

ORIGINAL RESEARCH

Quality Improvement Initiative To Improve Breastfeeding Rates And Monitoring Of Full-Term Neonates In The First Hour Of Life

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Abstract

Background: Early initiation of breastfeeding (EIBF) during the "Golden Hour" after birth provides essential nutrients and immunological benefits, significantly reducing neonatal mortality. However, barriers such as cultural practices and health system gaps limit its practice.

Objectives: To improve EIBF rates and neonatal monitoring within the first hour of life in full-term neonates (≥ 37 weeks gestation) through targeted quality improvement (QI) interventions.

Methods: This study was conducted in the Pediatrics and Obstetrics & Gynecology departments of Guru Nanak Dev Hospital, Amritsar, from June 2023 to April 2024. The four-phase methodology included a baseline survey, barrier analysis, intervention implementation using Plan-Do-Study-Act (PDSA) cycles, and final analysis. Interventions included staff training, role assignments, poster displays, and weekly feedback sessions. Data were collected daily and analyzed using descriptive statistics and appropriate statistical tests, with run charts illustrating progress.

Results: The EIBF rate improved from 12.65% at baseline to 56.95% by April 2024, with monitoring compliance increasing from 34.59% to 79.82%. Statistically significant improvements ($p < 0.05$) were achieved through structured awareness campaigns, team involvement, and regular discussions. Sustained compliance was observed during the final analytical phase.

Conclusion: This QI project demonstrated that systematic interventions, including education, accountability, and adaptive strategies, can significantly improve EIBF compliance. Active staff involvement and ongoing monitoring were critical to success. Embedding QI practices into routine care can sustainably enhance patient outcomes without additional resources, fostering a culture of continuous improvement.

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Introduction

Early childhood nutrition, particularly in the first year, is crucial for development, and breastfeeding is foundational to optimal nutrition and health. Breastfeeding provides essential nutrients and immunological benefits tailored to the needs of newborns, supporting both physical growth and cognitive development. The American Academy of Pediatrics (AAP) endorses human milk as the gold standard for infant nutrition, noting its unique health benefits compared to other feeding options¹⁻³.

The "Golden Hour," the first hour post-birth, is a critical period for evidence-based neonatal care. The World Health Organization (WHO) advocates for breastfeeding initiation within this hour, allowing infants to receive colostrum, which boosts immunity and decreases infection risks⁴⁻⁵.

EIBF provides antibodies, strengthens the immune system, and reduces the risk of illnesses like respiratory infections and diarrhea, with a protective effect against neonatal mortality⁶⁻⁸. Skin-to-skin contact during breastfeeding also promotes emotional bonding and stimulates all five senses, fostering cognitive development and emotional stability^{1,9}.

For mothers, early breastfeeding decreases postpartum bleeding, reduces risks of anemia, and lowers the likelihood of osteoporosis and certain cancers. In India, recent data show improvements in EIBF rates, yet challenges remain: only 41.8% of mothers initiated breastfeeding within the first hour in the 2019–2021 National Family Health Survey (NFHS-5)¹⁰⁻¹¹

Barriers to early breastfeeding include cultural practices, knowledge gaps, and health system

limitations such as lack of timely baby-mother transfer. QI strategies are essential for improving breastfeeding practices, especially in low- and middle-income countries where they have shown reductions in neonatal mortality¹².

Methodology

Our initiative aims to address barriers to EIBF through targeted QI interventions, monitoring vital signs during the Golden Hour, and promoting awareness among healthcare teams to improve the quality of neonatal care.

Material and methods

Study Setting: The study was conducted in the Pediatrics and Obstetrics & Gynecology departments of Guru Nanak Dev Hospital, Amritsar. It aimed to improve early initiation of breastfeeding (EIBF) and the monitoring of full-term neonates (≥ 37 weeks gestation) during their first hour of life.

Study Design: This quality improvement project followed a structured, four-phase methodology:

- Phase I – Baseline Survey (June 2023):** Collected baseline data on the EIBF rate and initial monitoring in full-term neonates.
- Phase II – Analytical Phase (July 2023):** Analyzed baseline data and identified barriers through process mapping, fishbone diagrams, and group discussions. The team established a SMART aim to enhance EIBF rates and monitoring.

- Phase III – Interventional Phase (August 2023 to January 2024):** Implemented interventions using PDSA cycles, which included staff training, poster displays, role assignment, and weekly performance feedback. Each intervention's impact was analyzed monthly.
- Phase IV – Final Analysis (February 2024 to April 2024):** Calculated final rates of EIBF and monitoring, addressed challenges, and discussed lessons learned. Future plans were also established to sustain improvements.

Interventions

Interventions targeted both process and structural improvements, such as:

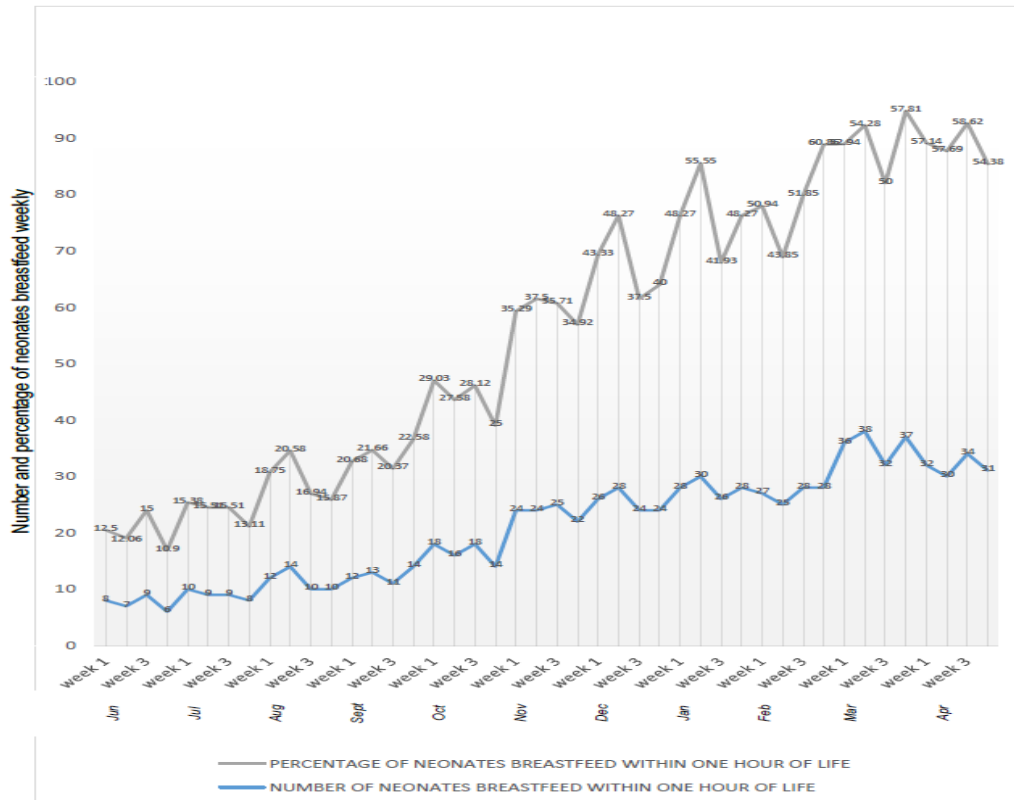
- Structural:** Posters of EIBF and monitoring guidelines were displayed prominently in labor rooms.
- Process:** Staff training through videos and weekly sessions, role assignments, and regular performance feedback.
- Outcome:** Increased awareness and motivation among staff, leading to improved EIBF rates and neonatal monitoring.

Data Collection and Analysis

Data were collected daily on neonates fulfilling inclusion criteria, noting practices of healthcare staff involved. Baseline and post-intervention data were analyzed with descriptive statistics, chi-square, Fisher's exact, Student's t-test, and Mann-Whitney tests. Run charts depicted progress over time.

Results and observations

Month	Number of cases	Percentage	Monitoring during first hour of life	Percentage of monitoring during first hour of life	Breastfeeding done within one hour of life	Percentage of breastfeeding done within one hour of life
June- 2023	237	8.96	82	34.59%	30	12.65%
July- 2023	242	9.15	92	38.01%	36	14.87%
August- 2023	254	9.6	98	38.58%	46	18.11%
September- 2023	234	8.84	98	41.88%	50	21.36%
October- 2023	240	9.07	110	45.83%	66	27.50%
November – 2023	265	10.01	136	51.32%	95	35.84%
Dec-23	242	9.14	156	64.46%	102	42.14%
January – 2024	232	8.77	170	73.27%	112	48.27%
February – 2024	210	7.93	159	75.71%	108	51.42%
March – 2024	266	10.05	205	77.07%	143	53.76%
April – 2024	223	8.43	178	79.82%	127	56.95%

Graph: 1 Run Chart Showing Percentage And Number Neonates Reast feed In Weekly Trend

In Graph 1, data was entered in a data matrix in Microsoft Excel sheet and then analysed. We represented the number of neonates breastfed during the first hour of life in numbers and percentages. We considered a P value of ≤ 0.05 as statistically significant. We depicted the outcome (EIBF compliance rate weekly) in percentages in a run chart. Data points were recalculated for the outcome measured every week from the start till the end of the study. A run chart showing the number of healthy full-term neonates breastfed during the first hour of life each month.

Maximum rate of EIBF was noted during the 4th week of February, followed by a decrease in rates during the first week of March. Minimum rate of EIBF was noted in the 4th week of June.

Phase 1: Baseline Data Collection (June 2023)

- **Initial Findings:** Baseline data showed low rates of early breastfeeding (12.65%) and monitoring (34.59%) within the first hour of life among full-term neonates.
- **Team Formation:** A multidisciplinary team was formed, including labor room staff, pediatricians, and nursing staff, to address these issues.

Phase 2: Analysis of Baseline Data (July 2023) Barrier Analysis: A fishbone diagram highlighted key barriers:

- **People Factors:** Lack of awareness, social taboos, and issues like sore nipples.

- **Process Factors:** Delays in shifting mothers, lack of reporting protocols.
- **Policy Factors:** No written policy on early breastfeeding.
- **Environment Factors:** Distance between nursery and labor room.
- **SMART Aim:** Set a target to increase early breastfeeding rates to over 50% within six months

FISH BONE DIAGRAM

Phase 3: Interventional Phase (August 2023 - January 2024) PDSA Cycle 1 (August - September 2023)

- **Objective:** Increase awareness and train staff on the benefits and techniques of early breastfeeding.
- **Outcome:** Early breastfeeding improved from 12.65% to 21.36%, and monitoring from 34.59% to 41.88% (statistically significant, $p < 0.05$).
- **Focused Group Discussion (FGD):** Addressed breastfeeding barriers and assigned specific roles to healthcare workers for greater involvement.

PDSA Cycle 2 (October - November 2023)

- **Objective:** Enhance team involvement by assigning specific roles for monitoring and record-keeping.
- **Outcome:** Early breastfeeding rates rose to 35.84%, and monitoring reached 51.32% (statistically significant).

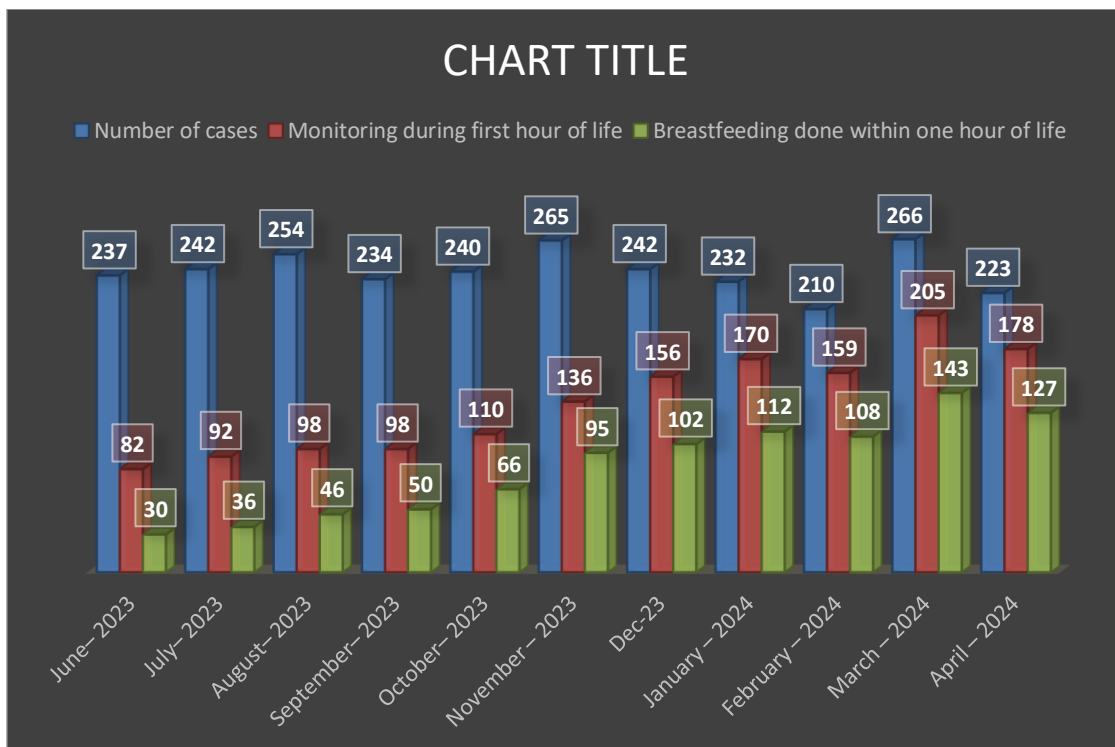
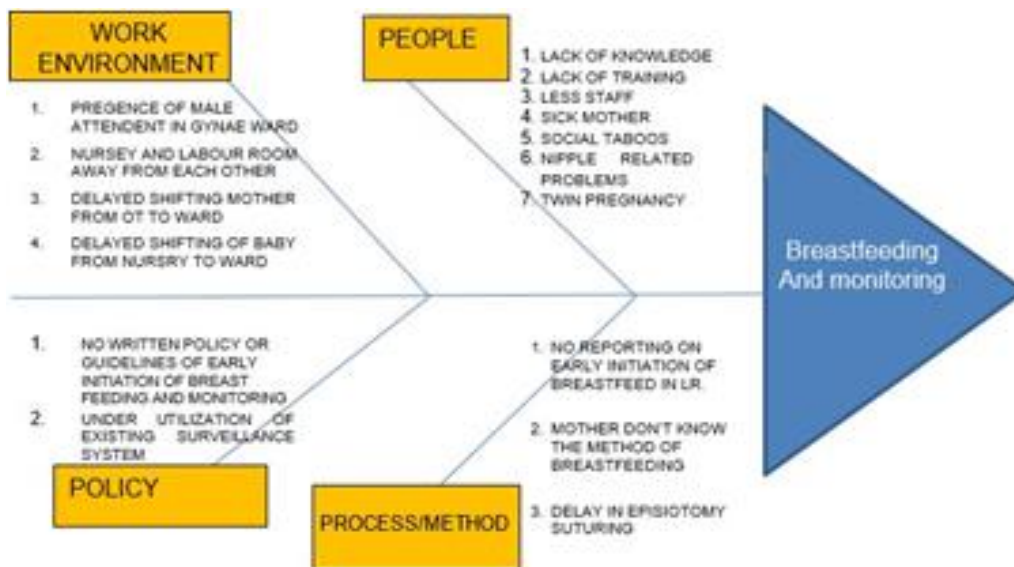
- **FGD Findings:** Role assignments increased interest and confidence among staff, improving compliance.

PDSA Cycle 3 (December 2023 - January 2024)

- **Objective:** Boost compliance further with posters and weekly meetings.
- **Outcome:** Early breastfeeding increased to 48.27%, and monitoring to 73.27% (statistically significant).
- **FGD Feedback:** Posters and videos effectively raised awareness, though some staff remained less engaged.

Phase 4: Final Analytical Phase (February - April 2024)

- **Sustained Improvement:** By April, early breastfeeding rates reached 56.95%, and monitoring within the first hour reached 79.82%.
- **Key Interventions:** Sequential changes through PDSA cycles helped achieve sustained improvement.
- **Future Plans:** Developed strategies for maintaining improvements, including ongoing training and role reinforcement.



The project successfully improved early breastfeeding and monitoring rates within six months through systematic interventions.

Role assignments, education, and regular discussions were instrumental in driving progress.

Overall, early breastfeeding increased from 12.65% in June 2023 to 56.95% by April 2024 and monitoring improved from 34.59% to 79.82%, meeting the SMART aim.

Discussion

A quality improvement project conducted at GMC Amritsar from June 2023 to April 2024 sought to increase this rate. Initial data showed only 12.65% compliance among 237 deliveries. A team was formed to identify barriers, including lack of awareness, nipple-related issues, maternal health, and staffing practices.

Key interventions were implemented through three PDSA (Plan-Do-Study-Act) cycles, with progressive role assignment and training:

The project demonstrated that structured awareness, role clarity, and regular feedback significantly improve early breastfeeding rates.

In this quality improvement project, active involvement of healthcare workers proved to be a key factor in promoting early breastfeeding and thorough monitoring. By ensuring that each healthcare team member was involved during the procedure, the project enhanced the consistency and quality of care. Staff members were given the responsibility of record-keeping, noting both the timing and details of breastfeeding initiation. Specifically, one staff member per shift was designated to document early breastfeeding initiation within the first hour of life for each newborn. Meanwhile, a resident was tasked with directly monitoring the baby's well-being. This structured division of responsibility fostered an environment of accountability and improved overall adherence to early breastfeeding practices. Notably, the improvement in the rates of early breastfeeding and monitoring from the baseline to the second PDSA cycle was statistically significant ($p < 0.05$), demonstrating the positive impact of these procedural changes.

In the subsequent PDSA cycle (PDSA #3, from December 1, 2023, to January 31, 2024), continuous efforts were made to address new challenges highlighted by feedback from nursing officers. To increase compliance, daily reminders about the importance of early breastfeeding were introduced, aiming to reinforce best practices among staff. In addition, a list of previously identified weak links was analyzed, and improvements were implemented to overcome these barriers. Focused group discussions were held at the end of the cycle, and specific challenges were identified, including postpartum complications that hindered breastfeeding, concerns over initiating breastfeeding in cases of meconium-stained amniotic fluid, and difficulties with

breastfeeding post-cesarean section due to maternal pain and positioning constraints. Data showed that during this period, compliance rates for early breastfeeding and monitoring within the first hour of life were 48.27% and 73.27%, respectively. Increasing the availability of informational posters and conducting weekly team meetings were found to be highly beneficial for improving breastfeeding and monitoring rates. The impact of these interventions on early breastfeeding initiation and monitoring within the first hour was statistically significant ($p < 0.05$).

Similar studies offer insight into various interventions that effectively promoted early breastfeeding. Patyal et al., for instance, utilized a quality improvement process involving postpartum mothers with stable newborns born via normal vaginal delivery. They addressed barriers such as limited knowledge of proper breastfeeding techniques (e.g., LATCH-ON) and insufficient staff motivation. Patyal's team employed process cycle matrix charts and Fishbone analysis, as well as brainstorming sessions to test change ideas through successive PDSA cycles. Interventions included providing educational pamphlets, encouraging early breastfeeding, offering mothers warm drinks after delivery, and restricting male presence in postnatal wards. The initiative successfully raised the breastfeeding initiation rate within the first hour from 12% to 80%, demonstrating that significant improvements can be achieved even without additional resources.¹³

Kalita et al. also conducted a quality improvement project focusing on increasing breastfeeding rates within the first hour for cesarean deliveries. Their study initially encountered obstacles such as insufficient nursing staff, inadequate operational policies for breastfeeding post-cesarean, and limited knowledge among staff regarding eligibility criteria and benefits of early breastfeeding initiation. Regular reminders, one-on-one sessions, and WhatsApp notifications were used to address these issues. With tools like Fishbone analysis and process flow mapping, the team identified underlying causes and implemented changes, resulting in an increase in first-hour breastfeeding initiation from 0% to 82%. Notably, the average time to initiation at the end of PDSA cycle 4 was 52 minutes.¹⁴

In another study, Devi et al. evaluated early breastfeeding rates for stable term and preterm newborns delivered via vaginal birth and cesarean section. Their interventions included designating a lactation supporter for each shift and providing education on breastfeeding benefits during small group discussions in both labor and OT complexes. The breastfeeding initiation rate within the first hour rose from 25% to 100% over a three-month period, showcasing the success of a comprehensive support structure and timely staff sensitization efforts.¹⁵ Studies by Gedam et al.,¹⁶ Edmond et al.,¹⁷ and Thakur et al.¹⁸ further underline the importance of tailored quality improvement measures to address

breastfeeding challenges across different settings and patient populations. For example, Gedam et al. achieved an increase in breastfeeding initiation rates from 69% to 88% for normal deliveries and 17% to 61% for cesarean sections in a district hospital setting. Similarly, Edmond et al.¹⁷ utilized Fishbone analysis and process flow mapping to improve the first-hour breastfeeding initiation rate for cesarean-born infants from 0% to 93% over a three-month period. Meanwhile, Thakur et al.¹⁸ enhanced expressed breast milk (EBM) usage in extremely low birth weight infants in an NICU by implementing protocols such as non-nutritive sucking and standardized Kangaroo mother care.

Collectively, these quality improvement studies highlight the effectiveness of structured interventions, such as staff education, regular reminders, documentation protocols, and dedicated lactation support, in overcoming barriers to early breastfeeding. Furthermore, they emphasize the need for continuous evaluation and adaptation of strategies to suit the specific needs of each clinical setting and patient demographic.

In this quality improvement (QI) project, similar methodologies were used as in other studies, including fishbone diagrams, process flow mapping, brainstorming sessions, and focused group discussions. These tools helped identify barriers to initiating breastfeeding and suggest specific, prioritized solutions using the Plan-Do-Study-Act (PDSA) cycle. Training sessions were held twice a week for staff and residents, using posters and videos to promote early breastfeeding, which significantly sustained staff interest and motivation.

The study included only healthy, term neonates delivered via lower-segment cesarean section (LSCS) and normal vaginal deliveries (NVDs). Monitoring during the first hour of life covered all vital signs and parameters every 15 minutes. Newborns with contraindications for breastfeeding were excluded, and while the long-term benefits of early breastfeeding initiation were acknowledged, they were not assessed in this study. A baseline analysis identified key barriers, leading to the development of a SMART goal aimed at improving breastfeeding rates and monitoring compliance within the first hour of life. Focused group discussions provided further insights, and changes were implemented through successive PDSA cycles, with posters and videos reinforcing staff awareness and engagement.

The final three-month analytical phase, from February 1 to April 30, 2024, involved calculating intervention compliance rates, represented in various data formats such as run charts, pie charts, bar diagrams, and tables. Statistical tests confirmed the significance of observed changes, and discussions among team members highlighted resolved barriers and gathered lessons learned for future QI projects. Key strategies included addressing new barriers with PDSA cycles, fostering supportive supervision, maintaining regular

data collection, involving all staff members in QI learning, holding weekly meetings to discuss weak areas, and training staff to build confidence in the early breastfeeding process.

Monitoring during the "golden hour"—the first hour of life—proved essential, as it allowed healthcare professionals to evaluate the newborn's transition from intrauterine to extrauterine life. During this period, vital signs like temperature, heart rate, and respiratory rate were closely monitored to identify potential health issues early on, including respiratory distress, irregular heartbeat, or infection symptoms. Monitoring also facilitated immediate support for mothers with breastfeeding positioning and latching techniques, enabling a smoother breastfeeding initiation. Additionally, the golden hour allowed close observation of risk factors like hypoglycemia and low birth weight, enabling timely interventions that contributed to the newborn's overall health and stability. Documentation during this hour provided a critical baseline for continued care and gave parents the support they needed for their newborn's well-being. The absence of monitoring in this period, on the other hand, could lead to missed signs of complications, delays in essential interventions, and potentially long-term health consequences for the newborn.

Quality improvement, as demonstrated in this project and many others, is a systematic approach to enhancing patient outcomes and overall healthcare delivery. QI involves identifying areas of concern, implementing modifications, and evaluating results. This continuous process optimizes clinical workflows, resource allocation, and adherence to evidence-based practices, ultimately creating a culture of improvement and professional development among healthcare staff. With proven efficacy, quality improvement methodologies enhance patient care without requiring additional manpower or financial resources, making them indispensable in routine healthcare processes. The success of this project and others supports the incorporation of QI methods into daily practice for sustainable improvements in healthcare quality and patient outcomes.

Conclusion

In conclusion, the quality improvement project at GMC Amritsar highlights the effectiveness of structured, collaborative interventions to promote early breastfeeding and comprehensive monitoring during the critical first hour of life. Through successive PDSA cycles, the project addressed key barriers by increasing staff awareness, defining clear roles, and implementing regular feedback systems, resulting in a statistically significant increase in compliance rates. This approach underscores the importance of staff involvement, consistent training, and adaptive strategies to overcome context-specific challenges in clinical care.

The findings align with similar studies, which reveal that structured methodologies, such as Fishbone analysis, process mapping, and continuous reinforcement through reminders and discussions, can significantly elevate breastfeeding initiation rates. Notably, active monitoring during the golden hour provides critical insight into newborn health, supporting early interventions that enhance both neonatal and maternal outcomes.

Ultimately, this project reinforces quality improvement (QI) as a sustainable approach to enhancing healthcare delivery and patient outcomes. By embedding QI practices in routine care, healthcare facilities can drive long-term improvements without the need for additional resources, fostering a culture of accountability, continuous learning, and enhanced patient care.

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