

## Experimental Study To Assess The Effectiveness Of Nurse Led Mentoring Using Quality Improvement Methodology For Health Care Workers In Improving Maternal And Neonatal Outcomes At Selected Hospitals In Delhi.

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### Abstract

**Background:** In the delivery room, immediate infant care techniques including skin-to-skin contact (SSC) and early breastfeeding initiation (EBFI) offer several advantages, including improved survival. The techniques have not been extensively embraced despite the evidence. Through a series of plan-do-study-act (PDSA) cycles, we employed a point-of-care quality improvement (QI) to adopt and maintain these two immediate infant care procedures in our delivery room over a period of two years.

**Aims:** The aim of the study was to assess the effectiveness of Nurse Led Mentoring using Quality improvement methodology for health care workers in improving maternal and neonatal outcomes at selected tertiary care hospitals in Delhi.

**Maternal outcome:** It refers to initiation of breast feeding in first hour after delivery with no or minimum complication of third stage of labor.

**Neonatal outcome:** It refers to skin-to-skin touch of mother and receiving breast feeding within first hour of delivery.

**Methodology:** A root cause analysis was conducted by a group of obstetricians, nurses and nursing students to determine the potential causes of an increase in early initiation of breastfeeding (EIBF). The areas of improvement in delivering maternal and neonatal care were assessed by using standard tool NQAS (National Quality Assurance Standard). The group made use of fish bone analysis and process flow mapping. In order to enhance the current data, several modifications could be implemented via successive Plan-Do-Study-Act (PDSA) cycles.

**Results:** A total 10 numbers of nurses participated in this QI study, which conducted from November 2021 to May 2022. Over the course of the study, SSC significantly increased from a baseline of 0% to 68% and EIBF from a baseline of 38% to 82%. This study discovered a 44% major gap closure in EIBF and 68% in SSC.

**Conclusion:** The Nurse Led Intervention's effectiveness in enhancing maternal and newborn outcomes has thus been shown. Making skin-to-skin contact with newborns shortly after delivery and EIBF as a part of pre-natal preparation and recording by a QI project might be continued without the need for any extra resources.

**Keywords:** Early skin-to-skin contact (SSC), Early initiation of breast feeding (EIBF), Nurses, Newborn, Plan-Do-Study-Act (PDSA).

### • Introduction

Over the last 20 years, India's maternal and infant death rates have decreased, but progress has lagged behind the 2015 objectives outlined in the millennium development goals (MDG) [1]. The Government of India's flagship program, the "National Rural Health Mission" (NRHM), which was recently renamed "National Health Mission" (NHM), adopted a number of novel approaches and schemes to increase institutional births, has contributed to the progress in part. Additionally, large expenditures were made to improve personnel, service delivery, infrastructure, and emergency transportation [2, 3].

The Maternal Mortality Ratio (MMR) in India has decreased by an astounding 6 points in the last year, and is now at 97 per lakh live births, as reported in a Special Bulletin on MMR by the Registrar General of India (RGI). The number of maternal fatalities during a certain time period per 100,000 live births is known as the MMR (Maternal Mortality Ratio). While the number of newborns in institutions has increased recently, however the quality of treatment there has not much improved [4, 5]. According to the evidence, the majority of maternal and infant fatalities take place during labor and the hours after delivery [6, 7]. In India, three newborn problems and four maternal difficulties account for 60% and 80%, respectively, of all maternal and neonatal mortality [8]. To achieve the anticipated reductions in mortality and morbidity, enough attention must be paid to the attribute of treatment and the management of difficulties in addition to initiatives to enhance treatment of institutional births [9, 10].

Several Indian states have launched programs that include the mentorship of labor room nurses at public health institutions in an effort to enhance the quality of midwifery services [11, 12]. Peer-to-peer coaching on the job and the systematic use of basic tools (such checklists or case sheets) for each delivery are common elements of these programs. In a recent large randomized controlled trial, the effect of a checklist-based nurse coaching program was examined in relation to maternal morbidity and mortality [13]. Despite the relatively short duration of the intervention, it significantly increased the adoption of evidence-based practices. Similar improvements in the adoption of evidence-based procedures by labor room nurses have been shown in evaluations of various nurse mentorship programs [14, 15].

More women are opting to give birth in medical facilities due to the worldwide push for universal health care, but health outcomes won't improve until service quality is guaranteed [16]. According to the WHO, monitoring labor is a high-priority QI intervention that may help direct prompt, appropriate responses [17]. It is crucial to assess maternal and fetal parameters regularly and promptly during labor in order to spot difficulties and make quick clinical decisions. The most often used labor monitoring device is the paper partograph, which is also the WHO's suggestion for active labor [18].

The study on Exclusive early initiation of breastfeeding (EIBF) and Skin-to-Skin Contact (SSC) is of utmost importance for various reasons. First and foremost, EIBF and SSC are crucial components of early newborn care, known to have numerous benefits for both infants and mothers. Investigating the impact of these practices can help identify their potential to improve neonatal health outcomes, such as reducing neonatal mortality and enhancing infant immunological responses. Furthermore, understanding the association between EIBF, SSC, and maternal health indicators, such as postpartum depression and breastfeeding success, can provide valuable insights into the holistic well-being of both mothers and infants during the early postpartum period. By conducting this study, healthcare professionals can gain evidence-based insights to develop and implement effective interventions to promote these practices in healthcare facilities. The findings may also contribute to enhancing awareness among expectant parents about the benefits of EIBF and SSC, thereby encouraging them to actively participate in these practices after childbirth.

The purpose of this research was to increase the rates of skin-to-skin contact (SSC) and early initiation of breastfeeding (EIBF) among newborns who were older than 37 weeks and did not need respiratory assistance or resuscitation. Over the course of seven months (November 2021 to May 2022) this quality improvement (QI) research was carried out in the labor room of a mother-child wing at selected hospital in New Delhi. The WHO paper partographs were formerly used by the labor room personnel to track labor.

- **Methodology**

- **Research Approach**

The quantitative research approach was selected for the study.

- **Research Design**

For this study, a quasi-experimental research design was deemed appropriate.

- **Population**

The study focused on 10 nursing officers working in the Labour room.

- **Sampling method**

Non-probability total enumerative sampling technique was opted to recruit the participants in the study based on eligibility criteria.

- **Sample size**

A sample size of 20 nursing officers was selected for the study. Experimental group - 10 nursing officers Control group - 10 nursing officers

- **Study settings**

At the selected labour room of Government hospital in New Delhi (as Experimental Group Setting) and second labour room of Government hospital in New Delhi (Control Group Setting), a quasi-experimental study was conducted on 10 nurses to determine the areas for improvement in providing maternal and neonatal care using standard tool NQAS (National Quality Assurance Standard) tool for 6 months (November 2021 to 31st May 2022).

- **Study instruments**

First, a questionnaire was used to collect the necessary baseline data obstetric and demographic information from the mothers, including their gravidity, age, parity, history of breastfeeding and number of previous pregnancies, as well as information on the babies' weight and gender. The second NQAS (National Quality Assurance Standard) tool was a written form that was used to assess how long the 3<sup>rd</sup> stage of labor lasted, which was assessed from the moment the baby was delivered until the moment the placenta was fully delivered [19].

- **Independent Variable**

Nurse led mentoring program

- **Dependent Variables**

1. Skin to skin contact immediately after birth of newborn.

2. Initiation of breast feeding within one hour after delivery.

• **Method of data collection**

Two nurses, one obstetrician, and two neonatologists made up the multidisciplinary QI team that we established. In the hospital's birth room, the research was carried out between November 2021 and May 2022. The responsibility of overseeing the implementation and data gathering was delegated to the two nursing officers.

The nursing officers who often worked in the delivery room gave their agreement for the researcher to watch and take notes on consenting mothers while they received treatment. The nurses were instructed to carry out their regular duties and not alter them in any way while the researcher was there. When the researcher entered the delivery room, she verified the laboring woman's and her family's consent and obtained the birth attendant's permission to be there. The clipboard-mounted observation record sheet, a timer, and a pen were all part of the observational apparatus. The researcher entered the room to see when labor began. The researcher set the stopwatch to start at the exact moment of delivery in order to note time the immediate postpartum period. Each mother was observed by the researcher for the whole of the first hour after delivery.

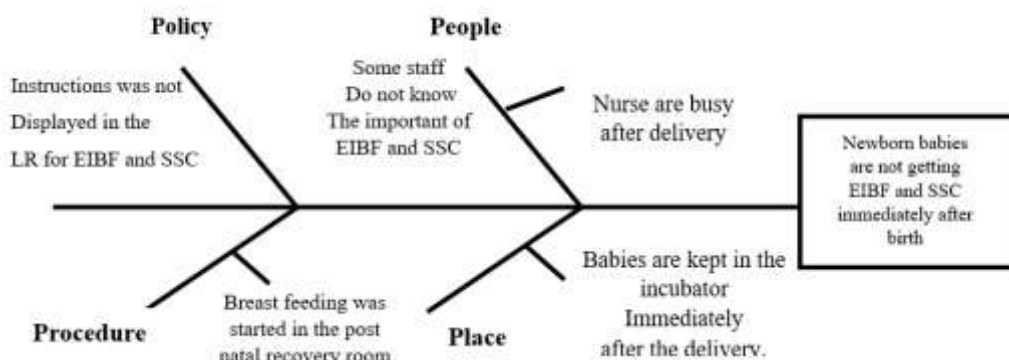
• **Strategy**

One obstetrician, one neonatologist, two charge nurses, two nursing officers, and a nursing orderly in the delivery room made up the multidisciplinary QI team. From November 2021 to May 2022, the research was performed in the hospital's labour room. The team leader was the nurse in charge.

She was given the duty of overseeing the procedure for quality improvement.

- One of the labour nursing officers was given the responsibility of **Communicator** • Another Labour room nursing officer was given the responsibility of **Recorder**.
- One of the sister In charge of labour room was given the responsibility of **Team Leader**.

**Problem analysis (Fish Bone diagram)**



Fish bone analysis was done and baseline data was collected

• **PDSA cycle #1 (1–31 December 2021)**

Base line data was collected from 1 November 2021 to December 2021. SSC data was nil and EIBF baseline data was 38%. Additionally, no one was tasked with keeping track of the time spent initiating early breastfeeding (EIBF) and having skin-to-skin contact right after delivery. Nurses were informed about the gravity of skin-to-skin contact immediately after birth and EIBF. Still, some nurses were reluctant to start the process because of their hectic schedules. Breastfeeding was usually finished after switching the mothers to the postnatal observation room, i.e., next to the labour room.

A multidisciplinary QI team was formed, consisting of two nurses in charge, two nursing officers, one obstetrician, and one neonatologist in the labour room.

The team came up with the solution that nursing officers on duty will help the delivered mother for the Skin-to-skin contact of new born babies immediately after birth and Early initiation of breast feeding (EIBF). Few nursing officers said, “it will be difficult for them as they have to assist in conduction of delivery and do the recording of data in delivery register.” Two nursing officers agreed to the process. They have tried it for two to three shifts. Observation 1 was completed within two to three days. It was not feasible for the nurses to stand near the mothers after delivery. Again, a meeting was held to recognize and understand the problem with the help of fish bone analysis and process flow chart. The suggestion was that during the process, help could be taken from midwifery students in the labour room and nursing attendants (aayas) along with the nursing officers.

• **PDSA cycle #2 (1–31 January 2022)**

Through training sessions held every other day for a week, the QI lead nursing officers educated the delivery room nurses on the value of initial skin-to-skin contact with new-borns and EIBF. In order to reach the most nurses possible on alternating days, low-intensity frequent training lasting around 15 minutes was also done during the afternoon shifts during shift changeover. To remind the workers in the birth room, posters and charts illustrating the relevance were put up. The notice was posted at the labor room complex's main entrance. Additionally, sensitization was finished for EIBF and skin-to-skin contact with new-born infants just after delivery. The significance of skin-to-skin contact right after delivery and EIBF was explained to the nurses and nursing attendants (aayas). The procedure was carried out starting with the next shift with the assistance of nursing assistants (aayas) and midwifery students who were present in the labor room. The nursing assistants were also made more sensitive. The plan was adopted. They were then able to carry out the procedure. The process was followed for the next month. QI team reported they could follow the process. But some mothers were not cooperative because of exhaustion and lack of knowledge about the importance of skin-to-skin contact immediately after birth and EIBF.

• **PDSA cycle #3 (1–28 February 2022)**

Mothers' cooperation and active involvement in the study were essential factors contributing to its success. During the prenatal observation room sessions, healthcare providers offered comprehensive counselling and preparation to the expectant mothers, explaining the significance and benefits of skin-to-skin contact and early breastfeeding initiation. This approach fostered a positive attitude and understanding among the mothers, encouraging them to embrace the procedure wholeheartedly.

Throughout the implementation of EIBF and SSC, the mothers displayed a remarkable level of maturity and enthusiasm. They eagerly embraced the practice, understanding its potential impact on their new-born's health and well-being. Many mothers actively sought guidance and assistance from healthcare professionals to ensure they performed the procedures correctly and effectively. The atmosphere in the postnatal care unit was characterized by a sense of collaboration and partnership between the mothers and healthcare providers. The mothers were receptive to the continuous support and guidance provided by the medical staff, and they actively communicated their experiences and concerns during the process. In several instances, mothers expressed their satisfaction with the skin-to-skin contact and early breastfeeding experience, highlighting their emotional connection and bonding with their new-borns. Their positive feedback further emphasized the importance of fostering maternal cooperation in promoting these essential new-born care practices.

Overall, the high level of maternal cooperation and willingness to adopt EIBF and SSC underscored the significance of education, counselling, and compassionate care in facilitating the successful implementation of these practices. The mothers' commitment to providing the best start for their infants through active participation further validates the need to continue advocating for and promoting such beneficial newborn care strategies.

• **Results**

Over the course of the period from November 2021 to May 31, 2022, the Nurse Led Mentoring program was given through frequent training lasting around 15 minutes given to the staff nurses, nursing students and nursing assistants (aayas) of labour room. SSC significantly increased from a baseline of nil to 68% and EIBF from a baseline of 38% to 82%. This study discovered a 44% major gap closure in EIBF and 68% in SSC. The intervention facilities used case sheets; hence, the end line analysis included case sheet data from these sites. The demographic information for the nursing officers is shown in Tables 1, 2 and 3.

• **Frequency and percentage wise distribution of samples based on Demographic Variables**

Table 1 presents the distribution of age, gender, and religious affiliations among the participants (nurses) in terms of frequencies and percentages. Among the participants, the age range of 21 to 30 had the highest frequency with 8 participants, accounting for 80% of the total sample. The age range of 31 to 40 had 1 participant, representing 10% of the total sample. The age range of 41 to 50 had no participants, making up 0% of the total sample. There were no participants above the age of 50. The entire sample consisted of female participants, accounting for 100% of the total. Among the nurses, 70% identified as Hindu, 20% identified as Christian, and 10% identified as Muslim.

**Table 1. Demographic variables of staff nurse, those are working in the labour room (N=10)**

Demographic variables	Frequency (f)	Percentage (%)
<b>Age (in years):</b>		
21-30	8	80%
31-40	1	10%

41-50	1	10%
Above 50	0	0%
<b>Gender:</b>		
Male	0	0%
Female	10	100%
<b>Religion</b>		
a. Hindu	7	70%
Muslim	1	10%
Christian	2	20%
Others Specify	0	0%

Table 2 lists the demographic characteristics of the samples (nurses), including their education level, labor room experience, and attendance at workshops, conferences, and training sessions. No one had a master's degree in nursing, 20% of nurses had B.Sc. nursing or post-basic nursing degrees, and 80% of nurses had diplomas in general nursing and midwifery. 10% of nurses have less than two years' experience in the delivery room, 10% have three to five years' experience, 20% have six to ten years' experience, and 60% have more than ten years' experience. In general, 80% of nurses do not attend any training, conferences, or workshops related to skin-to-skin contact right after delivery or EIBF. Only 20% of nurses do so.

**Table 2. Other demographic variables of staff nurse, those are working in the labour room (N=10)**

Demographic variables	Frequency (f)	Percentage (%)
<b>Education</b>		
a. Diploma in General Nursing and Midwifery	8	80%
b. Basic B.Sc Nursing / Post Basic B.Sc Nursing	2	20%
c. master's in nursing	0	0%
<b>Years of experience in Labor room</b>		
a. Less than 1	0	0%
b. 1- 2	1	10%
c. 3- 5	1	10%
d. 6-10	2	20%
e. More than 10	6	60%
<b>Attended any training, conference or workshops related to skin-to-skin contact immediately after birth and EIBF</b>		
a. No	8	80%
b. Yes	2	20%

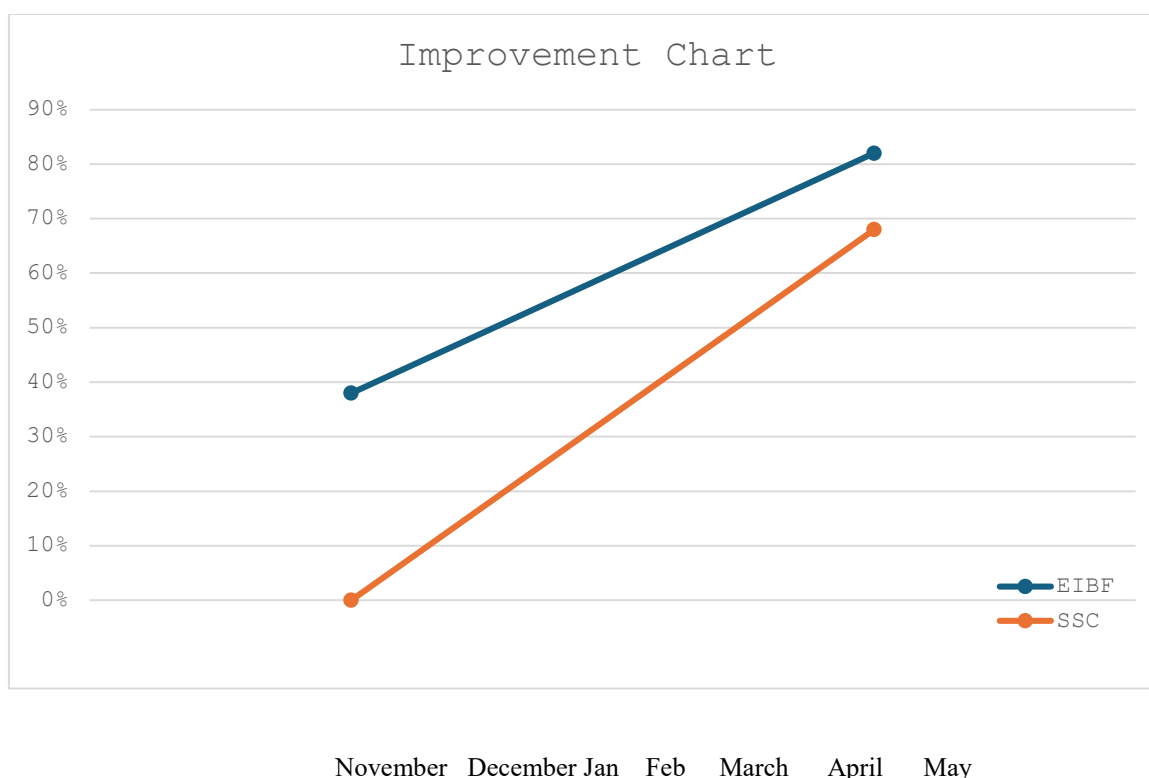
Table 3 presents demographic variables of mothers and their corresponding frequencies and percentages. The majority of participants (67%) are aged 21-30 years, while 31-40-year-olds account for 29% and 41-50-year-olds represent 3.6%. Regarding Gravida, 42% are Primigravida and 58% are Multigravida. In terms of religion, 80% identify as Hindu, 13.9% as Muslim, and 6.1% as Christians. Occupationally, 1.74% are in government jobs, 12% have private jobs, and 86% are housewives.

**Table 3. Demographic data of mothers (n= 689)**

Demographic variables	Frequency (f)	Percentage (%)
<b>Age (in years):</b>		
21-30	462	67%
31-40	203	29%

41-50	24	3.6%
<b>Gravida:</b>		
Primigravida	290	42%
Multigravida	399	58%
<b>Religion</b>		
a. Hindu	553	80%
Muslim	96	13.9%
Christian	48	6.1%
<b>Occupation</b>		
Govt. Job	12	1.74
Pvt. Job	84	12
Housewife	593	86

• **EIBF and SSC improvement chart**



**Fig. 1** Early initiation of breast feeding (EIBF) and skin to skin contact (SSC) improvement chart

In Figure 1, a significant gap closure of 44% is demonstrated. The data before intervention showed a percentage of early initiation of breastfeeding (EIBF) at 38%. However, after the implementation of early initiation of breastfeeding

services resulted in a remarkable improvement, reaching 82%. There was a significant improvement in skin contact of newborn babies immediately after birth nil to 68% and EIBF from a baseline of 38% to 82% over a 6 month period.

#### • Discussion

In order to give high-quality patient care and improve patient outcomes, QI approaches are being used more and more in healthcare. In this research, we assess the efficiency of Nurse Led Mentoring using Quality improvement methodology for health care workers in improving maternal and neonatal outcomes at selected hospitals in Delhi. The findings showed that there was a significant improvement in Skin-to-skin contact of newborn babies immediately after birth nil to 68% and EIBF from a baseline of 38% to 82% over a 6-month period. In addition, as a co- process, there is improvement from a baseline data from nil to 68% and EIBF from a baseline of 38% to 82% over without any major intervention in the system. Our work builds fresh evidence around an original and very inexpensive model of quality improvement. There have been recent efforts on a national and international scale to develop and test models for bettering maternal and neonatal health care [20-23].

To evaluate improvements, PDSA offers a systematic experimental learning technique [23]. Frontline employees and representatives of all stakeholders were included from the start in this QI program. To discover the difficulties of execution, they extracted potential solutions from inside themselves and tried them impartially on a modest scale as a team. This enabled us to improve and modify our strategy to make it more palatable and workable. The research applies to all healthcare institutions that employ an e-partograph to track work.

Additionally, the new project case sheet with an incorporated checklist may have had an impact on the gains in provider knowledge in this research [24]. Similar findings have been reported in other regions of the area in which the WHO safe birth work sheet was used to enhance fundamental birthing practices [25]. The project case sheet provides additional management rules for unforeseen issues in addition to being a thorough checklist for the management of normal labor. As a result, it not only serves to remind personnel of standard procedure but also offers clear instructions on how to differentiate between difficulties and how to treat patients prior to referral. Thus, it acts as an important work tool to remind employees to follow accepted therapeutic practices. The case sheet may not be utilized as successfully when used as a stand-alone checklist without mentoring, according to our study's findings that showed greater rates of case sheet utilization in the intervention institutions that established mentoring assistance. Poor documentation methods in the area have previously been identified [4], but the situation has transformed as a result of giving the providers an easy-to-use case sheet and offering frequent feedback and encouragement during mentorship visits [24]. The gaps in the intervention group's usage of case sheets demonstrate the necessity for ongoing mentoring help at the institutions and periodic reinforcement by higher health systems until coverage is adequate and sustained. Much emphasis has been placed on the necessity for execution research that assesses the efficiency of quality improvement programs [26]. We have extensively documented the procedure, containing the examining techniques we used for the intervention to guide the program's daily operations.

#### Conclusion

To improve newborn and maternal health consequences in India, the standard of care must be raised simultaneously with the number of institutional births. Through a quality improvement (QI) approach, it was shown that the Nurse Led Intervention is successful in enhancing maternal and newborn outcomes. By including them in pre-natal preparation and tracking them via a QI effort, skin-to-skin contact of newborn infants shortly after delivery and EIBF might be maintained without the need for extra resources. We were able to show that this approach was not extremely expensive, making it likely that it might be replicated in different settings in India and worldwide.

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