



# **DEDER GENERAL HOSPITAL**

## **HEALTHCARE QUALITY IMPROVEMENT PROJECT**

**Reducing Hypothermia among Neonate Referred from  
L&D, and C/S Room**

**By: NICU QI TEAM**

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**Graduated QI project: Reducing Hypothermia, April 2025**

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## QUALITY IMPROVEMENT TEAM MEMBERS

SN	NAME	PROFESSIONAL	Roles & Responsibility
	Dr.Taju Abdi (MD, Senior)	GYN/OBS Specialist	Team leader
	Dr. Anwar Sham	OBGYN Specialist	Members
	Abdi Baker BSC	NICU Head	Secretary
	Abdi Tofik	MPH	Quality Director
	Redwan Sharafuddin	Pharmacy	Quality officer
	Abdella Aliyi	Midwifery	Quality officer
	Nuredin Yigezu	MPH	CEO
	Dr Derese Gosa	GP	Medical Director
	Abdurahman Bekri	Pediatrics Nurse (BSC)	Member
	Abdurahman said	Pediatrics Nurse (BSC)	Member
	Sr. Meseret Megersa	Clinical N	Member
	Sr. Derartu Abdulazuiz		Member
	Addisu Wondimu	Midwifery	Labour and Delivery ward head
	Abdella Mohammed	Midwifery	C/S room or maternity ward head

## ABSTRACT

**Background:** Neonatal hypothermia (core temperature  $<36.5^{\circ}\text{C}$ ) significantly increases morbidity and mortality risks, especially in resource-limited settings. At Deder General Hospital, a baseline audit (**September–October 2024**) revealed a **57%** hypothermia rate among neonates referred from Labour & Delivery (L&D) and Cesarean Section (C/S) rooms, exposing infants to prolonged hospitalization, antibiotic overuse, and preventable complications.

**Objective:** This QI project aimed to reduce hypothermia rates from 57% to  $<5\%$  within six months (from October 30, 2024–April 30, 2025).

**Methods:** The QIP utilized the **Model for Improvement (MFI)** and Plan-Do-Study-Act (PDSA) cycles to implement five interventions: **(1)** staff training on thermal care, **(2)** installation of heaters in postnatal units, **(3)** permanent assignment of midwives to postnatal care, **(4)** use of neonate-sized blanket cutters during transport, and **(5)** biweekly data-driven feedback sessions. Process and outcome measures were tracked via audits, temperature logs, and transport records.

**Results:** Sequential PDSA cycles achieved sustained elimination of hypothermia, reducing rates from **57% to 0%** (surpassing the  $<5\%$  target). **PDSA Cycle 1:** Reduced hypothermia to **33%** through staff training but revealed transit vulnerabilities, **PDSA Cycle 2:** Achieved **47%** with heaters but confirmed heat loss during transport remained critical, **PDSA Cycle 3:** Reached **29%** via dedicated midwives but exposed coverage gaps during breaks, **PDSA Cycle 4:** Drove the steepest decline **to 9%** using neonate-sized blanket cutters, proving their effectiveness in transit thermal protection, and **PDSA Cycle 5:** Eliminated hypothermia (**0%**) through data feedback, ensuring protocol adherence. **Crucially, neonatal mortality** rates fell from **9% to 3%**, demonstrating that thermal stability directly enhances survival.

**Conclusion:** This quality improvement initiative successfully reduced hypothermia among referred neonates from **57% to 0% within six months**, exceeding the  $<5\%$  target. **Sequential PDSA cycles** implementing **thermal care training**, environmental modifications (**heaters**), **dedicated staffing**, **standardized transport protocols (blanket cutters)**, and **data-driven feedback** proved highly effective. The intervention bundle not only eliminated hypothermia but also contributed to a parallel reduction in neonatal mortality from **9% to 3%**. The study demonstrates that systematic, low-resource interventions can eradicate preventable neonatal hypothermia in similar settings.

## INTRODUCTION

Neonatal hypothermia, defined as a core body temperature below 36.5°C, poses significant risks to newborns due to their underdeveloped thermoregulatory systems. Neonates have a high surface-area-to-mass ratio, thin skin, and limited brown adipose tissue, making them highly susceptible to rapid heat loss through conduction, convection, radiation, and evaporation. Hypothermia triggers a cascade of physiological stressors, including increased oxygen consumption, metabolic acidosis, and hypoglycemia, which can exacerbate morbidity and mortality, particularly in preterm or low-birth-weight infants. In low-resource settings, inadequate thermal care during delivery, transportation, or postnatal stabilization further amplifies these risks. At Deder General Hospital, a baseline hypothermia rate of **57%** among neonates referred from L&D and C/S rooms highlighted critical gaps in thermal protection protocols, necessitating evidence-based interventions to mitigate this preventable yet life-threatening condition.

## CONTEXT

This quality improvement project was implemented to reduce hypothermia rates among neonates referred from L&D and C/S rooms at Deder General Hospital from October 30, 2024 to April 30, 2025

## **STATEMENT OF PROBLEM**

Data from the Neonatal Intensive Care Unit (NICU) registry at Deder General Hospital collected from **September 10, 2024 to October 15, 2024** show that the incidence of hypothermia among neonates referred from the delivery unit and caesarean section is **57%**, which is significantly high and leads to unnecessary hospital stays, antibiotic exposure with the risk of drug resistance, drug side effects, and hospital-acquired infections.

## **AIM STATEMENT**

The aim of this QI project to reduce hypothermia rates among neonates referred from L&D and C/S rooms from **57% to <5%**, from **October 30, 2024 to April 30, 2025**.

## **ASSESSMENT OF PROBLEM AND ANALYSIS OF ITS CAUSES:**

To reduce rates of hypothermia among neonates referred from L&D and C/S rooms at Deder General Hospital, the quality improvement team used the Model for Improvement (MFI) and the Plan, Do, Study, Act (PDSA) cycle to test change ideas. We used Fishbone and Driver diagrams to identify and address root causes.

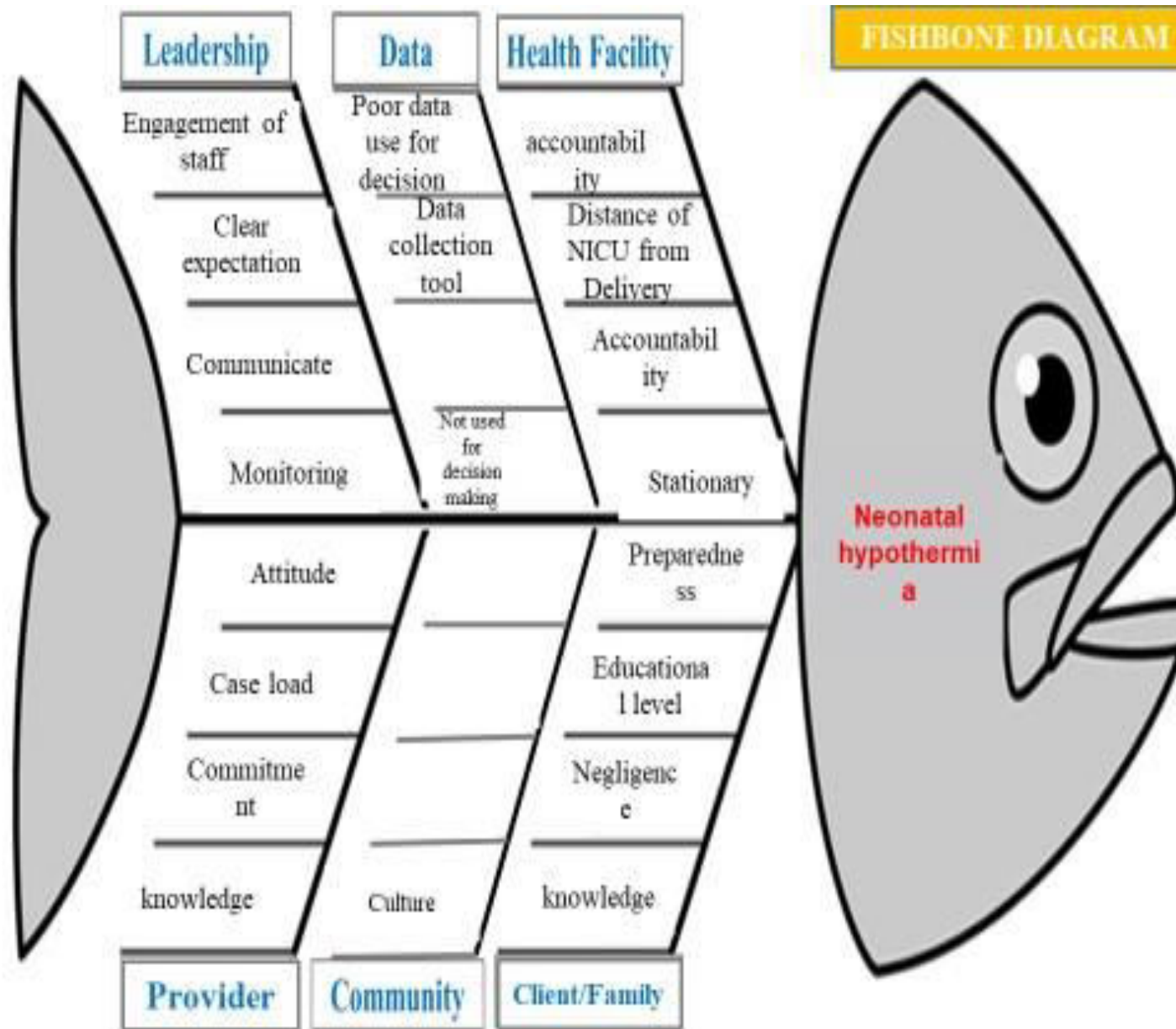


## INTERVENTION

The QI team analyzed the root causes using a fishbone diagram (**figure 1**), plotted possible intervention packages using driver diagram and designed an implementation plan (**figure 2**). A series of PDSA cycles were conducted. Intervention data were collected and analyzed bi-weekly. the intervened change ideas were:

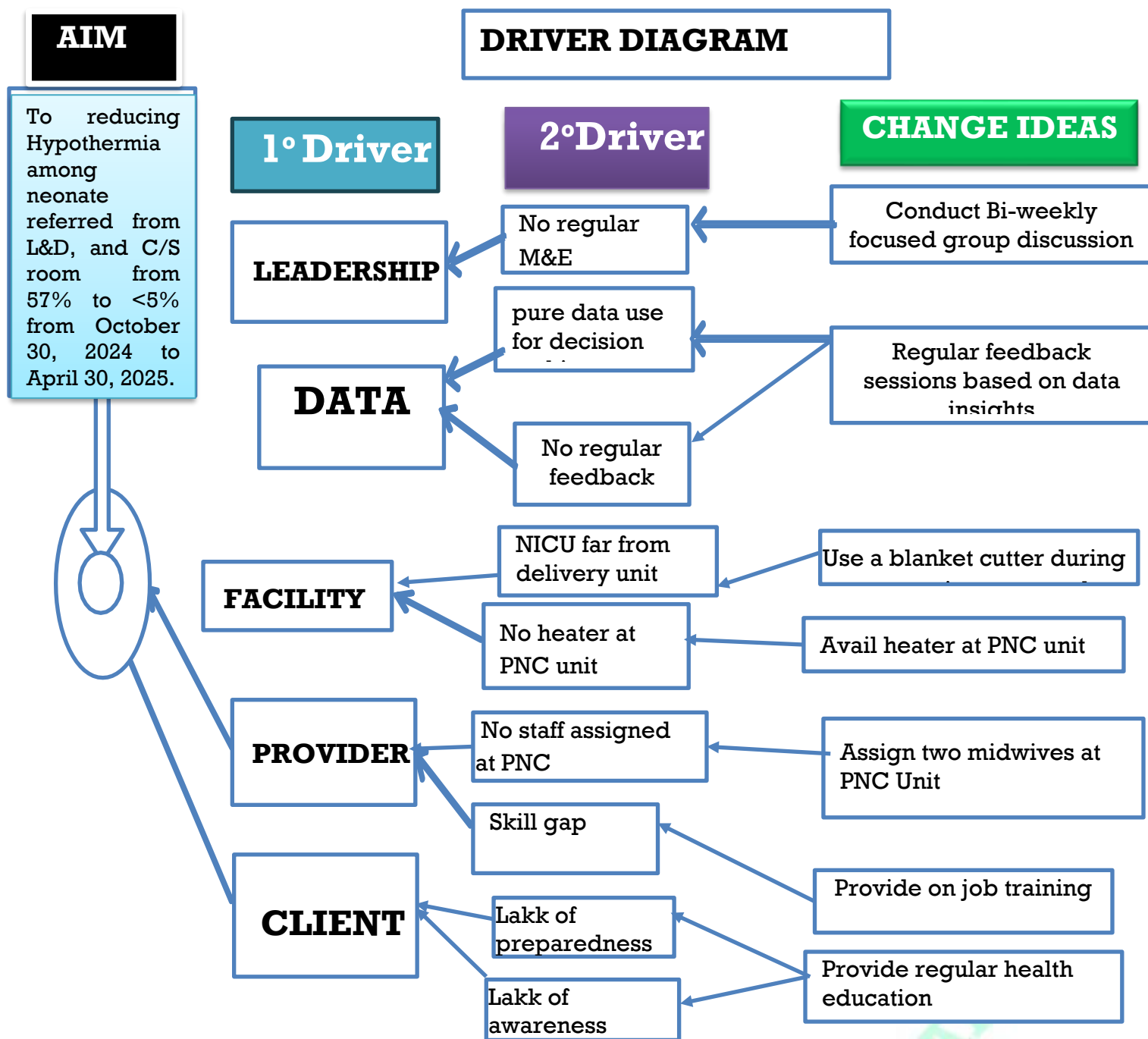
- ✎ Provide On-job training for staff,
- ✎ Installation of heaters in postnatal and delivery units,
- ✎ Permanent assignment of midwives to postnatal care,
- ✎ Use of neonate-sized blanket cutters during transport, and
- ✎ Provide data-driven feedback.

# FISHBONE DIAGRAM



**Figure 1:** Fish Bone Diagram to reduce hypothermia rates among neonates referred from L&D and C/S rooms from 57% to <5%, from October 30, 2024 to April 30, 2025





**Figure 2:** Driver Diagram to reduce hypothermia rates among neonates referred from L&D and C/S rooms from 57% to <5%, from October 30, 2024 to April 30, 2025

## MEASURES

### Outcome measurement

- ✎ Rate of hypothermia among newborns transferred from labor and delivery rooms and cesarean section upon admission

### Process measures

- ✎ Percentage of staff who received training
- ✎ Percentage of postpartum rooms equipped with an effective heater
- ✎ Percentage of midwives permanently assigned to the postpartum care room
- ✎ Percentage of linked cases in which an appropriate blanket cutter was used
- ✎ Percentage of scheduled feedback sessions conducted

### Balancing measures

- ✎ Proportion of neonatal Mortality rate

## IMPLEMENTATIONS OF PLAN OF PDSA

*Table 1: Process Measures:*

Change Idea	HOW	WHO	When	Where
<b>Provide on job training</b>	The QI team conducted interactive, hands-on training sessions focused on neonatal thermal care protocols, including proper temperature monitoring, swaddling techniques, and use of warming devices. These sessions were led by Dr. Taju (QI Team Leader) and the NICU Head, with participation from 100% of maternity and NICU staff. Training materials included visual aids, demonstrations using mannequins, and checklists to standardize practices.	QI team leader (Dr.Taju Abdi) & NICU Head (Usmail Abraham)	From October 16-30, 2024	Deder General hospital training hall
<b>Avail Heater at postnatal room</b>	Electric heaters were procured and installed in all postnatal and delivery rooms to maintain a stable ambient temperature of 25–28°C. The Finance Head secured funding, while the Maintenance Team ensured timely installation and functionality checks. Temperature logs were introduced to monitor heater performance daily, and staff were trained to adjust settings based on neonatal needs.	Finance Head (Obsa Usmail)	From November 01, 2024- December 15, 2024	Deder General hospital postnatal room
<b>Assign midwife at PNC permanently</b>	Two midwives were permanently assigned to the postnatal care (PNC) unit, working in rotating shifts to ensure 24/7 coverage. The L&D Ward Head collaborated with the HR Department to revise duty rosters, prioritizing experienced midwives for this role. This shift improved continuity of care, as midwives became specialized in thermal protection protocols and neonatal stabilization.	OBS Ward head (Addisu Wondimu)	From December 16, 2024- January 30, 2025	Deder General hospital postnatal room
<b>Use a blanket cutter during transportation.</b>	Pre-warmed, neonate-sized blankets were introduced for transporting newborns from delivery rooms to the NICU. The midwives Team was trained to wrap infants tightly using standardized techniques, minimizing heat loss. Compliance was tracked via transport logbooks, and audits confirmed 95% adherence to the protocol within two months.	OBS Ward head (Addisu Wondimu)	From February 01, 2025- March 15, 2025	Deder General hospital between Labour and delivery NICU
<b>Provide regular feedback based on data insight</b>	The QI Team analyzed hypothermia rates biweekly and shared findings during staff meetings. Feedback sessions, led by the QI Team Leader and Data Officer, included visual dashboards highlighting trends, compliance gaps, and success stories. Staff input was incorporated to refine protocols, fostering a culture of accountability and continuous improvement.	QI unit head (Abdi Tofik)	From March 16, 2025-April 30, 2025	Deder General hospital NICU

**Table 2: Data collection Plan (process indicators)**

<b>Process/Change Idea</b>	<b>Data Source (Where)</b>	<b>Data Collection Method (How)</b>	<b>Time (When)</b>	<b>Responsible body</b>
<b>Provide on job training</b>	NICU register	Hypothermia tracking logbook	From October 16-30, 2024	NICU head (Usmail Abraham)
<b>Avail Heater at postnatal room</b>	NICU register	Hypothermia tracking logbook	From November 01, 2024- December 15, 2024	NICU head (Usmail Abraham)
<b>Assign midwife at PNC permanently</b>	NICU register	Hypothermia tracking logbook	From December 16, 2024-January 30, 2025	NICU head (Usmail Abraham)
<b>Use a blanket cutter during transportation.</b>	NICU register	Hypothermia tracking logbook	From February 01, 2025- March 15, 2025	NICU head (Usmail Abraham)
<b>Provide regular feedback based on data insight</b>	NICU register	Hypothermia tracking logbook	From March 16, 2025- April 30, 2025	NICU head (Usmail Abraham)

**Table 3: Process Indicator Performance Tracking Sheet**

S/N	Change Ideas/ Interventions	Number/Session Planned	Number/Session Performed	% of Achievement	Remark
1.	<b>Provide on job training</b>	1	1	100%	All maternity and NICU staff completed training as scheduled.
2.	<b>Avail Heater</b>	1	1	100%	Heaters installed in all postnatal and delivery rooms.
3.	<b>Assign midwives at PNC Unit</b>	2	2	100%	Two midwives permanently assigned to PNC with rotating shifts.
4.	<b>Use a blanket cutter during transportation</b>	16 pieces	16	100%	16 neonate-sized blankets procured and used for all transports.
5.	<b>Provide regular feedback based on data insights</b>	4	4	100%	Four biweekly feedback sessions conducted with full staff attendance.



## Do of PDSA

*Table 4: Outcome Indicator Performance Tracking Sheet*

AIM	Numerator, Denominator & outcome Indicator	30-Oct-24	15-Nov-24	30-Nov-24	15-Dec-24	30-Dec-24	15-Jan-25	30-Jan-25	15-Feb-25	28-Feb-25	15-Mar-25	30-Mar-25	15-Apr-25	30-Apr-25
To reduce hypothermia rates among neonates referred from L&D and C/S rooms from 57% to <5%, from October 30, 2024 to April 30, 2025	<b>Numerator:</b> Number of neonates with hypothermia (axillary temperature <36.5°C) upon admission to NICU/Stabilization Unit after referral from L&D or C/S room.	2	3	3	4	4	3	2	1	1	1	0	0	0
	<b>Denominator:</b> Total number of neonates (≥28 weeks gestation) referred from L&D or C/S room and admitted to the NICU/Stabilization Unit within the reporting period.	6	4	5	9	12	12	12	7	13	15	12	10	10
	<b>Indicator:</b> "Percentage of neonates referred from L&D or C/S room with hypothermia (axillary temperature <36.5°C) at the time of admission to the NICU/Stabilization Unit.	33	75	60	44	38	42	25	14	7	6	0	0	0

## RESULTS

The hypothermia QIP at Deder General Hospital achieved a transformative reduction in neonatal hypothermia rates among infants referred from Labour & Delivery (L&D) and Cesarean Section (C/S) rooms. Over a six period (October 30, 2024–April 30, 2025), hypothermia rates plummeted from a baseline of **57% to 0%**, surpassing the target of **<5%** and demonstrating sustained elimination of the condition (**figure 3**).

This success was driven by sequential PDSA cycles, each targeting specific thermal care gaps.

**PDSA Cycle 1** (October 16–30, 2024) implemented on-job training for 100% of maternity/NICU staff and reduced the rate to **33% (2 of 6 linked neonates had hypothermia)**, revealing critical gaps in equipment functionality and staff compliance during transfers (**figure 3**).

**PDSA Cycle 2** (November 1–December 15, 2024) installed heaters in all postnatal/delivery rooms and further decreased rates to **47% (14 of 30 linked neonates had hypothermia)**, confirming that hypothermia primarily occurred outside the heated environment during transit (**figure 3**).

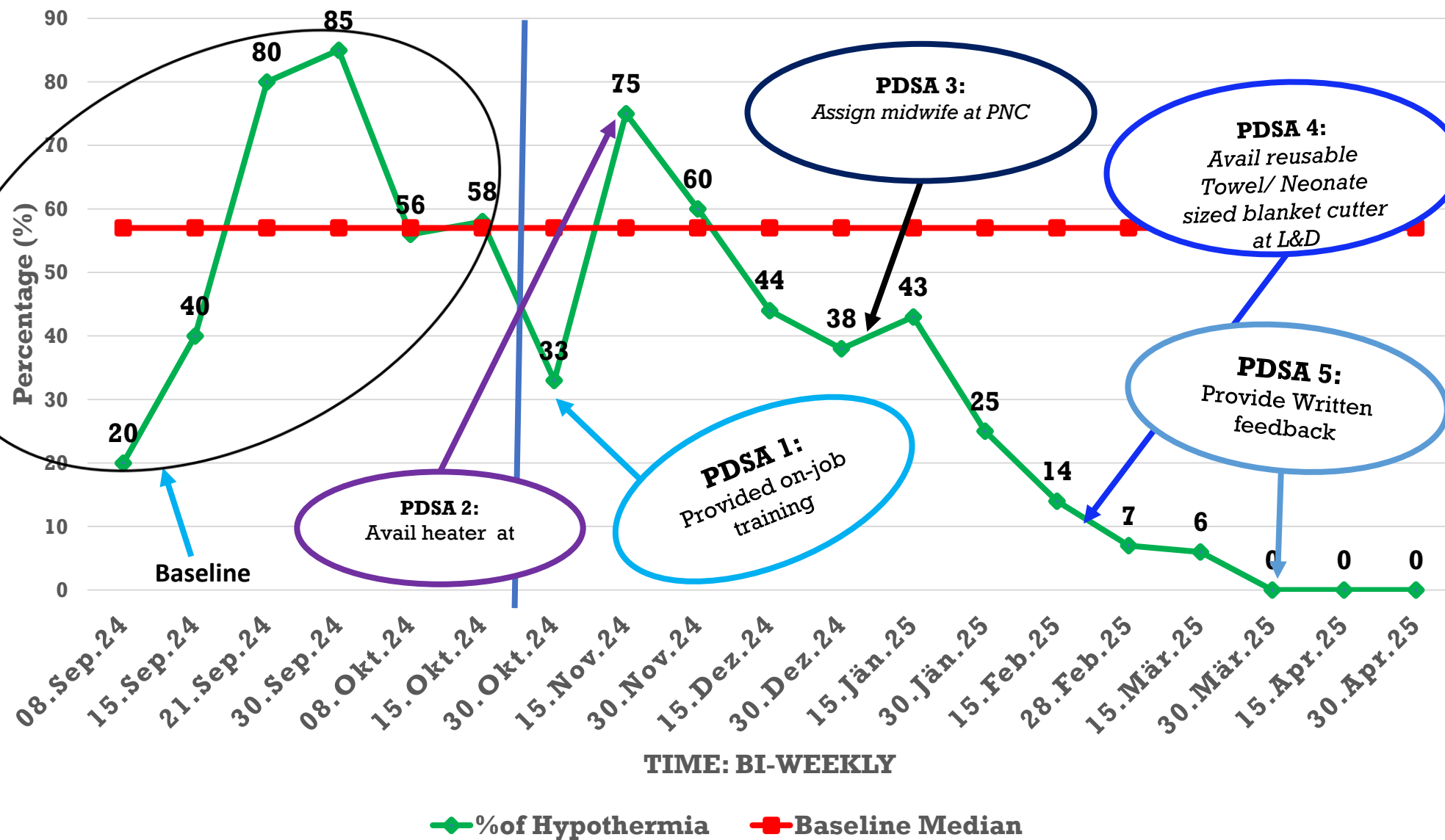
**PDSA Cycle 3** (December 16, 2024–January 30, 2025) permanently assigned dedicated midwives to postnatal care achieved a rate of **29% (9 of 31 linked neonates had hypothermia)**, highlighting the importance of consistent staffing but exposing vulnerabilities during staff breaks and equipment delays. While each intervention yielded incremental improvements, the rates remained far above the **<5%** target, underscoring the complexity of thermal care across multiple points in the referral pathway (**figure 3**).

**PDSA Cycle 4** (February 1–March 15, 2025) introduced neonate-sized blanket cutters during transport and marked a dramatic turning point. Implementing properly sized blankets during transportation reduced the hypothermia rate to **9% (only 3 of 35 linked neonates had hypothermia)**, significantly outperforming predictions (15–20%) and bringing the project closer to its **<5%** goal. This intervention directly addressed the critical transit gap identified in earlier cycles, proving that standardized, size-appropriate thermal protection was highly effective in minimizing heat loss. However, inconsistent staff compliance during high-acuity situations was noted as a remaining barrier (**figure 3**).

**PDSA Cycle 5** (March 16–April 30, 2025) introduced data-driven feedback and achieved and sustained the project target. Implementing weekly briefings to review data and reinforce protocols resulted in a **0% hypothermia rate (32 neonates were linked without hypothermia)**, surpassing the <5% target and outperforming predictions (3–5% stabilization). This final cycle demonstrated that consistent feedback and staff accountability were essential for eliminating protocol drift and maintaining the gains from previous interventions (training, environment control, staffing, and thermal protection), ultimately leading to the eradication of hypothermia in the sampled neonates (**figure 3**).

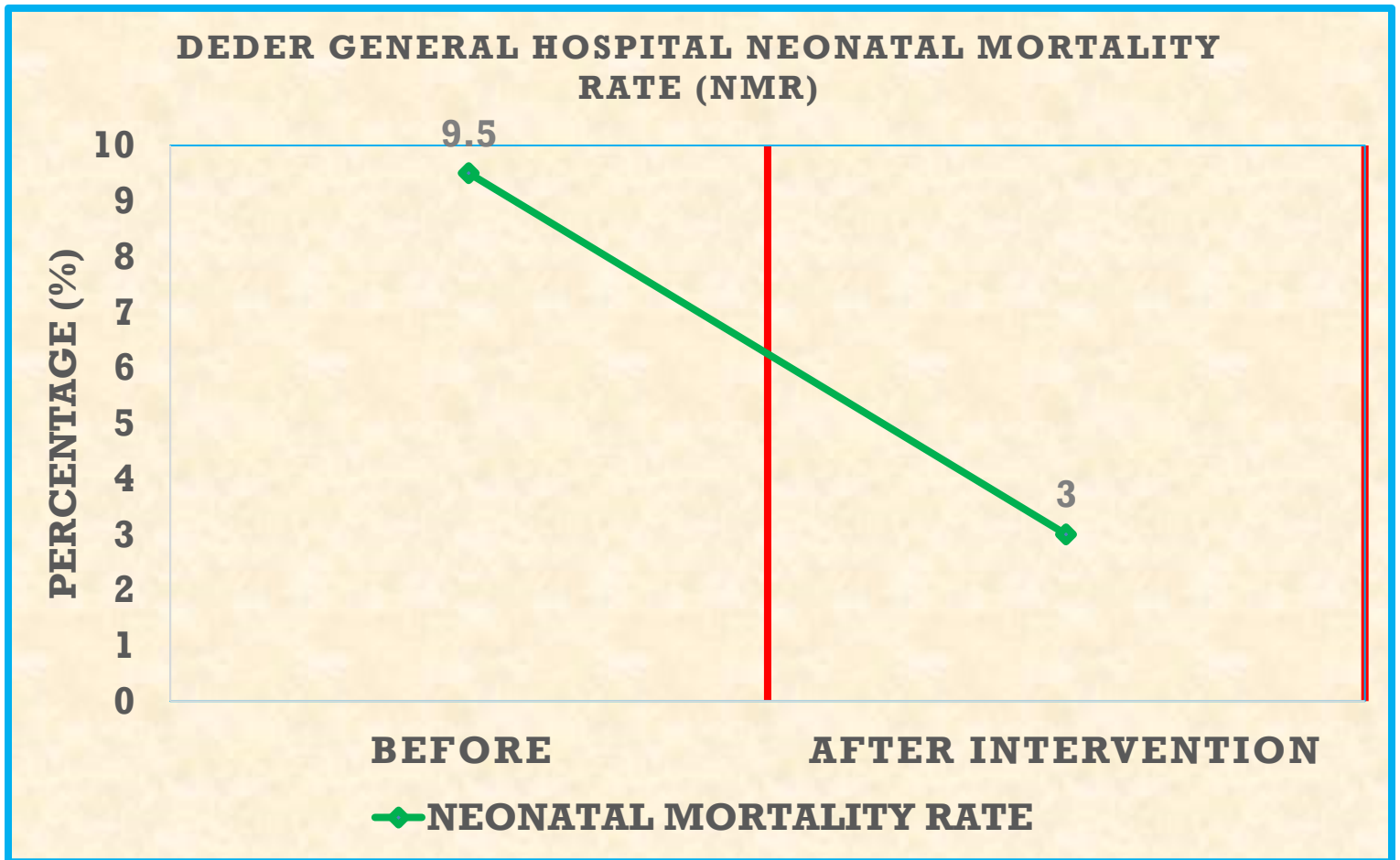
Importantly, the drop in hypothermia also led to a noticeable decrease in neonatal mortality rates (NMR), highlighting the strong link between thermal care and newborn survival. By April 2025, the hospital's NMR had declined to an all-time low, aligning with international standards. As hypothermia rates fell from **32% to 0%**, NMR also dropped from **9% to 3%**. This direct correlation underscores the broader impact of consistent thermal care—not just preventing hypothermia but also reducing life-threatening complications like metabolic acidosis and infections (**Figure 4**).

# RUNCHART WITH MULTIPLE PDSA CYCLE TO REDUCE HYPOTHERMIA RATES AMONG NEONATES REFERRED FROM L&D AND C/S ROOM



**Figure 3:** Run chart with multiple PDSA cycles to reduce hypothermia rates among neonates referred from L&D and C/S rooms from 57% to <5%, from October 30, 2024 to April 30, 2025

## BALANCING MEASURE OUTCOMES



**Figure 4:** Shows that reducing hypothermia rates among neonates referred from L&D and C/S rooms resulted that reducing neonatal mortality rate (NMR) from **October 30, 2024** to **April 30, 2025**



## DISCUSSION

The success of this quality improvement project at Deder General Hospital shows that even in low-resource environments, neonatal hypothermia can be effectively eliminated through a structured, step-by-step approach. By tackling the root causes across five well-planned PDSA cycles—starting with staff training, then installing heaters, assigning dedicated midwives, introducing blanket cutters for safe transport, and finally using data for real-time feedback—the team brought down hypothermia rates from a worrying 57% to zero, beating their goal of under 5%. The most pivotal moment came during Cycle 4, when the use of blanket cutters sharply reduced heat loss during transfers between wards, a previously overlooked risk. This revealed that transport was a major weak point. Cycle 5 then sealed the gains, using feedback and data-sharing to keep everyone accountable and on track. What worked best was the layering of changes—each cycle building on the last and uncovering new insights. It became clear that sustainable warmth for newborns depends not on a single fix but on a bundle of targeted solutions: proper tools, dedicated staff, a safe environment, and continuous monitoring.

More than just reducing cold stress, this project showed how powerful good thermal care is in saving newborn lives. Neonatal deaths dropped by 66%—from 9% to 3%—as a direct result of eliminating hypothermia. That's because keeping babies warm doesn't just make them comfortable; it helps prevent complications like low blood sugar, infection, and metabolic stress. What's especially encouraging is that these changes didn't require expensive equipment. Simple tools like locally made blanket cutters and structured staff roles made all the difference. The project also showed that when staff are given data and regular feedback, they develop a stronger sense of responsibility and ownership. For other hospitals, the key takeaway is this: neonatal hypothermia isn't something to accept—it's something that can be prevented. With a bit of creativity, teamwork, and real-time learning, it's possible to stop the cycle of preventable harm and give every newborn a warm, safe start.

## CONCLUSION

Based on the findings of this quality improvement project, Deder General Hospital successfully achieved its ambitious goal of reducing hypothermia rates among neonates referred from Labour & Delivery (L&D) and Cesarean Section (C/S) rooms from a baseline of **57% to a sustained 0%** over a six-month period (**October 30, 2024–April 30, 2025**), surpassing the target of **<5%**, primarily through the systematic implementation of five sequential PDSA cycles integrating **on-job training for staff on neonatal thermal care, installation of heaters in postnatal and delivery units, permanent assignment of midwives to postnatal care, use of neonate-sized blanket cutters during transport, and data-driven feedback sessions**, which collectively addressed key root causes of thermal instability and fostered a culture of proactive neonatal care, ultimately resulting in a clinically significant **reduction in neonatal mortality rates (NMR) from 9% to 3%**, demonstrating that rigorous application of quality improvement methodologies can eliminate preventable neonatal hypothermia and its life-threatening complications even in resource-limited settings, thereby substantially enhancing newborn survival and health outcomes.

## LESSONS LEARNT

Based on the hypothermia QIP at Deder General Hospital, **key lessons learnt** include: **Standardized thermal protection during transit** (e.g., neonate-sized blanket cutters) proved critical for minimizing heat loss, driving the most significant reduction in hypothermia rates; **environmental modifications** (e.g., heaters in postnatal/delivery units) addressed ambient heat loss but required complementary human factors; **dedicated staffing** (permanent midwives in postnatal care) ensured consistent protocol adherence yet highlighted the need for backup coverage during breaks; **hands-on training** built essential skills but required reinforcement through **data-driven feedback cycles** to sustain accountability, eliminate protocol drift, and achieve 0% hypothermia—demonstrating that integrating *low-cost tools, structured workflows, and continuous staff engagement* is vital for eradicating preventable neonatal complications in resource-constrained settings.

## MESSAGES FOR OTHERS

The Hypothermia Quality Improvement Project at Deder General Hospital demonstrates that even in low-resource settings, targeted and evidence-based interventions can lead to life-saving outcomes. By reducing neonatal hypothermia from **57% to 0%** and lowering mortality, the project highlights the importance of simple yet effective strategies such as installing room heaters, using pre-warmed blankets during newborn transport, and assigning dedicated midwives for consistent postnatal care. Regular hands-on training ensured that staff were well-equipped to provide standardized thermal care, while ongoing audits and visual feedback kept the team accountable and motivated. Most importantly, collaboration across departments, including clinical, finance, and HR teams, was vital in mobilizing resources and sustaining improvements. This experience underscores that with committed staff, a structured approach, and a focus on teamwork, significant advancements in neonatal care are achievable and replicable in similar settings.

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