Health system intervention packages on improving coverage of kangaroo mother care for preterm or LBW infants: a mixed-methods systematic review

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GWSPH Research Day

GW Public Health

Abstract

Introduction. Global coverage of Kangaroo mother care (KMC) remains low and health system intervention strategies that may improve coverage are not known.

Methods. We conducted a systematic review of studies evaluating the effect of health system intervention strategies for KMC implementation compared to no or different interventions, on KMC coverage in preterm or LBW infants. KMC coverage achieved by various studies was summarized. All included studies were classified as those that achieved increased KMC coverage (defined as ≥25% increase from baseline, with final coverage ≥50%) or low KMC coverage (defined as <25% increase from baseline or final coverage <50%). Studies that achieved increased KMC coverage were further classified based on the mean duration of skin-to-skin contact (SSC; hours per day) achieved. Health system interventions in different categories were summarized by WHO health system building blocks to understand factors linked to increased KMC coverage.

Findings. We identified 16 studies evaluating 15 health system intervention packages for KMC implementation that applied interventions in one or more health system building blocks that reported KMC coverage. All three studies that applied interventions across 5–6 building blocks (100%), two of the four studies that applied interventions across 3–4 building blocks (50%), and three of the nine studies that applied interventions across 1–2 building blocks (33%), achieved increased KMC coverage. Studies that did not achieve increased coverage had interventions primarily targeting health workforce and service delivery and were weak on leadership and governance, financing, and health information systems. All three studies that achieved increased KMC coverage with mean SSC ≥8h/d (100%), three of the five studies that achieved increased KMC coverage with mean SSC <8h/d (60%), and three of the eight studies with low KMC coverage (38%) had high-intensity interventions in at least one health system building blocks. High-level leadership engagement, KMC supportive policies, staff licensing, and facility standards regulations, strengthened numbers and capacity of nursing staff, government funding and expanded health insurance, wards with conducive environment, and recording KMC-specific indicators in clinical registers were key factors among studies that achieved increased KMC coverage.

Conclusion. High-intensity interventions across multiple health system building blocks should be used for equitable scale-up of KMC.

Objectives

There are few published data on population-based coverage of KMC, but it is known that the global KMC coverage remains low despite the long-standing WHO guidelines, country-level policies, and continued advocacy and efforts by global organizations

However, there has been no systematic review of evidence on how to take KMC to scale. Health system interventions to improve implementation and achieve high population-based coverage of KMC in infants born preterm or low birth weight are not known.

Therefore, we undertook the current review to understand which health system intervention strategies for KMC implementation increase its coverage in preterm or LBW infants.

Methods

Type of studies. We included interventional studies – randomized trials (individually randomized and cluster-randomized), non-randomized trials, before-and-after studies, interrupted time series, and repeated measure studies that evaluated the effect of health system interventions for KMC implementation meeting the quality criteria used by the Cochrane Effective Practice and Organisation of Care (EPOC) Group, applied in one or more of the WHO health systems building blocks, compared to no or different (non-health system) interventions, on KMC coverage in preterm or LBW infants. However, because of the paucity of studies, we also included uncontrolled before-and-after studies, which is a departure from the EPOC criteria. All studies that reported an intervention package directed at improving KMC coverage in facilities or communities irrespective of baseline KMC coverage and effect were considered for inclusion. We excluded studies that only sought to improve the duration of KMC and/or encourage earlier initiation.

Participants/population. Participants were preterm (born at <37 completed weeks of gestation) or LBW (birth weight <2500g) infants.

Interventions. We included studies that applied interventions in one or more health system building blocks for improving KMC implementation. KMC was defined as continuous and prolonged skin-to-skin contact (SSC) of the infant with the chest of the mother (or another caregiver), feeding exclusively with breast milk, with or without early discharge from the hospital for preterm or LBW infants. We included all studies that reported 'any KMC' i.e., irrespective of SSC duration, support for exclusive breastfeeding or breastmilk feeding or early discharge, as long as it was clear that the intention was to provide continuous and prolonged SSC beyond the first hour after birth. Studies which focused only on SSC in the first hour after birth for all or term normal birth weight infants were excluded. The interventions could have been applied at any scale or health system level, e.g., facility, home or community, or district or national levels, and could include one or more health system components to improve KMC practice. The health system actions were defined using the WHO health system building blocks framework.

Table 1. Subgrouping of studies using quantitative results on KMC coverage

Subgroups of studies	Color coding
KMC coverage increased ≥25% AND final coverage ≥50% AND mean SSC ≥8h/day	Dark green
KMC coverage increased ≥25% AND final coverage ≥50%; mean SSC <8h/d or not reported	Light green
KMC coverage increased <25% OR final coverage <50%	Red

Comparator. Comparison groups were those that received no intervention to improve KMC or a different package of interventions, i.e., not targeting any health system components defined in Table 2.

Table 2. Classification used for health system interventions for KMC implementation

Health system building block	Examples of interventions
Leadership and governance	• Involvement of National/State Government or hospital administration • National/State or hospital policies
Health financing	• Conditional cash transfers (demand side) • Pay for performance (supply side)
Health workforce	• Recruitment of staff • Capacity-building activities
Service delivery	• Improving facility-based services through various approaches including QI, changes in infrastructure, additional services like parental/family education and support, etc. • Community-based surveillance and support
Health information systems	• Generating/collecting intervention-specific data • Use of data to inform action
Equipment and supplies	• Supplies that are directly required for practicing KMC, e.g., KMC beds, reclining chairs, binders, etc.

Outcomes. The primary outcome was coverage of "any KMC", i.e., the proportion of eligible preterm or LBW infants who received 'any KMC' as defined above. The secondary outcome was the description of the components of the packages of health system intervention strategies that achieved increased (≥50%) coverage of 'any KMC'.

Search strategy. We systematically searched MEDLINE, Ovid, WHO Global Index Medicus, CINAHL, SCOPUS, Epistemonikos, and Web of Science, with no limit on language or date. The search was not limited by language, and all the potentially eligible studies were translated, if required, for inclusion in the review. The search was first done in August 2021, and updated in June 2022. A current update is underway.

Results

Figure 1. PRISMA flow chart

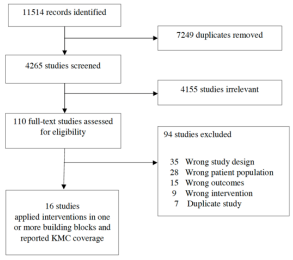

Table 4. Any KMC coverage and change in KMC coverage achieved by included studies by KMC coverage categories

KMC coverage categories	Study (author, year)	Any KMC coverage (Proportion of eligible preterm or LBW infants who received any KMC) Intervention group	Comparison group	Change in any KMC coverage from baseline	Mean skin-to-skin contact per day achieved
Coverage increase ≥25% AND final coverage ≥50% AND SSC≥8h/day	Mony 2021 (25)	2144/3686 (64%)[1]	0[1]	64%	≥8 hours per day prior to discharge
	Arora 2021 (26)	22/27 (82%)	34/64 (53%)	29%	≥8 hours per day prior to discharge
	Kapoor 2021 (35)	92/92 (100%)	66/88 (75%)	25%	≥8 hours per day prior to discharge
Coverage increase ≥25% AND final coverage ≥50%	Joshi 2022[#] (28)	76/100 (76%)	30/100 (30%)	46%	6 hours per day during hospital stay
	Minot 2021 (30)	31/37 (84%)	1/15 (7%)	77%	Not reported
	Hendricks-Munoz 2014 (31)	67/78 (86%)	9/34 (26%)	60%	About 4 hours per day during hospital stay
	Calibo 2021 (24)	253/478 (53%)	19/179 (11%)	42%	Not reported
	Mondkar 2021 (29)	81/114 (71%)	49/113 (43%)	28%	Not defined, but "extended KMC", likely to be at least 6 hours per day during hospital stay
Coverage increase <25% OR final coverage <50%	Panda 2021 (27)	5/10 (50%)	3/8 (38%)	12%	Not reported
	Prashantha 2019[#] (36)	42/100 (42%)	2/100 (2%)	40%	Not reported
	Vesel 2013 (21)	190/375 (51%)	105/370 (28%)	23%	Not reported
	Hodgins 2020 (22)	186/503 (37%)	96/649 (15%)	22%	Not reported
	Nation 2021 (34)	15/24 (63%)	13/25 (52%)	11%	Not reported
	Kabir 2022 (23)	9174/226 (22%)	37/792 (5%)	17%	Not reported
	Spira 2018 (Nepal) (32)	23/124 (19%)	29/127 (23%)	4%	Not reported
	Spira 2017, (Uganda)[#] (33)	12/20 (60%)	29/36 (81%)	-21%	Not reported

[1] *Combined data from seven different sites where coverage varied from 55% to 85%;* [2] *None of the hospitals in the study areas provided KMC at baseline*
[3] *Study reported only in percentage, denominator assumed to be 100 for both groups*
[#] *Combined data from two hospitals*

Quantitative assessment of KMC coverage. Eight of the 16 studies achieved increased KMC coverage with final KMC coverage ≥50% and an increase of ≥25% from baseline (Table 3). Of these, three studies reported SSC duration ≥8 hours per day. One was large mixed methods implementation research study conducted in 8.7 million population in India and Ethiopia, that achieved a final KMC coverage (SSC for ≥8 hours per day) of 55–85% at different sites, with an increase in the population-based coverage of KMC by more than 75% across seven sites in the two countries. The mean duration of skin-to-skin contact was 9.6 to 12.0 h/d in India sites and 11.6 to 14.9 h/d in Ethiopia sites.

Qualitative analysis of health system interventions by KMC coverage categories. A higher proportion of studies that applied interventions across more health system building blocks achieved increased coverage:

- All three studies (100%) that applied interventions across 5–6 building blocks achieved increased coverage: Mony 2021, Arora 2021 and Calibo 2021
- Two of the four studies (50%) that applied interventions across three to four building blocks achieved increased coverage: Minot 2021, Mondkar 2021, Prasantha 2019, and Kabir 2022 applied interventions across 3–4 building blocks but only Minot 2021 and Mondkar 2021 achieved increased coverage.
- Three of the nine studies (33%) that had interventions across one to two building blocks attained increased coverage. Of the rest nine studies, only three studies, i.e., Kapoor 2021, Joshi 2022 and Hendricks-Munoz 2014 achieved increased coverage.

Conclusion

The review findings suggest that a higher proportion of studies that applied interventions across more health system building blocks achieved increased KMC coverage– 100% studies that applied interventions across 5–6 building blocks, 50% studies that applied interventions across 3–4 building blocks, and 33% studies that applied interventions across 1–2 building blocks achieved increased coverage.

Table 6. Summary of key interventions required to achieve increased KMC coverage.

HS BBs	Key interventions
Leadership and Governance or Policy	1. High-level leadership engagement 2. KMC supportive policies & regulations on staff licensing and facility standards
Health workforce	3. Ensure adequate nursing staff with strengthened competency and motivation to support KMC 4. Engagement of professional organizations, KMC 'champions', maternal-neonatal staff collaboration
Health financing	5. Govt. finding of KMC wards, human resources, running costs 6. Expanded health insurance for small babies
Service delivery	7. KMC wards with a conducive environment (infrastructure, support, and counselling) 8. Community engagement to promote KMC 9. Early identification and facilitated referral of LBW babies
Health information systems	10. Recording KMC (clinical registers) using KMC specific indicators in routine data systems
Supplies	11. KMC beds, chairs, and garments

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