J Afric Neonatal 2025;3: 85 - 91

ORIGINAL

Kangaroo mother care in the African Neonatal Network hospitals: Resources, obstacles and practices

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https://dx.doi.org/10.4314/jan.v3i3.4

Received: 1st July 2025
Accepted: 7th July 2025

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Abstract: *Background:* Kangaroo mother care (KMC) is a proven, low-cost intervention that improves survival and outcomes for preterm infants. However, its uptake remains suboptimal, and data on KMC implementation across African hospitals are limited.
Objective: To document the current resources and practices related to KMC provision in hospitals within the African Neonatal Network.
Methods: Fourteen hospitals in the African Neonatal Network responded to an annual facility survey and a health facility survey co-developed by faculty in the African Neonatal Network and Vermont Oxford Network. Additionally, a point-prevalence audit was conducted to evaluate KMC provision for all eligible preterm infants on a single day. All analyses use descriptive statistics.
Results: Only one hospital had a fully operational immediate kangaroo mother care (iKMC) unit, though four others were in the process of establishing one. The spot audit showed that 50% of eligible infants were receiving skin-to-skin care at the time of assessment, and of those, 43% had received at least 18 hours of skin-to-skin contact in the previous 24 hours. However, in five hospitals, no infants had received any skin-to-skin care in the preceding 24 hours. Key barriers to establishing iKMC units included inadequate space, equipment shortages, staffing constraints, and concerns about safety.
Conclusion: While KMC and iKMC are being implemented in the African Neonatal Network hospitals, significant gaps remain in resource availability and practice consistency. This study identifies key challenges and opportunities for improvement, highlighting the need for continued monitoring and targeted interventions to enhance the provision of high-quality KMC.

Keywords: Infant, Newborn; Premature; Infant Mortality / prevention & control; Kangaroo-Mother Care Method; Skin-to-Skin Contact; Neonatal Intensive Care Unit;

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Quality of Health Care / organization & administration; Africa South of the Sahara; Global Health

Résumé: *Contexte:* Le contact peau à peau, ou method kangourou (Kangaroo Mother Care, KMC), est une intervention éprouvée et peu coûteuse qui améliore la survie et les résultats chez les nouveau-nés prématurés. Toutefois, son adoption reste sous-optimale, et les données sur la mise enœuvre de la KMC dans les hôpitaux africains demeurent limitées.
Objectif: Documenter les resources disponibles et les pratiques actuelles en matière de KMC dans les hôpitauxmembres du Réseau Néonatal Africain.
Méthodes: Quatorze hôpitaux du Réseau Néonatal Africain ontrépondu à une enquête annuelle sur les établissements de santé, codéveloppée par des experts du Réseau Néonatal Africain et du Vermont Oxford Network. Un audit de prevalence ponctuelle a également été réalisé pour évaluer la mise enœuvre de la KMC chez tous les nouveau-nés premature éligibles à une date donnée. Toutes les analyses ont été effectuées à l'aide de statistiques descriptives.
Résultats: Un seul hospital disposait d'une unité de KMC immédiate (iKMC) pleinement fonctionnelle, bien que quatre autressoient en cours d'implantation. L'audit ponctuel a révélé que 50 % des nourrissons éligibles recevaient des soins peau à peau au moment de l'évaluation, et parmi ceux-ci, 43 % avaient bénéficié d'au moins 18 heures de contact peau à peau au cours des 24 heure sprécédentes. Toutefois, dans cinq hôpitaux, aucun nourrissonn'avait reçu de soinspeau à peau durant les 24 heures précédentes. Les principaux obstacles à la mise en place d'unités iKMC comprenaient l'insuffisance d'espace, le manque d'équipements, les contraintes de personnel et des préoccupations relatives à la sécurité.
Conclusion: Bien que la KMC et l'I KMC soient mises enœuvre dans les hôpitaux du Réseau Néonatal Africain, des lacunes importantes persistent quant à la disponibilité des ressources et à l'uniformité des pratiques. Ce tte étude met enévidence les principaux défis ainsi que les opportunités d'amélioration, soulignant la nécessité d'un suivi continu et d'interventions ciblées pour renforcer la prestation de soins KMC de qualité.

Introduction

Low birth weight infants who are born preterm or small for their gestational age (or both) constitute approximately 15% of all neonates worldwide but account for 70% of all neonatal deaths.[1] Reducing mortality among these infants is key to the achievement of the United Nations Sustainable Development Goals target of reducing neonatal mortality to a level at least as low as 12 deaths per 1000 live births in all countries by 2030.[2]

Kangaroo mother care (KMC) is a method of caring for preterm and low birth weight infants that involves continuous and prolonged skin-to-skin contact between the family and the baby, exclusive breast milk or breastfeeding diet, and context-appropriate discharge and follow-up provided to the baby and family.[3] It is a proven, low cost, highly effective intervention to reduce neonatal mortality, particularly in low and middle-income countries (LMICs) where access to conventional neonatal intensive care is limited.[3,4] Other short-term benefits include decreased incidence of severe infections, improved thermal regulation, enhanced breastfeeding rates, and better overall growth and neuro developmental outcomes. The nurturing physical contact provided by KMC also supports the emotional well-being of both the infant and the parents and long-lasting social and behavioural protective effects have been reported.[5]

Historically, KMC was only offered once small or preterm babies had "stabilised". This practice resulted in many of the smallest and sickest babies missing out on the potential benefits as they died before starting KMC. Recent evidence has proven that immediate kangaroo mother care (iKMC) reduces mortality when initiated as soon as possible, even before physiological stabilisation.[6]

In Africa, the implementation of KMC varies widely across regions and facilities.[7,8] While some hospitals and clinics have integrated KMC into routine neonatal care, others face challenges due to resource limitations, lack

of trained personnel, and cultural barriers.[8,9] Immediate KMC is less commonly practiced, often due to a lack of understanding of its benefits, safety and practical issues such as space, staffing and supplies.[10] Several obstacles hinder the widespread adoption and effective practice of KMC and iKMC including cultural beliefs that may discourage prolonged skin-to-skin contact, lack of awareness or misinformation about the benefits of KMC among healthcare providers and parents, and infrastructural constraints such as inadequate space and privacy in healthcare settings.[7] Additionally, there may be resistance to changing long-standing practices or a lack of policy support at the institutional or national level.[11,12]

The Africa Neonatal Network (ANN) is committed to advancing neonatal care across its member countries, including Ethiopia, Nigeria, Rwanda, Uganda, and Zimbabwe. One of the key focus areas for ANN is the promotion and implementation of KMC. The objective of this paper was to describe the current practice of KMC within our member hospitals, focusing on inputs, processes and outputs.

Methods

Data collection was conducted in 14 African Neonatal Network (ANN) member hospitals across five countries: Ethiopia, Nigeria, Rwanda, Uganda, and Zimbabwe.

Vermont Oxford Network (VON) conducts an annual survey for members that was co-developed with ANN faculty members, which includes information on the hospital setting, number of beds and admissions, staffing, obstetric service, follow-up clinic, resuscitation and essential newborn care, transfers and transport, family-centred care, services provided by the neonatal unit, guidelines in the neonatal unit, quality assurance/ continuous quality improvement, and level of neonatal care. Participation in the membership survey is mandatory. The responses used for this manuscript are from 2023.

In October 2023, the ANN conducted a health facility assessment to collect more detailed information on buildings and facilities, medications, diagnostics and consumables, equipment, staffing, governance, thermal regulation, foetal transition, nutrition, family-centred care, kangaroo mother care, infection prevention and control, and perceived priorities.

Tables of hospital-level measures include data from both the membership survey and the health facility assessment. All analyses are descriptive.

In March 2024, hospitals were asked to take one day in one week to answer questions on up to 40 infants. The questions related to whether babies < 2000g were receiving KMC, IV fluids or CPAP (see appendix 1). Results were tallied centrally and shared with the teams.

The collaborative QI project and subsequent assessments received individual and hospital institutional research and ethics review approvals at the start of the collaborative and learning initiative.

Results

One hospital of 14 reported having an iKMC unit, four were in the process of opening an iKMC unit, four were actively considering opening an iKMC unit but had not yet started the process, and five were not yet considering opening an iKMC unit but were amenable to the idea if resources were available. The perceived obstacles to opening an iKMC unit are shown in Figure 1. Space, staff, equipment, and safety were among the top major obstacles, with units noting they would not be able to open an iKMC without major investment to overcome these barriers.

Twelve of the hospitals had a protocol regarding KMC which was used consistently, one hospital had such a protocol but use was reported as inconsistent, and one hospital did not have a KMC protocol. Five hospitals provided KMC garments to families. All hospitals allowed a person other than the mother to provide KMC. Ten of 14 hospitals (71%) reported having a dedicated KMC follow up clinic to monitor growth and nutritional status following discharge from the NICU hospitalization.

Units were asked to consider specific hypothetical clinical situations for infants born weighing 1200 grams at birth and report how often they thought such infants would receive at least 1-2 hours of skin-to-skin care in their unit (Fig 2). The likelihood that very low birth weight infants would receive skin-to-skin care varied depending on the level of respiratory support, and on the infant's age. Only three hospitals (21%) reported that most infants born at 1200 grams on CPAP on their first day of life would receive skin-to-skin care, but provision of skin-to-skin care increased in infants needing less respiratory support and as the babies got older.

On the day of the audit, 66/132 (50%) of infants with birth weight < 2000 grams were receiving skin-to-skin care with a range at the unit level from 0% to 100%, while 57/132 (43.2%) of babies had received at least 18 hours of skin-to-skin care in the preceding 24 hours. Of the infants that were receiving skin-to-skin care at the time of the audit (66/132), 86% (57/66) were receiving continuous KMC with at least 18 hours of skin-to-skin care in the preceding 24 hours. Five hospitals reported no babies had received at least 18 hours of skin-to-skin care, but five hospitals reported over 50% of infants weighing < 2000 grams had received at least 18 hours of skin-to-skin care in the preceding 24 hours.

Fig 1: Barriers to immediate kangaroo mother care at 14 African Neonatal Network hospitals

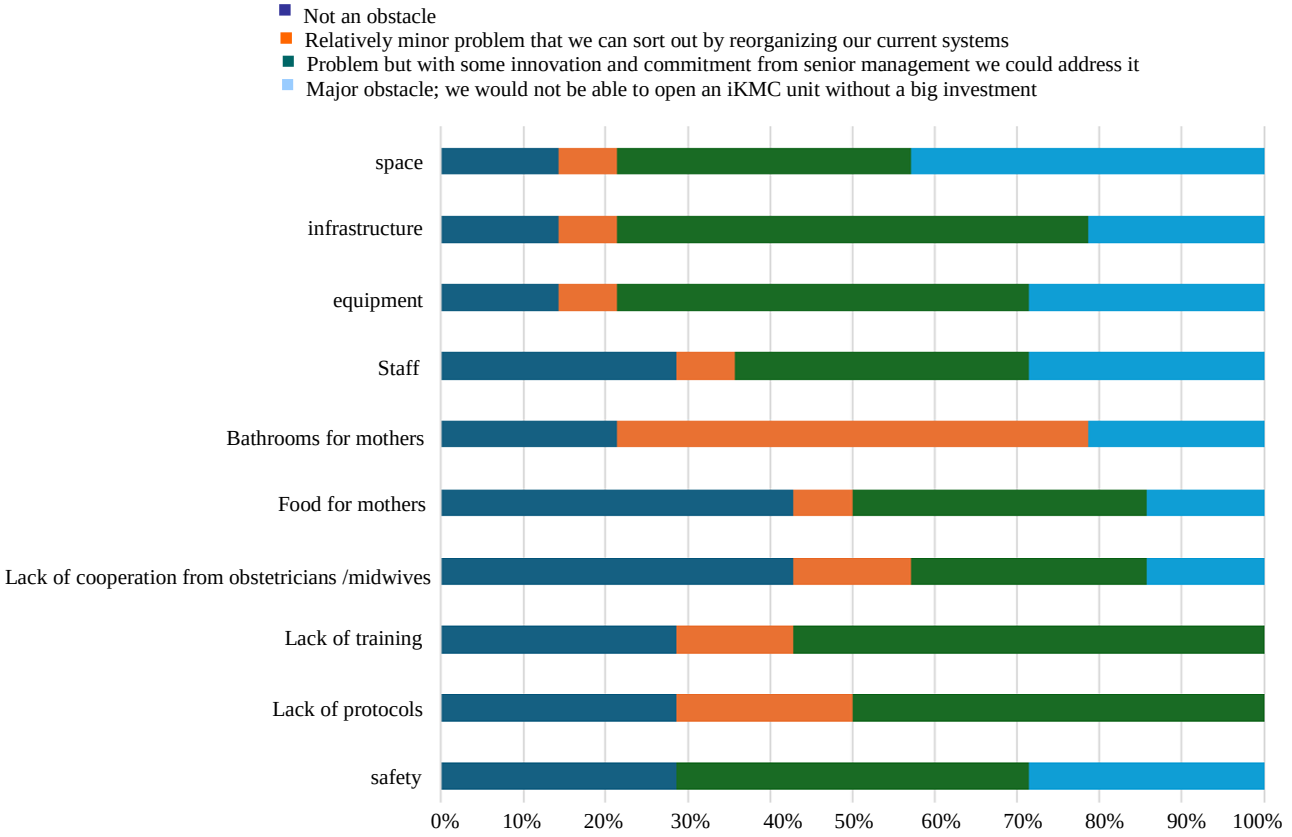
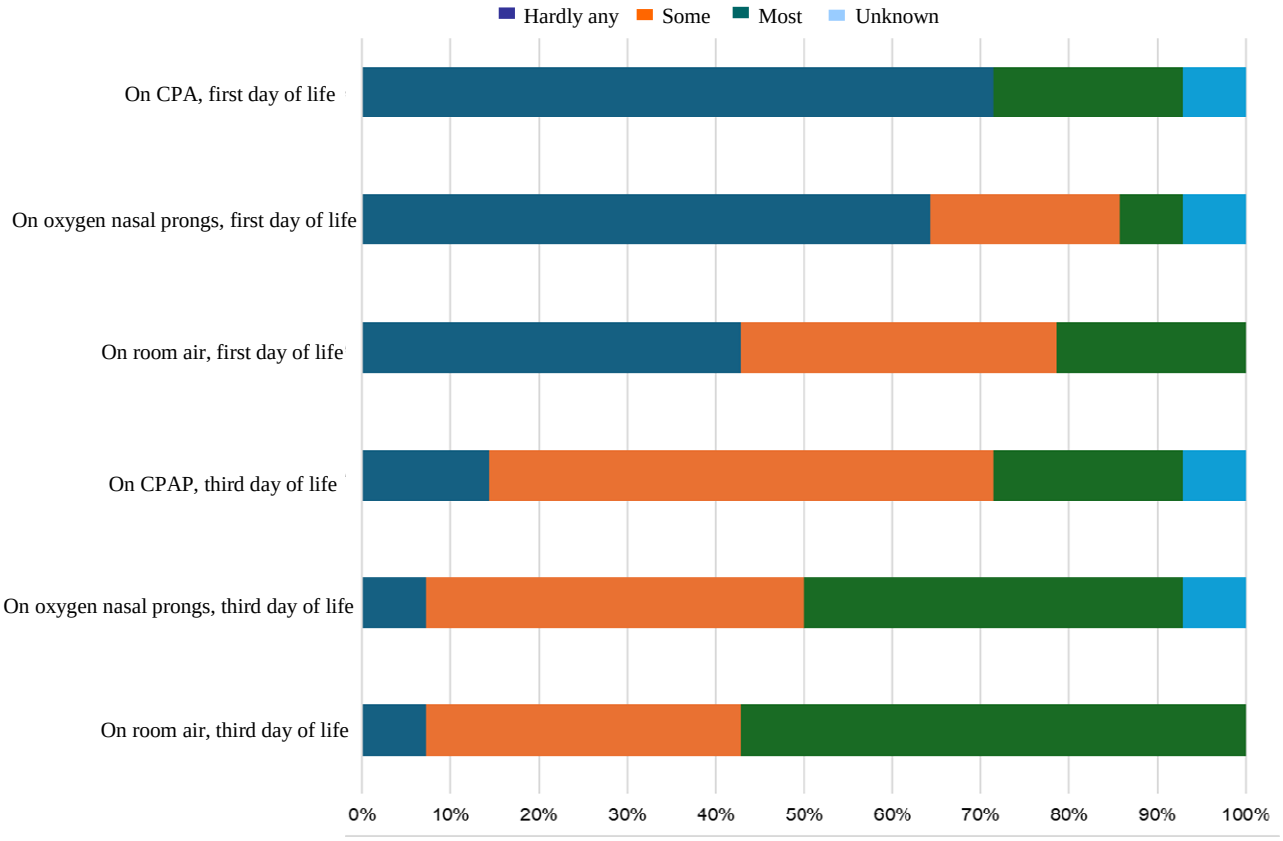


Fig 2: Proportion of infants born at 1200 Grams who would we able to receive 1 to 2hours of KMC per day at 14 African neonatal network Hospitals by under various care scenarios



Discussion

This study described the current KMC practice at 14 ANN hospitals in five African countries and explored barriers to increasing the provision of KMC and iKMC to babies at those hospitals. Despite the evidence for the benefit of both KMC and iKMC, the uptake of these practices remains sub-optimal. The audit revealed a wide variation in the provision of KMC across units, ranging from 0% to 100%, which highlights an opportunity to standardise care.

In the same cohort of ANN hospitals in 2024, 62.6% of infants weighing < 2000 grams at birth received any KMC.[13] With a historical practice of only providing KMC to babies who were felt to be physiologically stable, it was unsurprising to see that hospitals felt less inclined to provide KMC to babies who needed higher levels of respiratory support and were also less likely to provide KMC on day one compared to day three. These findings highlight the need to educate about the evidence supporting provision of KMC to the sickest and smallest babies, who may be the ones to benefit most from KMC.

This study found that the main perceived barriers to the roll out of iKMC included space, staff, equipment and infrastructure. As Henderson *et al*. reported in this same cohort of sites, space is an issue - hospitals reported a median of 8 (IQR: 4, 9) KMC beds and 4 (IQR: 4, 7) iKMC beds.[14] Still, attempts that address only one or two of these issues in isolation will be unlikely to succeed. It is heartening that most of the units were either in the process of opening an iKMC unit or actively considering it. That said, besides the one established unit, no other iKMC units have since opened within the ANN, highlighting the challenges in establishing a new iKMC unit in a resource limited environment.

Health care workers' concerns about patient safety were also a perceived barrier, which is a consistent finding.[10,15,16] Historically, the World Health Organization (WHO) recommended starting KMC after an infant was stabilised in an incubator or warmer, which can take up to a week. However, the iKMC Study, a randomised, controlled trial in five hospitals in Ghana, India, Malawi, Nigeria, and Tanzania, found lower mortality at 28 days for infants born < 2000 grams who received iKMC.[6] As such the WHO now recommends KMC should be initiated as soon as possible after birth, including before stabilisation.[17] Training for health care workers on safe KMC practices can be successful when provided as part of a quality improvement initiative.[18]

KMC is not a binary intervention but exists on a spectrum of duration and timing of initiation. Even without additional physical resources, facilities can enhance both the quantity and quality of KMC within their existing constraints. This concept of "maximal KMC"—doing the best possible with what is currently available—should be actively promoted, even as efforts continue to secure the resources needed for universal implementation of immediate and continuous KMC.

This study has limitations. By nature of being surveys, both the membership survey and health facility survey suffered the limitations and biases associated with survey type research including self-reporting and recall biases. Although all participating hospitals in the ANN completed the surveys, limiting participation bias, the units participating in the ANN cannot be thought of as representative of the wider African contexts.

It will be important to monitor and report changes over time in both the resources available and the practice of KMC and iKMC across facilities in the ANN. Incorporating family perspectives and feedback will add valuable insight into implementation and acceptability. Key research priorities include identifying which infants benefit most from iKMC to optimize resource allocation, evaluating the feasibility of initiating iKMC and CPAP at referring facilities and during transport, adequately supporting families to provide iKMC and KMC in the hospital setting and assessing both the efficacy and implementation of these approaches. Additionally, the mental health benefits for families and infants, as well as discharge planning, follow-up, and long-term outcomes, warrant further investigation.

To support more effective quality improvement, there may be a need to enhance the granularity of data, particularly around KMC duration, which is known to be closely linked to improved outcomes. Significant work remains to deepen our understanding of optimal implementation strategies, as well as the economic and cost considerations involved in scaling KMC equitably and sustainably.

Conclusion

This study provides an overview of the resources and practices of KMC and iKMC in hospitals within the African Neonatal Network. Although KMC is being implemented, significant variability exists, highlighting opportunities for improvement. Most hospitals reported similar challenges in establishing new iKMC units, emphasizing the need for targeted interventions and investments. Implementation research remains a priority.

Acknowledgments

We are indebted to our colleagues at the following hospitals who submit data to VON on behalf of infants and their families: St. Paul's Millennium Medical College, Addis Ababa, Ethiopia; Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia; Tirunesh Beijing Hospital, Addis Ababa, Ethiopia; Assosa Hospital, Asosa, Ethiopia; Hawassa Referral Hospital, Awassa, Ethiopia; Ayder Hospital, Mekelle, Ethiopia; Sacred Heart Hospital,

Abeokuta, Nigeria; Federal Teaching Hospital Ido-Ekiti, Ekiti, Nigeria; King Faisal Hospital, Kigali, Rwanda; Mengo Teaching Hospital, Kampala, Uganda; St Francis Nsambya Hospital, Kampala, Uganda; Lubaga Hospital, Kampala, Uganda; Murambinda Mission Hospital, Harare, Zimbabwe; Neocare Baby Hospital, Harare, Zimbabwe.

Funding: Bill and Melinda Gates Foundation
INV-042791

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Appendix 1. Kangaroo Mother Care Audit Instructions

Please choose one day in the next 7 days to complete the audit.

For each infant who was born <2000 grams, please complete the attached sheet.

Put tally marks (or checkmarks) in the boxes for an infant.

When completed, count the number of tally marks in each column and record the totals at the bottom of the page.

NB: Anyone doing ward round can do this audit.

For example, an infant who was born at 1575 grams who is on IV fluids, not on CPAP, is in skin-to-skin care at the time that you see them during the audit, but has not been in skin-to-skin care for at least 18 hours – the row looks like this:

On IV Fluids?	On CPAP?	In Skin-to-Skin?	In Skin-to-Skin for >18 hours?
1		1	

Do the audit **only once** on **one day** in the next 7 days.

Do the audit on infants born <2000g. If you have 40 or fewer, stop when you have identified all infants during the time that you do the audit. If you have >40 infants, stop at 40.

In addition to the number of "yes" responses (boxes ticked), we will also need the <u>denominators</u>: out of how many infants. For example, 2 of 10 infants were on CPAP. If you have >40 infants, the denominator is 40.