

Neonatal Hypothermia in Mogadishu, Somalia: Strengthening Thermal Care Beyond NICU Equipment

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Abstract: Neonatal hypothermia remains an important and preventable threat to newborn survival in low-resource settings. Somalia has a high neonatal mortality burden, while published evidence on admission hypothermia in Somali neonatal intensive care units (NICUs) remains limited. Regional evidence provides an important basis for understanding the problem. A systematic review of East African studies reported a pooled neonatal hypothermia prevalence of 57.2%, and a Kenyan tertiary hospital study found hypothermia in 73.7% of neonatal admissions. In Mogadishu, the challenge is shaped by home birth, gaps in thermal care during the period before referral, limited transport capacity, inconsistent temperature monitoring, workforce constraints, and unreliable infrastructure. This commentary examines how these factors interact and considers interventions that have shown benefit in comparable low-resource settings. The evidence supports a layered approach that combines immediate drying and skin-to-skin care, delayed bathing, early breastfeeding, reliable temperature measurement, kangaroo mother care for preterm and low-birth-weight newborns, thermal protection during referral, staff training, and sustainable maintenance of warming equipment. These measures should complement rather than replace incubators and radiant warmers. Somalia-specific prospective data are needed to quantify admission hypothermia, assess adherence to thermal-care practices, and evaluate implementation outcomes.

Keywords: neonatal hypothermia, neonatal intensive care unit, Somalia, Mogadishu, thermal care, warm chain, kangaroo mother care, neonatal mortality

Introduction

Newborns are highly susceptible to heat loss because of their large surface area relative to body mass and immature thermoregulation. Preterm and low-birth-weight newborns are particularly vulnerable. Neonatal hypothermia is associated with increased morbidity and mortality in low-resource settings and can occur before admission to a neonatal unit.^{1,2}

Thermal protection begins with simple practices, including immediate drying, skin-to-skin contact, early breastfeeding, appropriate wrapping, and avoidance of early bathing. WHO guidance identifies thermal care as a core component of essential newborn care and emphasizes maintaining warmth from birth through the early neonatal period.^{3,4} Yet implementation remains inconsistent in many low-resource settings. A systematic review and meta-analysis of East African studies involving more than 20,000 newborns estimated a pooled prevalence of neonatal hypothermia of 57.2%.⁵ At Moi Teaching and Referral Hospital in Kenya, 73.7% of newborns enrolled in a neonatal unit study were hypothermic at admission, while only 7.8% received optimal thermal care.⁶

Somalia faces substantial structural barriers to newborn care. WHO data report a neonatal mortality rate of approximately 36 deaths per 1000 live births for 2022, while UNICEF reports a rate of 34 per 1000 for the latest country profile.^{7,8} A recent analysis of Somali demographic and health survey data found that 83.6% of births in the study population occurred at home and that home delivery was associated with higher odds of neonatal mortality than

facility delivery.⁹ These findings are important for thermal care because heat loss can begin before a newborn enters the formal health system. In addition, referral delays, transport conditions, and gaps in facility readiness may extend the period during which a newborn is exposed to cold stress.

Evidence from Mogadishu also highlights the importance of strengthening neonatal care systems. A 2025 retrospective study from a tertiary NICU in Mogadishu described neonatal mortality in relation to prematurity, sepsis, low birth weight, resuscitation needs, and hypothermia.¹⁰ However, the available Somali literature does not provide a reliable national estimate of admission hypothermia across NICUs. This commentary therefore uses Mogadishu as the focal setting while drawing on East African and other low-resource evidence to identify practical measures that could be adapted to Somalia.

What the Evidence Shows About Neonatal Hypothermia

The available evidence supports a high burden of neonatal hypothermia in comparable East African settings, but it should not be presented as a direct prevalence estimate for Somalia. The East African meta-analysis estimated a pooled prevalence of 57.2%, with important variation between studies and settings.⁵ The Kenyan study at Moi Teaching and Referral Hospital reported admission hypothermia in 73.7% of newborns and found low adherence to recommended thermal-care practices.⁶ More recent Ethiopian evidence also demonstrates that hypothermia remains common in neonatal intensive care, with a 2025 study reporting a prevalence of 66.7% at St. Peter's Specialized Hospital.¹¹ These findings provide regional evidence of the scale of the problem but do not establish the prevalence in Mogadishu or Somalia as a whole.

Several mechanisms are relevant to the Somali context. A newborn can lose heat through evaporation after birth, conduction from cold surfaces, convection, and radiation.^{1,3} Exposure can occur during drying and wrapping, while awaiting referral, during transport, or during procedures in a facility. Preterm and low-birth-weight newborns have additional vulnerability because of limited thermal reserves and immature physiological regulation. Consequently, the temperature recorded at NICU admission may reflect a sequence of events that began at birth rather than a problem originating inside the NICU.

Why Thermal Care Remains Difficult in Mogadishu

Home Birth and the Period Before Facility Care

The high proportion of home births in Somalia means that thermal protection cannot be treated solely as an NICU responsibility.⁹ Immediate drying, skin-to-skin contact, early breastfeeding, appropriate wrapping, and delayed bathing can be provided outside hospitals when birth attendants and families have the knowledge and materials required. Evidence from Ghana has shown that newborn-care behaviours are shaped by local beliefs and can be addressed through culturally appropriate behaviour-change approaches rather than through messages that simply reject existing practices.¹² For Somalia, community education should therefore focus on practical thermal-care actions and engage birth attendants, families, and community health workers.

Temperature Monitoring and Staff Practice

Temperature measurement is a basic requirement for identifying hypothermia, monitoring recovery, and evaluating quality improvement. The Kenyan experience illustrates the gap that can occur between guideline availability and bedside practice, with fewer than one in ten enrolled newborns receiving optimal thermal care.⁶ WHO's 2025 Essential Newborn Care Course continues to identify thermal care as a core competency for health workers caring for newborns.³ In Mogadishu, a standardized admission-temperature protocol, documentation field, escalation pathway, and regular audit would create a measurable quality indicator without requiring major capital investment.

Equipment, Electricity, and Maintenance

Incubators and radiant warmers remain important for newborns who require them, particularly when a newborn is unstable or cannot receive adequate skin-to-skin care.⁴ However, equipment alone cannot prevent heat loss that occurs

Table 1 WHO Thermal-Care Actions and Practical Considerations for the Somali Context

Thermal-Care Action	Required Practice	Practical Consideration
Warm environment	Maintain a warm delivery and newborn-care environment.	Facility and community spaces should minimize cold drafts and unnecessary exposure.
Immediate drying	Dry the newborn immediately and remove wet cloths.	Can be performed at home or in a facility with basic supplies.
Skin-to-skin contact	Place the newborn skin-to-skin with the mother or another caregiver when appropriate.	Requires training in positioning and monitoring.
Early breastfeeding	Initiate breastfeeding as soon as possible, ideally within the first hour when clinically appropriate.	Should be integrated into immediate newborn care.
Delayed bathing	Avoid early bathing and keep the newborn dry and warm.	Community counselling should address local beliefs and practices.
Appropriate clothing and covering	Use suitable clothing, head covering, and blankets while avoiding overheating.	Supplies should be available at birth and during referral.
Rooming-in	Keep mother and newborn together when clinically appropriate.	Supports skin-to-skin care and breastfeeding.
Warm transport	Protect newborns from heat loss during referral using appropriate coverings and other locally feasible measures.	Requires standard protocols, supplies, and trained transport personnel.
Warm resuscitation	Provide resuscitation on a warm surface and minimize exposure.	Primarily facility-based and requires equipment readiness.
Training and monitoring	Train staff and birth attendants and monitor adherence to thermal-care practices.	Competency-based training and routine audit can support implementation.

Notes: Adapted from World Health Organization thermal-care and essential newborn care guidance. Practical considerations are an implementation-oriented adaptation for the Somali context and are not a validated national feasibility assessment.

before admission. WHO guidance also recognizes the need for thermal protection during stabilization and transfer.⁴ Recent quality-improvement evidence from an Ethiopian referral hospital is relevant: a bundle that included temperature checks, immediate drying and wrapping, and avoidance of early bathing improved admission and in-hospital temperatures and reduced hypothermia episodes.¹³ This supports an approach in which equipment is integrated with protocols, staff competencies, monitoring, and reliable infrastructure rather than treated as a stand-alone intervention (Table 1).

Referral and Transport

Thermal protection should continue during referral. WHO guidance supports appropriate thermal environments and recognizes plastic wrapping as a possible option during stabilization and transfer of preterm newborns when appropriate.⁴ For Somalia, the practical priority is to define a standard transport package, train personnel in its use, and ensure that supplies are available whenever a newborn is referred. The 2025 Mogadishu NICU study also identified weaknesses in referral systems as part of the wider context of neonatal mortality.¹⁰ Thermal protection should therefore be incorporated into broader referral-system strengthening rather than developed as an isolated intervention.

What Comparable Settings Suggest Can Work

Evidence from comparable settings points to a combination of low-cost clinical practices and system-level quality improvement. In Ethiopia, a bundled quality-improvement intervention that included admission temperature measurement, immediate drying and wrapping, and delayed bathing was associated with improved temperature measures and

fewer hypothermia episodes.¹³ The study was conducted in one referral hospital and was not designed to establish national effectiveness, but its components are operationally relevant to other low-resource facilities.

Kangaroo mother care is another important component. WHO recommends KMC as routine care for preterm or low-birth-weight newborns and recommends initiating it as soon as possible after birth when clinically appropriate.^{14,15} The 2025 WHO clinical practice guide emphasizes prolonged skin-to-skin contact and family involvement.¹⁴ These recommendations are particularly relevant to settings where reliable electricity and advanced warming equipment are limited. KMC should not be described as a replacement for incubators or other thermal support when these are clinically required. Instead, it should be integrated into a broader thermal-care pathway.

Community interventions require similar attention to implementation. Evidence from rural Ghana showed that thermal-care behaviours were influenced by local beliefs and that opportunities for behaviour change existed when interventions were culturally grounded.¹² For Somalia, this suggests that community thermal care should be delivered through trusted health workers and birth attendants, using practical demonstrations and locally appropriate messages.

A Practical Thermal-Care Approach for Somalia

Based on the available evidence, a Somali thermal-care strategy should link the home, referral pathway, and NICU rather than focusing on the incubator alone. The following priorities are consistent with WHO recommendations and evidence from comparable low-resource settings:

- Standardize immediate thermal care at birth, including thorough drying, skin-to-skin contact, early breastfeeding, appropriate wrapping, and delayed bathing.
- Record axillary temperature at NICU admission and at defined intervals thereafter, with a documented response for hypothermic newborns.
- Strengthen KMC for preterm and low-birth-weight newborns according to current WHO guidance and clinical stability.
- Include thermal protection in neonatal referral protocols, with appropriate wrapping, warm coverings, and trained transport personnel.
- Pair donated warming equipment with preventive maintenance, biomedical support, power-continuity planning, and monitoring of equipment functionality.
- Train NICU staff, community health workers, and birth attendants using practical competency-based education rather than lectures alone.
- Establish facility-level audits of admission hypothermia, thermal-care adherence, equipment functionality, and referral conditions.
- Generate prospective Somali data on admission temperature, risk factors, thermal-care practices, transport exposure, and outcomes.

Recommendations

First, the Federal Ministry of Health and relevant regional authorities should develop or strengthen standardized neonatal thermal-care protocols based on WHO guidance and adapt them to the Somali service-delivery context. Second, NICUs should make admission-temperature documentation a routine quality indicator and review performance regularly. Third, KMC should be integrated into neonatal services for preterm and low-birth-weight newborns in accordance with current WHO recommendations. Fourth, neonatal referral protocols should include thermal protection from departure to arrival. Fifth, equipment donations should be accompanied by maintenance plans, biomedical training, power-continuity measures, and monitoring of functionality. Finally, Somali hospitals and researchers should prioritize prospective studies that quantify the burden of hypothermia and evaluate feasible interventions.

Conclusion

Neonatal hypothermia is a clinically important thermal-care challenge, but the available evidence does not yet allow a reliable national prevalence estimate for Somalia. Evidence from East Africa and other low-resource settings

nevertheless shows that hypothermia can occur frequently at admission and that prevention depends on more than warming equipment. For Mogadishu, a practical response should connect community thermal care, reliable temperature measurement, KMC, protected neonatal transport, trained staff, and sustainable equipment support. These measures should be implemented alongside efforts to strengthen the wider neonatal referral and quality-of-care system. Prospective Somali data are needed to determine the local burden, identify the most important points of heat loss, and evaluate which interventions are most feasible and effective in different settings.

Abbreviations

CHW, Community Health Worker; KMC, Kangaroo Mother Care; LBW, Low Birth Weight; NICU, Neonatal Intensive Care Unit; TBA, Traditional Birth Attendant; WHO, World Health Organization.

Ethics and Consent

This article is a commentary based on published literature and publicly available data. It did not involve human participants, identifiable records, or new data collection. Ethics committee approval and informed consent were therefore not required.

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Author Contributions

Both authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors declare no conflicts of interest in this work.

References

1. Mullany LC. Neonatal hypothermia in low-resource settings. *Semin Perinatol*. 2010;34(6):426–433. doi:10.1053/j.semperi.2010.09.007
2. Lunze K, Bloom DE, Jamison DT, Hamer DH. The global burden of neonatal hypothermia: systematic review of a major challenge for newborn survival. *BMC Med*. 2013;11:24. doi:10.1186/1741-7015-11-24
3. World Health Organization. *Essential Newborn Care Course*. 2nd. World Health Organization; 2025.
4. World Health Organization. WHO Recommendations for Care of the Preterm or Low-Birth-Weight Infant. World Health Organization; 2022.
5. Beletew B, Mengesha A, Wudu M, Abate M. Prevalence of neonatal hypothermia and its associated factors in East Africa: a systematic review and meta-analysis. *BMC Pediatr*. 2020;20(1):148. doi:10.1186/s12887-020-02024-w
6. Orwa J, Mwangi N, Mburu M, Irimu G, van Elburg RM, Benders MJNL. Neonatal hypothermia and adherence to World Health Organisation thermal care guidelines among newborns at Moi Teaching and Referral Hospital, Kenya. *BMC Pediatr*. 2021;21(1):132. doi:10.1186/s12887-021-02583-4
7. World Health Organization. Global health observatory: Somalia country profile. World Health Organization; 2026.
8. UNICEF. Somalia: Country Profile and Child-Related Data. UNICEF Data; 2026.
9. Kahie AM, Ali AO, Omer NM, Kahie SM, Nadarajah S, Omer NM. Individual and community-level determinants of neonatal mortality in Somalia: a multilevel analysis of the 2018-2019 demographic and health survey. *Front Pediatr*. 2025;13:1693062. doi:10.3389/fped.2025.1693062
10. Ali ME, Hassan YO, Ahmed MAM, Mohamud LB. Neonatal mortality and associated factors at a tertiary-level neonatal intensive care unit in Mogadishu, Somalia: a retrospective study. *Pediatr Health Med Ther*. 2025;16:93–102. doi:10.2147/PHMT.S500093
11. Sebro E, Asefa T, Mamo AE, et al. Prevalence and associated factors of neonatal hypothermia in the neonatal intensive care unit at St. Peter's Specialized Hospital, Ethiopia. *Sci Rep*. 2026;16(1):4417. doi:10.1038/s41598-025-34527-w
12. Hill Z, Tawiah-Agyemang C, Manu A, Okyere E, Kirkwood BR. Keeping newborns warm: beliefs, practices and potential for behaviour change in rural Ghana. *Trop Med Int Health*. 2010;15(10):1118–1124. doi:10.1111/j.1365-3156.2010.02593.x

13. Baracetti M, Hagos E, Tolera J, et al. Effectiveness of bundled interventions for the prevention of neonatal hypothermia in low-income settings: a quality improvement project in a referral hospital in Ethiopia. *Children*. 2025;12(6):709. doi:10.3390/children12060709
14. World Health Organization. Kangaroo mother care: a clinical practice guide. World Health Organization; 2025.
15. World Health Organization. Kangaroo mother care: a transformative innovation in health care. *Global position paper*. World Health Organization; 2023.

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