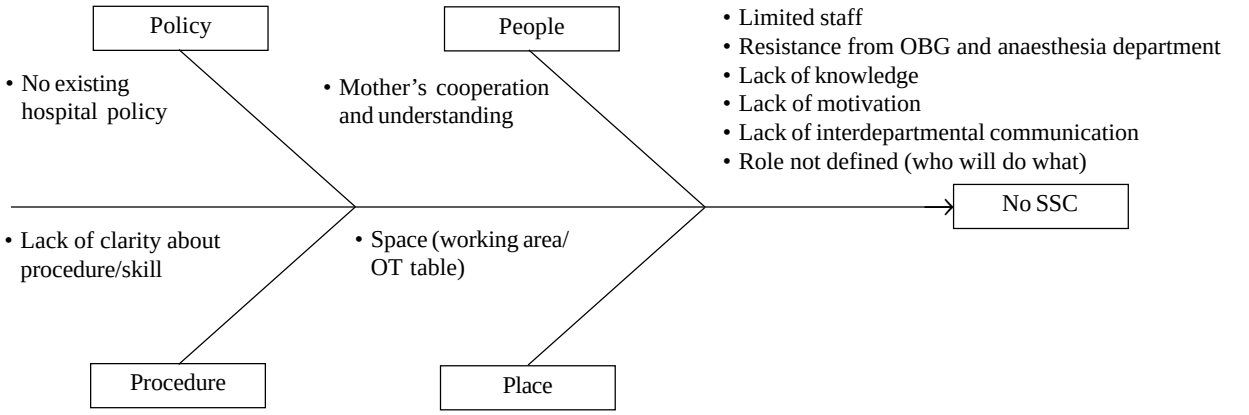
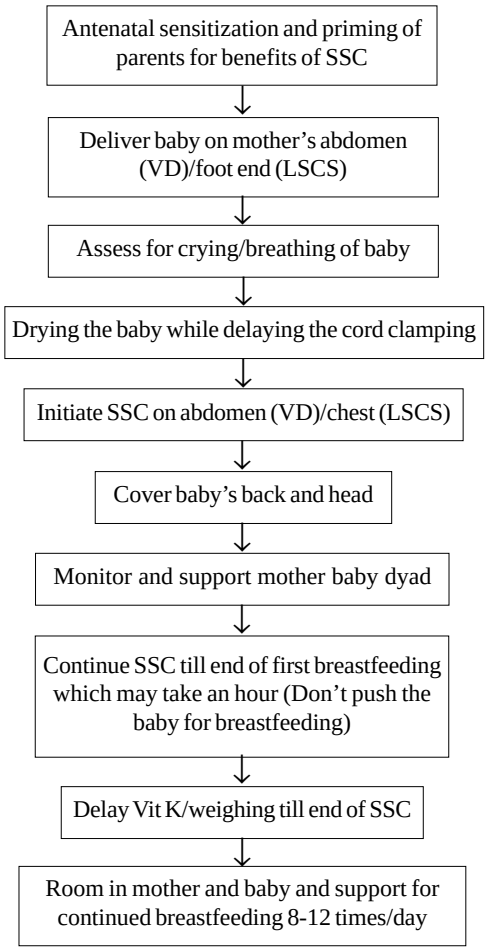


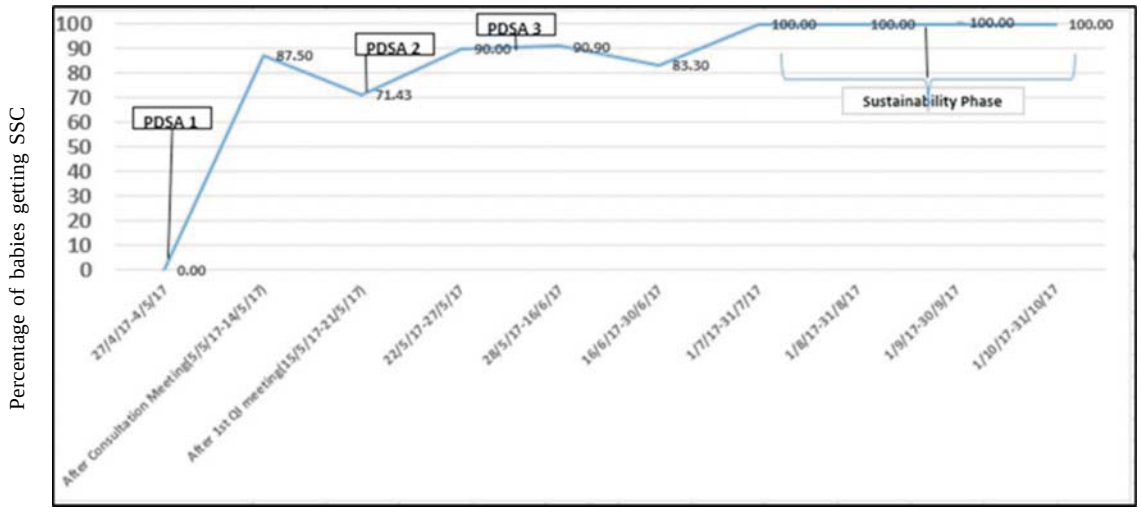
OBG: Obstetrics and Gynecology; SSC: Skin-to-skin contact: OT: Operation theater

WEB FIG. 1 *Fish Bone analysis.*



VD: Vaginal delivery; LSCS: Lower segment cesarian section; SSC: Skin-to-skin contact.

WEB FIG. 2 *Algorithm of providing Skin-to-skin contact.*



SSC: Skin-to-skin contact.

WEB FIG. 3 *Run Chart.*

WEB TABLE I PDSA CYCLES UNDERTAKEN AND THEIR OUTCOMES

PDSA	*Duration*	*Problem identified*	*Action taken*	*Babies receiving SSC *(%)*	*Remarks*
PDSA 1	5/5/17-20/5/17	Lack of awareness about benefits of SSC and EIBF among doctors and nurses. Lack of Policy.	Consultation meeting organized. Knowledge sharing and sensitization done. Policy regarding SSC and EIBF made.	87.5 (14/16)	Sensitization of healthcare staff and clear policy helped in initiation of practice of SSC
PDSA 2	21/5/17-14/6/17	1. Mothers were not sensitized and were non-compliant.	1. Mothers counseled using standard counseling template at admission to LR and during transfer to OT	90(18/20)	Counseling improved maternal compliance Clarity on position of pediatrician smoothened process.
		2. Confusion regarding position of pediatrician around OT table while initiating skin to skin contact and baby on mother	2. head end position was favoured for pediatrician and across mother's chest for baby		
PDSA 3	15/6/17-30/6/17	Short duration of SSC; no assigned person to continue SSC	Lactation nurse identified to double up as transition tnurse till mother shifted out of OT	83.3 (20/24)	SSC given to over 80% babies but duration continued to be a problem

**Babies Who Received SSC, Babies eligible to receive SSC.*