Office of Evidence Based Practice (EBP) – Critically Appraised Topic: Kangaroo Mother Care

Specific Care Question

Among infants in the Intensive Care Nursery what kinds of nursing actions or interventions increase the percentage of eligible infants who receive Kangaroo Mother Care (KMC)?

Question Originator

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Literature Summary

Background. Reducing infant mortality rates has been an objective of Healthy People 2020 since its inception in 2006 (The Office of Disease Prevention and Health Promotion, 2018). However, based on data from 2010 when comparing the U.S. with 11 other industrialized nations the U.S. ranks tenth with a morality rate of 4.2 per 1,000 live births (MacDorman, Mathews, Mohangoo, & Zeitlin, 2014). In 2016, the state of Missouri ranked 34th out of the 50 states with an infant mortality rate of 6.5, Kansas ranked 22nd with a rate of 5.9; in 2014 these rates were 6.1 and 6.3 respectively (Centers for Disease Control and Prevention, 2018).

Low birthweight (LBW) has been defined as weight at birth of less than 2500 gm, irrespective of gestational age (Lawn et al., 2014; United Nations Inter-agency Group for Child Mortality Estimation (UN IGME), 2015). LBW has been associated with infant mortality (Lawn et al., 2014; UN IBME, 2015). Modern neonatal care requires trained professionals and is costly (Conde-Agudelo & Diaz-Rossello, 2016). Modern neonatal care is needed during stabilization until the time the infant adapts to extrauterine life (Conde-Agudelo & Diaz-Rossello, 2016). Since 1978, researchers have been testing KMC on LBW infants to reduce mortality and associated cost of care. Based on research findings, the World Health Organization (2018) and the American Academy of Pediatrics (2015) support the use of KMC in pre-term infants.

Skin-to-skin contact (SSC) has been a key aspect of KMC since its inception. In SSC, infants are placed vertically between the mother's breasts and firmly attached to the chest for as long as the dyad could tolerate it (G. J. Chan, Valsangkar, Kajeepeta, Boundy, & Wall, 2016). SSC can be performed by the infant's other family members. The other two components of KMC are (a) breastfeeding (frequent and exclusive or nearly exclusive) and (b) early discharge from the hospital with strict follow up, regardless of gestational age or weight (G. J. Chan, Valsangkar, et al., 2016).

The date in which Children's Mercy—Kansas City first initiated KMC is unknown though the implementation of this intervention is not universal.

Study characteristics. The search for suitable studies was completed on January 30, 2018. One hundred and seventy nine articles were identified in the PubMed search. When limited to systematic reviews (SR) four were identified (G. Chan, Bergelson, Smith, Skotnes, & Wall, 2017; G. J. Chan, Labar, Wall, & Atun, 2016; Seidman et al., 2015; Smith, Bergelson, Constantian, Valsangkar, & Chan, 2017). One additional article was identified during an ancestry search of the SR references (Conde-Agudelo & Diaz-Rossello, 2016). After an in-depth review, the four original SRs were found to answer the question.

Key results. Based on very low quality evidence, there is a strong recommendation to integrate enabling interventions to increase the percentage of eligible infants who receive Kangaroo Mother Care. The literature review provides enablers and barriers identified from the caregiver (parents and families) and health system perspective. These enablers and barriers provide countermeasures the ICN might implement.

Three of the four SRs (G. Chan et al., 2017; G. J. Chan, Labar, et al., 2016; Smith et al., 2017) appear to be written by the same authors with the same search strategy being employed. However, the first article (G. J. Chan, Labar, et al., 2016) is the foundational article that identified six themes (buy-in and bonding, social support, time, medical concerns, access and context) from the literature. The two remaining SRs used the six themes to analyze the enablers and barriers from the caregiver's (mothers, fathers, and families) perspective (Smith et al., 2017) and the health

system perspective (G. Chan et al., 2017). The fourth SR analyzed the literature to identify barriers and facilitators from the mother or father's perspective (Seidman et al., 2015).

KMC is multi-faceted. If employed, it appears to have an impact on parental empowerment. In addition, the cost of care burden may be decreased with this intervention.

Summary by Outcome

Enablers that increase the percentage of eligible infants who receive KMC. Caregivers identified enablers for KMC were either experiential in nature (such as family bond developed, feelings of confidence, ease of practice, promotion of emotional well-being) or resource dependent. Resource dependency included support from family, friends, and support from health system providers. Primarily resource dependency within a health system included facility and provider enablers. Facility enablers were increased awareness of the health system endorsing KMC through the development of a standardized provider approach to caregivers about KMC including written protocols and checklists, posters, the use of KMC metrics on unit metrics and the provision of a private and relaxed atmosphere for the parent and infant. Provider enablers included increasing KMC experience by practicing moving an infant onto the caregiver's chest with invasive lines in place, creating an environment in which the health care team can access the infant when needed during KMC, and expanding the knowledge of KMC to other allied health professionals.

Barriers that decrease the percentage of eligible infants who receive KMC. Caregivers identified barriers for KMC to be experiential, sociocultural, or resource dependent. KMC did not occur if the caregiver's perceived the infant did not enjoy it or the infant had an increased risk of being hurt with KMC; providers' were unable to explain the benefits of KMC, caregivers perceived KMC was forced on them or caregivers experienced physical discomfort in sitting for long periods of time with KMC. Sociocultural barriers revolved around societal norms (older generations) influencing caregivers not to employ KMC. Resource dependent barriers included facility and provider concerns. Facility barriers included lack of a private, quiet environment and staff shortages. Provider concerns included that KMC was not based in evidence, KCM was a barrier to providing excellent care, inconsistent use of KMC within the system, KMC protocols were perceived as inflexible, KMC increased provider workload.

Search Strategy and Results (see PRISMA diagram)

"Kangaroo-Mother Care Method"[Majr] Filters: 10 years, Humans, English. One hundred and seventy nine citations identified, when limited to SRs four were identified. One additional article (Conde-Agudelo & Diaz-Rossello, 2016), a meta-analysis (MA), was identified during an ancestry search of the SR references. After an in-depth review, the four original SRs were found to answer the question.

Studies Included in this Review

Chan et al. (2017)
Chan, Labar, et al. (2016)
Seidman et al. (2015)
Smith et al. (2017)

Studies Not Included in this Review with Exclusion Rationale

Authors (YYYY)	Reason for exclusion
Conde-Agudelo and Diaz-Rossello (2016)	Reported outcomes did not include enablers and barriers.

Method Used for Appraisal and Synthesis

The Cochrane Collaborative computer program, Review Manager (Higgins & Green, 2011)[a] was used to synthesize the four included studies.

[a]Higgins, J. P. T., & Green, S. e. (2011). *Cochrane Handbook for Systematic Reviews of Interventions [updated March 2011]* (Version 5.1.0 ed.): The Cochrane Collaboration, 2011.

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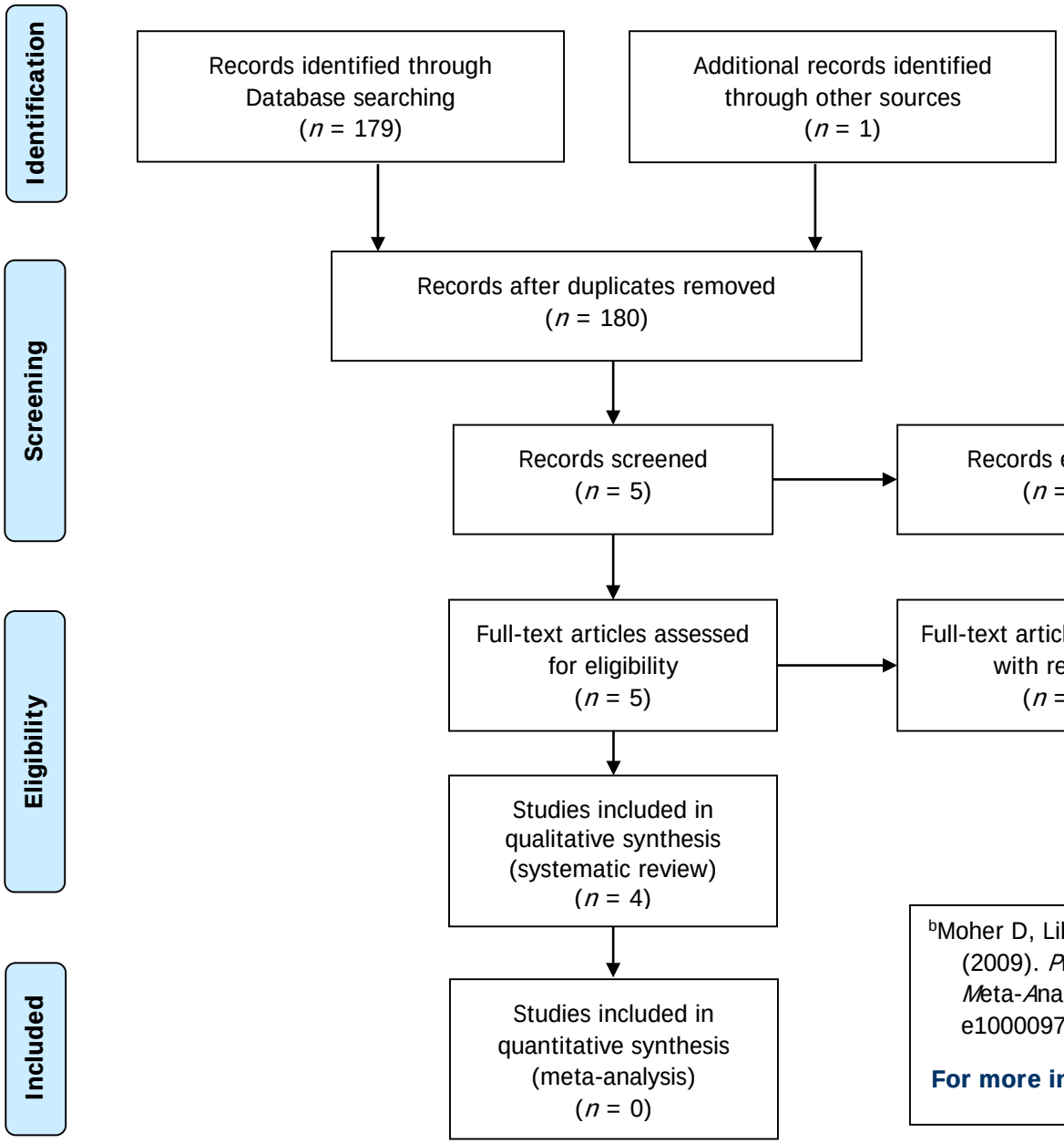
Figure 1. Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRIMSA)[b]



[b]Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

Literature Characteristics.
Chan 2016

Study Type	Systematic Review
Background	**Objectives:** To investigate factors influencing the adoption of kangaroo mother care in different contexts. **Research questions:** N/A **Participants:** Population of interest included mothers, newborns, or mother-newborn dyads that practiced KMC, and health-care providers, health facilities, health systems, and communities that have implemented KMC. **Interventions:** Implementation of kangaroo care. The promotion of skin-to-skin contact for as long as possible once the infant was stabilized. Frequency and duration of skin-to-skin contact was not defined. **Co-medications:** N/A **Comparators:** N/A **Outcomes:** Identification of barriers to KMC implementation or enablers for successful implementation
Methods	**Eligibility criteria**: Studies were included if there was identification of: • barriers to KMC implementation, or • enablers for successful KMC implementation. Studies were excluded if: • human subjects were not used as study participants, or • primary data collection did not occur. **Information sources**: • PubMed, Embase, Web of Science, Scopus, African Index Medicus (AIM), Latin American and Caribbean Health Sciences Literature (LILACS), Index Medicus for the Eastern Mediterranean Region (IMEMR), Index Medicus for the South-East Asian Region (IMSEAR) and Western Pacific Region Index Medicus (WPRIM) without language restrictions, from January 1960 to August 19, 2015 • Search terms included “kangaroo mother care” OR “kangaroo care” OR “skin-to-skin care.” • The reference lists of published systematic reviews and references of the included articles were searched. • The grey literature was explored for programmatic reports and the study team requested data from programs implementing kangaroo mother care. **Risk of bias:** • Two reviewers independently extracted data from identified articles using standardized forms to identify potential determinants of kangaroo mother care uptake, including data on knowledge, attitudes, and practices. • Reviewers compared their results to reach consensus and a third party broke ties. • To assess study quality, studies were evaluated in five quality domains: selection bias, appropriateness of data collection, appropriateness of data analysis, generalizability, and ethical considerations.
Results	**Included studies:** 112 studies. **Synthesis of results**: Six major themes concerning barriers and enablers were identified for implementation of kangaroo mother care: • buy-in and bonding, • social support, • time, • medical concerns, • access, and • context. **Description of the effect:** • Health care workers were critical for implementation in hospitals or health care facilities.

	• To support implementation of KMC context-specific materials such as training curriculums, job aids, and guidelines should be developed. • Contextual factors and sociocultural norms need to be considered.
Discussion	**Strengths and Limitations of evidence:** • Although 35% of the studies were completed in the Americas, it does not break out by country. • There are strong cultural biases that act as barriers to implementing KMC. **Interpretation:** A general theme was identified that if health care workers were to support KMC within facilities it is dependent on the support of management and institutional leadership.
Other	**Funding:** Saving Newborn Lives program of Save the Children Foundation, Inc. No conflicts of interest.

Chan 2017

Study Type	Systematic Review of Qualitative data
Background	**Objectives:** Barriers and enablers of Kangaroo Mother Care (KMC) implementation from the health care systems (HCS) perspective **Research questions:** What strategies can be employed to overcome barriers to implementation of KMC within health systems? **Participants:** Review of 2875 abstracts of which 86 were eligible for inclusion **Interventions:** Actions to promote KMC adoption within HCS **Co-medications:** N/A **Comparators:** N/A **Outcomes:** Implementation strategies for KMC adoption in HCS
Methods	**Eligibility criteria**: Studies were included if there was identification of: • primary data on barriers or enablers to KMC implementation Studies were excluded if: • primary data collection did not occur. **Information sources**: • Embase, Scopus, Web of Science, PubMed and World Health Organization Regional Databases, • Search terms used 'KMC' or 'kangaroo care' or 'STS care', • January 1, 1960 to August 19, 201, • Hand search of reference list from included studies, published systematic reviews and data from programs implementing KMC **Risk of bias:** • Two independent reviewers used a standardized data abstraction form to assess eligibility and abstract data from each article. • Each eligible study was assessed for the potential risk of bias in five domains including: selection bias, appropriateness of data collection, appropriateness of data analysis, generalizability, and consideration of ethics. • The authors did not identify what process occurred if the literature reviewers did not agree about the inclusion of a study.
Results	**Included studies:** *N* = 86 studies **Synthesis of results:** *Overview of studies:* • Most studies had a sample size of < 50 participants (61.6%). • Nearly half of the studies were based on interview or survey data (47.7%). • One-third of the studies occurred in the Americas (32.6%). • Over half of the studies were based in a health care facility (58.1%). • One-third of the studies based in a neonatal intensive care unit (32.6%) while (9%) of the studies were either community or population based studies. The six themes are analyzed with barriers and facilitators identified:

1. Caregiver Buy-in
   - Barriers:
     - HCWs
       - KMC benefit based on perception not science,
       - inconsistent use of KMC within a facility, and
       - concern for stability of an infant.
     - HCS
       - reluctance to allocate space for SSC, and
       - high leadership turnover.
   - Facilitators:
     - HCWs
       - experience with KMC, and
       - nurses more likely to employ KMC if they believed it worked.
     - HCS
       - companions for mothers promoted KMC, and
       - posters of KMC in the facility.
2. Support and empowerment
   - Barriers:
     - HCWs
       - lack of leadership / management support,
       - newborn care was not a priority for the HCS,
       - parents and visitors seen as a barrier, and
       - limited communication between HCWs.
     - HCS
       - KMC protocols perceived as inflexible.
   - Facilitators:
     - HCWs
       - management mobilizes resources,
       - nurse involved in care related decision making, and
       - other allied health members support KMC.
     - HCS
       - Companions for mothers promoted KMC.
3. Time
   - Barriers:
     - HCWs
       - HCW belief that KMC takes too much time thereby increasing workload.
     - HCS
       - staff shortages,
       - limited visitation time,
       - limited parental access, and
       - visitors were an obstacle to breastfeeding and KMC performance.
   - Facilitators:
     - HCWs
       - some nurses reported that KMC did not increase the amount of time spent with patient/family.
     - HCS
       - greater or unlimited visitation time enhanced support from family and promoted KMC, and
       - KMC ward.
4. Medical concerns
   - Barriers:
     - HCWs
       - did not believe KMC was safe, and
       - staff not trained in preterm care.
     - HCS
       - few NICUs had written KMC protocols,

	▪ no checklist for KMC admission procedures, and ▪ follow-up and discharge procedures not well structured. • Facilitators: o HCWs ▪ practicing securing catheters lowered nurses' concerns, and ▪ nurses with five or more years of experience more likely to implement KMC. o HCS ▪ few NICUs had written KMC protocol, ▪ no checklist for KMC admission procedures, and ▪ follow-up and discharge procedures not well structured. 5. Access to training and resources • Barriers: o HCWs ▪ KMC training not part of orientation curriculum, and ▪ lack of training led to conflicting knowledge on time and duration for KMC. o HCS ▪ lack of privacy, ▪ space limitations, and ▪ cost of KMC resources. • Facilitators: o HCWs ▪ expanding training to other health care personnel besides nurses. o HCS ▪ access to private space/screens, and ▪ relaxed atmosphere with dim lighting. 6. Cultural norms • Barriers: o HCWs ▪ traditional newborn care, such as bathing and dressing of infants to promote temperature control, delayed SSC, and ▪ in warm climates staff did not believe hat and socks were necessary. o HCS ▪ no record of SSC, ▪ difficulty adapting/teaching electronic medical records for KMC, and ▪ implementing continuous KMC was difficult. • Facilitators: o HCWs ▪ some HCWs advised mother to delay bathing so infant would not get cold. o HCS ▪ include KMC in heath facility statistics. **Description of the effect:** KMC is a complex intervention which requires a multi-factorial approach for implementation.
Discussion	**Strengths and Limitations of evidence:** Strengths: • Comprehensive collection of studies of KMC research and implementation programs, Limitations: • Majority of studies came from areas with neonatal mortality rates (NMR) of <15 per 1000 live births, • KMC protocols are distinctly dependent on infant population, including preterm and low birth weight infants, **Interpretation:** KMC is a complex intervention with unique barriers and enablers at both healthcare worker and facility levels. Further research is needed to test models that address the barriers and support facilitators in order to promote and implement context-specific health system changes for greater KMC adoption.

Other	**Funding:** The Saving Newborn Lives Program of the Save the Children Federation, Inc.

Seidman 2015

Study Type	Systematic Review
Background	**Objectives:** Identify the most frequently reported barriers and enablers to KMC for mothers, fathers, and healthcare practitioners. **Research questions:** 1. What are the most frequently cited barriers that could prevent a mother from successful practicing of KMC? **2.** Are there any key positive factors that enable a mother to practice KMC? **Participants:** Mothers, fathers, nurses, other healthcare providers **Interventions:** • Documented implementation of KMC, Skin –to-Skin (STS), or • Other interventions related to Reproductive, Maternal, Newborn, & Child Health and Nutrition (RMNCH&N) that may have included KMC / STS, or • The publication had relevant information on specific barriers to implementation. **Co-medications:** N/A **Comparators:** N/A **Outcomes:** 1) Frequency with which a barrier / enabler was mentioned across publications • Outcomes further divided into sociocultural, resourcing, and experiential categories
Methods	**Eligibility criteria**: Studies were included if the study: • was included any of the interventions above, • was published in a peer-reviewed journal, • included data on the sample population, sample size, and location of implementation, • was original research, and • was published in English. Studies testing the efficacy of KMC or STS practice (e.g. randomized controlled trials) were included if issues of acceptability, feasibility, or barriers to practice for parents or practitioners were documented in the abstract. Any publication published before August 13, 2013 (the date of the final database search) was eligible for inclusion. Studies were excluded if they were: • a literature review, • conference proceeding, • letter to the editor, or • abstract only in order to prevent double counting of data and to ensure that all barriers were understood in the context of the entire study. **Information sources**: • PubMed, EMBASE, Scopus, Web of Science, and the WHO Regional Databases (AIM, LILACS, IMEMR, IMSEAR, and WPRIM) were searched through 2013. • Search terms included: "Kangaroo Mother Care" OR "Kangaroo Care" OR "Skin to skin care". • Reference lists from literature reviews were scanned for relevant articles. • Recommendation for studies to be included were also accepted from participants at the KMC Acceleration Meeting in Istanbul, October 2013 and in consultation with leaders in the fields of KMC and newborn health. **Risk of bias:** • Two independent reviewers screened the titles and abstracts, these reviewers also abstracted the data from the included articles. • A third reviewer independent assessment related to screening and abstracting results. • Due to limited data on this topic all relevant articles were included, even if barriers/enablers were not the primary focus of the article or were observational in nature.

	• Methodology was developed to weight findings from each publication based on the way in which the data was identified and captured (indirect, exploratory, systematic, or prioritized), with prioritized being the highest weighted due to highest degree of focus on barriers to KMC. This application has been used in other public health systematic reviews; however this approach has not been validated.
Results	**Included studies:** • 103 articles o 9 prioritized o 48 systematic o 31 exploratory o 15 indirect • Number of participants not reported **Synthesis of results:** The top five barriers identified by mothers were resource (defined as any barrier which would need to be overcome by changing the quality or quantity of resources dedicated to supporting KMC practice) and experiential in nature (defined as any barrier directly related to the experience of practicing KMC; which is specific to the individual, rather than broader society). • Resource barriers were: o issues with facility environment / resources, o negative impressions of staff attitudes or interactions with staff, o lack of help with KMC practice and other obligations, and o low awareness of KMC / infant health. • Experiential barriers identified: o Fear / anxiety of hurting infant. The top five enablers identified by mothers fall within experiential and resourcing (definitions above). • Experiential enablers were: o mother-infant attachment, o feelings of confidence / empowerment, and o ease of practice / preference over traditional care. • Resource enablers identified were: o support from family, friends, and other mothers, and o support from staff or community health worker. Resourcing (definition above) and sociocultural factors (defined as any barrier related to the unique aspects of the culture in which the parent was living or practicing KMC; this is more general to society, and less specific to the individual) emerged as the top five barriers to KMC adoption for nurses.* • Resourcing barriers were: o actual increased workload / staff shortages, and o lack of clear guidelines / training. • Sociocultural barriers were: o general lack of buy-in / belief in efficacy, o concerns about other medical conditions / care, and o belief that KMC causes extra work. *Note a data point was counted in the "Concerns about other medical conditions / care" category when the publication indicated that nurses' beliefs countered guidelines for KMC practice or when there was lack of consensus among nurses about whether KMC was safe to practice when an infant had a certain condition. Data for fathers, community health workers, and physicians was less than mothers and nurses and therefore these findings were amalgamated as a whole by the authors. Due to the heterogenous nature of the population the findings are not discussed in this analysis. **Description of the effect:** • Implementing interventions to enhance the enablers and mitigate the barriers surrounding KMC is needed.

Discussion	**Strengths and Limitations of evidence:** • Due to limited data on this topic all relevant articles were included, even if barriers/enablers were not the primary focus of the article or were observational in nature. • Definitional challenges related to practice and implementation of KM limited the ability of the authors to pool results across different practice sites. **Interpretation:** • There is a general paucity of evidence which directly studies barriers / enablers to KMC. • The most commonly reported barriers for nurses were increased workload, lack of clear guidelines/training, general lack of buy-in, and concerns about other medical conditions. • Enablers were not discussed specifically for nurses but addressing the barriers would likely enable a higher degree of participation.
Other	**Funding:** Funding for this study was provided by the Bill & Melinda Gates Foundation. Funders were not involved in collection, analysis, or interpretation of data. Funders did review drafts of this manuscript. Employees of a for-profit company (Boston Consulting Group) were involved in writing this review, but the outcome of the engagement was not contingent upon the findings or analysis in this paper or any other part of the engagement with the foundation.

Smith 2017

Methods	Systematic Review
Background	**Objectives:** To identify barriers and enablers of implementation and scale up of KMC related to HCS enabling/deferring KMC. **Research questions:** What effect do health care systems have on caregivers (mothers, fathers, and families) KMC as enablers or inhibitors? **Participants:** Review of 1360 abstracts on KMC and skin to skin contact of the neonate, of which 98 full text articles were included in qualitative analysis **Interventions:** KMC includes the following: • early, continuous, and prolonged skin-to-skin contact between infant/caregiver, • exclusive breastfeeding, • early discharge from hospital, and • adequate support for caregiver/infant at home. **Comparators:** N/A **Outcomes:** Efforts to scale up and integrate KMC into health systems to reduce barriers, including those posed by HC workers, in order to promote the uptake of the intervention by caregivers.
Methods	**Study Eligibility criteria**: Inclusion criteria: • primary data collection, • KMC was individual exposure, • human subjects, • outcomes of interest measured, • full text articles, • barriers/facilitators of successful KMC implementation, and • not duplicate of previous data. **Information sources**: • search of PubMed, Embase, Web of Science, Scopus, WHO regional databases, • search terms used: 'kangaroo mother care,' or 'kangaroo care,' or 'skin to skin care', • data sources from 1960-August 2015 were included, with the majority of articles being published within the past 5 years, and • the study team also reviewed the references of published systematic reviews, searched unpublished programmatic reports, and requested data from the Saving Newborn Lives Program at Save the Children. **Risk of bias:** • Two independent reviewers used a standardized data abstraction form to assess eligibility and abstract data from each article. • If the literature reviewers did not agree about the inclusion of a study, a third reviewer broke the tie. • Each eligible study was assessed for the potential risk of bias in five domains including: selection bias, appropriateness of data collection, appropriateness of data analysis, generalizability, and consideration of ethics.
Results	**Included studies** *N* = 98 studies **Synthesis of results**: Most studies had less than 50 participants recruited from HC systems with the barriers / enablers to KMC uptake presented in themes: 1. Caregiver buy-in and bonding • Barriers: o mothers less likely to accept KMC if HC workers could not clearly explain the benefits, o parents were told to do KMC without an explanation left parents feeling as though KMC was force on them, and o parents perceived infant did not enjoy KMC. • Facilitators: o standardization of HCWs presentation of KMC to caregivers,

	o testimonials from other caregivers on the benefit of KMC, o infant slept longer, and o family bond developed. 2. Social support for caregivers • Barriers: o mothers experienced a lack of support from HC workers, o some hospital staff were resistant to family participation, o lack of privacy, o HC workers were occasionally considered to be loud and uncaring by parents and did not respect family privacy, and o parents identified that societal norms (older generations did not view KCM as appropriate newborn care, infant care should be provided by mothers only) influenced them to not employ KCM. • Facilitators: o equality of gender roles, o the presence of welled trained HCW in KMC made mothers' less apprehensive to practice, and o respected elders promote benefits of KMC. 3. Caregiver time for KMC adoption • Barriers: o commuting time to / from health care system, and o inability to afford commuting cost. • Facilitators: o unlimited visitation hours, o HC workers could access the infant during KMC, and o provide transportation financial support to caregivers. 4. Medical Concerns • Barriers: o maternal fatigue, o sitting long periods of KMC was difficult if mother or infant had mental / physical limiters (c-section, depressed, post-partum pain or infant distress respectively), and o caregivers discomfort sleeping upright. • Facilitators: o KMC helped mother's recover from post-partum depression, and o KMC helped to relieve stress and promote emotional well-being for the caregiver(s). **Description of the effect:** Lack of buy in, poor social support, lack of time at the hospital/home, and medical concerns about the mother/infant were barriers to caregiver adoption of KMC.
Discussion	**Strengths and Limitations of evidence:** • Strength: the research "draws on the rich body of qualitative research" to help HCW to understand barriers/facilitators of the KMC intervention. • Limitations: conclusions are limited by the existing body of evidence. Half of the considered studies were conducted in urban settings with low neonatal mortality. **Interpretation:** Interventions must be developed to mitigate caregiver barriers.
Other	**Funding:** Save the Children's Saving Newborn Lives program

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