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### **BMJ Open**

## Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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#### **ABSTRACT**

#### **Objectives**

To understand family and parent perspectives on essential care provided to infants in the first 28 days of life, in order to inform behavioral interventions for improving home care in low income countries, where the majority of newborn deaths occur.

#### Design

A comprehensive, qualitative systematic review was conducted. MEDLINE/PubMed, Embase, and Cumulative Index of Nursing and Allied Health databases were systematically searched for studies examining the views of parents and family members on newborn care at home. The search period included all studies published from 2006 to 2017. Studies using qualitative approaches or mixed-methods studies with substantial use of qualitative techniques in both the methods and analysis sections were included. Studies meeting the inclusion criteria were abstracted and evaluated using Critical Appraisal Skills Programme guidelines. Following the initial selection and appraisal, barriers and facilitators to recommended care practices across several domains were synthesized.

#### **Results**

Of 411 results retrieved, 37 met both inclusion and quality appraisal criteria for methodology and reporting. Geographic representation largely reflected that of newborn health outcomes globally, with the majority of studies conducted in the region of Sub-Saharan Africa and South Asia. Specific barriers and facilitators were identified among a range of domains including: cord care, drying and wrapping, thermal control, skin to skin contact, hygiene, breast feeding, care seeking for illness, low birth weight recognition. Cross cutting facilitators, common to all domains were also evident, including delivering at a health facility, including female relatives in counseling, lower health care costs, and exposure to newborn care messaging in the community.

#### **Conclusions**

When designing behavioral interventions to address newborn mortality at scale, policy makers and practitioners must include barriers and facilitators important to families in low income settings. **Review registration number** CRD42016035674.

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#### **Article Summary**

#### **Strengths and limitations:**

- Strengths of the review include having had a librarian/information scientist in the research team, and multiple reviewers experienced in qualitative research, data collection, and analysis.
- Another strength of the study was the comprehensive search strategy; assessment and scoring of quality and confidence placed in the findings based on guidelines; and a comprehensive description of study findings.
- Limitations included: the exclusion of documents not available in English, and those that may have been relevant but were outside the defined date limitations.

#### Introduction

Approximately 46% of all under-five deaths in 2016 occurred during the neonatal period, the initial 28 days following birth. Southern Asia and sub-Saharan Africa account for nearly 80 percent of the newborn deaths. By 2030, the Sustainable Development Goals (SDG) target to reduce neonatal mortality to at least as low as 12 per 1,000 live births. However, per current trends, over 50 countries will fail to meet this target on newborn survival. Yet, the majority of these deaths are preventable.

During the neonatal period, care provided by parents and caregivers is critical for newborn survival.<sup>3</sup> In order to ensure that newborns both survive and thrive, parents and caregivers must provide nurturing care in the form of good health, adequate nutrition, safety and security, and responsive caregiving.<sup>4</sup> The provision of quality, effective care at the home

and community level is critical for improving newborn health outcomes and promoting optimal early childhood development. A reduction in neonatal mortality by 25% can be achieved by scaling up community interventions alone. Although feasible interventions exist to reduce newborn mortality, uptake of the interventions is low.

In order to increase scale up of coverage and implementation of effective home and community-based newborn care practices, providing data on research priorities for newborn health is key. Researchers have identified specific domains related to caregiver perceptions and behaviors as priorities. Qualitative research was deemed particularly useful for obtaining information on newborn care practices, which vary based on the sociocultural context in low-income countries.

Despite the existence of multiple individual qualitative and formative research studies on home and community-based newborn care, a systematic review of the available qualitative research is lacking. Therefore, we conducted a systematic review to provide data to improve both programming and policy for home and community care for newborns.<sup>7</sup>

The primary objective of this study was to systematically review qualitative literature related to parent and family experiences with newborn care practice in low-income countries, synthesizing information related to barriers and facilitators to inform interventions focused on improving newborn survival, care and development.

#### Methods

This systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO): registration number CRD42016035674. The review followed

guidelines from the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) statement. Due to the emphasis on qualitative research, the review primarily employed the ENTREQ guidelines for reporting, while also drawing guidance from PRISMA, which is more specific to the requirements of quantitative literature reviews. 10,11

Newborn care practices were defined as all actions taken by parents/caregivers that provide for the essential biological, physiological and psychological needs of the newborn infant following delivery and up to the end of the newborn period (28 days of life). These included, but were not limited to, the essential newborn care practices as defined in the international reference literature such as cord care, drying and wrapping after delivery, initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness. 12

#### Inclusion and exclusion criteria

Studies were included if they used qualitative data collection methods such as interviews, focus groups, direct observation, and participatory action research. Inclusion requirements also stipulated that studies needed to have a well-described methodology section and a clear description of the qualitative data analysis methods and process (e.g., grounded theory, narrative analysis, content analysis, thematic analysis). Finally, data must have been directly obtained from parents or caregivers of newborns (infants under 28 days of age, including low birthweight or small babies), whether born at home or at a facility, with or without skilled attendance. Caregivers were defined as mothers/fathers or other adult family or community members who provided day-to-day physical and psychological support to meet the basic needs of newborn infants. Community health workers were not considered as caregivers.

Search strategy

Excluded studies were those for which it was difficult to extract qualitative data (e.g., mixed methods studies without clearly labeled data, or studies in settings where perceptions of parents/caregivers experiences of newborn care practices could not be clearly identified, such as summaries or aggregate data). Commentaries, protocols, and systematic reviews were not included in the analysis. Additionally, studies from countries other than those defined by the World Bank as low-income countries and lower-middle income countries (which have a Gross National Income per capita of less than \$4,125) were excluded.<sup>13</sup>

Studies published in English language from 2006-2017 were explored. The following electronic databases were searched: MEDLINE (PubMed), Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL: EBSCOhost). A health sciences librarian (RH) developed the database searching strategy and conducted the final searches. The initial search strategy was developed for MEDLINE and then adapted for other databases. Medical Subject Headings (MeSH) were used followed by free-text terms using controlled vocabulary (see the Appendix for a detailed description of the search strategy). Only articles in English were included due to potential difficulties in translating and interpreting foreign language qualitative data by native English-speaking reviewers, and to ensure that the review covered the most current literature on infant and young child feeding practices.

**Figure 1** presents the selection process which followed the PRISMA guidelines for reporting of systematic reviews. <sup>11</sup> Search results were initially imported into Endnote reference management software (Thomson Reuters (Scientific) LLC) and duplicates and irrelevant studies were removed. Four independent reviewers screened study titles and abstracts for suitability

against inclusion and exclusion criteria. The decision to include or exclude a study was required by two reviewers. If after consultation a decision wasn't reached, a third reviewer (AK) made the final decision.



## Figure 1. Selection flow chart of review process See attached figure file

#### Data extraction

For organization of extracted data, a unified matrix was utilized to record specific characteristics of included studies. Extracted data included reference details (author/data/publication), methodological approach (e.g., interviews/focus groups), conceptual framework (e.g., Grounded Theory), objectives or aims of the study, sampling methodology, socio-demographic characteristics of participants, country/region, and analysis method(s). The initial results of the selection process and data abstraction, with selected characteristics, are presented in **Table 1**.

#### Quality appraisal

Each selected article was initially assessed according to the Critical Appraisal Skills

Program checklist <sup>14</sup> to ensure quality and internal validity. Selected studies met minimum criteria defined through the checklist including domains such as appropriateness of study design, data collection techniques, and analysis methods. Appraisal results are presented in Table 2 using the following questions for analysis:

- 1. Was there a clear statement of the aims of the research?
- 2. Is a qualitative methodology appropriate?
- 3. Was the research design appropriate to address the aims of the research?
- 4. Was the recruitment strategy appropriate to the aims of the research?
- 5. Was the data collected in a way that addressed the research issue?
- 6. Has the relationship between researcher and participants been adequately considered?
- 7. Have ethical issues been taken into consideration?
- 8. Was the data analysis sufficiently rigorous?
- 9. Is there a clear statement of findings?
- 10. How valuable is the research?

Possible Responses: Yes, No, and Cannot assess due to missing information

#### Table 2. CASP Criteria Analysis

Following data abstraction, data from the results, discussion and conclusion sections were imported into NVivo 11 qualitative software (NVivo qualitative data analysis software; QSR International Pty Ltd. Version 11, 2015). Content analysis was employed to identify domains for investigation and presentation. A narrative summary of the identified domains and themes was reviewed by the research team (SE, ANB, EFK) to produce a consensus-based listing including barriers and facilitators to recommended newborn care practices.

#### **RESULTS**

#### Geographic overview of studies reviewed

The vast majority of studies identified emerged from research carried out in the Sub-Saharan region, while the South Asian region was also well represented in the qualitative literature relating to newborn care practices at home.

Sub-Saharan Africa

Studies from the African region comprised 24 of 37 included for review, and information presented in the studies described the full range of home based newborn care practices.

South Asia

From the South Asian region, 8 of 37 studies presented information on newborn care practices, covering more general rather than specific domains of newborn care, though one focused on breastfeeding.

Southeast Asia

Three studies, two related to breastfeeding in Cambodia and Lao PDR, along with another from Cambodia related to skin care, were identified from the Southeast Asian region.

Latin America / Caribbean

Two qualitative studies were identified from the Latin America/Caribbean region, from Guatemala and Haiti, related to breastfeeding and cord care respectively.

#### **Barriers and facilitators**

A comprehensive list of barriers and facilitators stratified by the recommended care practice that were generated through the data synthesis exercise appears in **Table 3**. For each domain of newborn care, study findings were extracted, and information on barriers and facilitators synthesized. Among the 37 studies in this review, many of the reported barriers and facilitators were cross-cutting for recommended newborn care practices (i.e. cord care, drying and wrapping after delivery, prompt initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness). Across all practices, delivering at a health facility, including grandmothers in decision-making processes during and after pregnancy, low health care costs, and exposure to newborn care messaging in the community were reported as important facilitators for adoption of recommended newborn care practices. Common barriers

across the recommended practices included traditional and historical beliefs and practices, cultural and gender norms, geographic location, conflicting health messaging, and societal pressures.

Barriers that influenced adoption of recommended **cord care practices** included lack of resources (e.g. clean water and razor blades), misinformation on timeliness of cord cutting, religious and cultural beliefs, and untrained birth attendants. Facilitators included institutional delivery, exposure to educational campaigns on safe and hygienic cord cutting practices, community outreach activities promoting handwashing and provision of clean razor blades, decision-making by grandmothers and women leaders, and cord-care counseling by TBAs.

Barriers to timely **drying and wrapping** included perceptions of newborn vulnerability and dirtiness, conflicting advice household stakeholders, and waiting for delivery of the placenta. Facilitators included institutional delivery, exposure to educational campaigns on newborn thermal regulation, traditional wrapping practices, and the presence of two TBAs during delivery.

Factors impeding **delayed bathing** included societal pressure for cleanliness, preference for immediate bathing due to concerns about ritual pollution and hypothermia, negative perceptions of the vernix, and immediate bathing at health facilities. Factors that facilitated delayed bathing after delivery included hospital-based birth, exposure to newborn care messaging on the radio during pregnancy, communication between health care workers in the

community and at the facility during pregnancy, and social support from other women in the household.

Factors inhibiting **skin-to-skin care** and **thermal control** practices included use of blankets instead of skin-to-skin contact, not immediately releasing baby to mother following delivery, early bathing, concerns of disease transmission, and maternal household duties.

Facilitators included exposure to kangaroo care messaging during pregnancy, observing positive newborn health outcomes of other mothers who used kangaroo care practices, medical advice from health care providers, and prior participation in behavior change interventions.

Barriers to care-seeking for illness included lack of transport, minimal financial resources, distances to health facility, gender norms, prior negative experiences at health facilities, and cultural norms such as protective isolation during the postpartum period.

Facilitators included family knowledge and recognition of danger signs and illness symptoms, lower health care costs, community education and support from religious leaders, and exposure to newborn health campaigns.

Barriers to **initiating breastfee**ding included spatial/physical isolation, conflicting health messages, mother exhaustion, baby not crying for milk, historical and traditional beliefs to discard colostrum, and education. Facilitating factors included community and family member knowledge, information provided during health facility-based birth, attendance by trained TBAs, being a first time mother, and exposure to breast feeding education and policy

campaigns.

#### **DISCUSSION**

This systematic review of qualitative research is an important step to providing data specifically relevant to behavior change in settings where high newborn mortality continues. Effective behavior change interventions to improve newborn survival and development require information on a number of complex factors related to essential newborn care. Policy recommendations and current approaches to reducing newborn mortality have not yet been appropriately scaled to reduce newborn mortality to levels targeted by the Sustainable Development Goals. Behavioral interventions are ideally targeted to specific populations and knowledge of those populations is best informed by the type of qualitative data synthesized in this review. 16

#### **Conclusions**

This systematic review identified studies related to the experiences and first-hand accounts of family members and caregivers responsible for providing essential newborn care services following delivery up to the first 28 days of life. The review identified barriers and facilitators commonly reported in studies related to newborn care best practices. The findings presented here are directly applicable to social and behavioral change initiatives aimed at improving newborn care practices for better newborn health outcomes in low resource settings.

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	1. Results of literature sele			Τ =	T	T
No.	Author(s)	Year	Qualitative Methods	Participants	Country (s)	Newborn Care Practices
1	Aborigo, Moyer, Rominski, et al.	2012	In depth interviews (IDI), Focus Group Discussions (FGD)	Mothers, health care providers, TBA, community leaders, grandmothers, compound heads, heads of households	Ghana	Breastfeeding practices
2	Adejuyigbe, Bee, Amare et al.	2015	IDI, Narrative Interviews, and Observations (O)	Mothers, fathers, health workers, grandmothers, TBA	Nigeria, Tanzania, Ethiopia	Thermal care and bathing
3	Alam, Ali, Sultana et al.	2008	IDI, O	Mothers, fathers, grandmother, family members, TBA	Bangladesh	Cord care practices
4	Amare	2014	IDI	Mothers, grandmothers, TBA	Ethiopia	Cord care practices
5	Amare, Shamba, Manzi, et al.	2015	IDI, FGD, (O)	Mothers, fathers, health workers, TBA, grandmothers, merchants	Four African sites	Emollient use for skin care
6	Atyeo, Frank, Vail et al.	2017	Semi structured interviews (SSI)	Mothers	Guatemala	Breastfeeding practices
7	Bazzano, Kirkwood, Tawiah-Agyeman, et al.	2008	IDI, FGD, Participant Observation, Case Study (CS), SSI	Mothers, grandmothers, health providers, community members	Ghana	Care seeking behaviors
8	Bazzano, Oberhelman, Potts et al.	2015	IDI, O, FGD, visual media	Mothers, grandmothers, fathers	Cambodia	Breastfeeding practices
9	Bazzano, Var, Grossman, et al.	2017	O, SSI	Mothers	Cambodia	Newborn care practices with emphasis on use of emollients
10	Byaruhanga, Nsungwa- Sabiiti, Kiguli, et al.	2011	IDI, FGD	Mothers, TBA, elderly care takers	Uganda	Care seeking behaviors
11	Degefie, Amare, and Mulligan	2014	IDI, Key informant interviews (KII)	Mothers, grandmothers, TBA, fathers	Ethiopia	General care practices
12	Dhinga, Gittelsohn, Suleiman, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, health care providers	Tanzania	Cord care practices
13	Engmann et al.	2013	IDI, FGD	Mothers, grandmothers, health care providers	Ghana	Newborn illness, danger signs, and care seeking behavior
14	Gondwe, Munthali, Ashorn, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, traditional healers,	Malawi	Pre-term birth and care seeking practices
15	Herlihy, Shaikh, Mazimba, et al.	2013	IDI, FGD	Mothers, grandmothers, TBA, community members	Zambia	Cord care practices
16	Hill, Tawaiah-Agyemang, Manu et al.	2010	IDI, FGD, and Narratives (N)	Mothers, grandmothers, TBA, fathers, pregnant women	Ghana	Thermal care practices
17	Hunter, Callaghan-Koru, Mahmud, et al.	2014	IDI, FGD	Pregnant women, mothers, husbands, grandmothers, traditional healers, community leaders, religious leaders, health care providers	Bangladesh	Skin to Skin practices
18	Kesterton and Cleland	2009	IDI, FGD	Mothers, grandmothers, TBA	India	General care practices
19	Khadduri, Marsh, Rasmussen et al.	2008	SSI, FGD	Women of reproductive age, health service providers, mothers, fathers	Pakistan	General care practices
20	Lee, Durham, Booth, et al.		IDI, FGD	Mothers, health care staff, key informants	Lao PDR	Breastfeeding practices

	Lunze, Yeboah-Antwi, and Marsh	2014	IDI, FGD	Mothers, community leaders, health officers, grandmothers	Zambia	Neonatal hypothermia and thermal care
						practices
F	Melesse-Salasibew, Filteau, and Marchant	2014	IDI, SSI, FGD	Mothers, local experts on newborn care practices	Ethiopia	General care practices following home births
	Moran, Choudhury, Khan, et al.	2009	IDI	Pregnant women, mothers	Bangladesh	General care practices
	Moyer, Aborgio, Logonia et al.	2012	IDI, FGD	Women with newborns, grandmothers, compound heads, community leaders, TBA, health care providers	Ghana	Cord care practices
	Mrisho, Schellenberg, Mushi et al.	2008	IDI, FGD, CS	Female community informants	Tanzania	Home-based care practices
<b>26</b> N	Nabiwemba, Atuyambe, Criel, et al.	2014	IDI	Mothers	Uganda	Care practices for LBW babies
<b>27</b> N	Nalwadda, Waiswa, Guwatudde, et al.	2015	IDI, FGD	Mothers, fathers, TBA	Uganda	General care practices with emphasis on cord care
	Newbrander, Natiq, Shahim, et al.	2014	IDI, FGD, O	Household members of perinatal woman, community members	Afghanistan	General care practices
	Okeyere, Tawiah- Agyemang, Manu, et al.	2010	IDI, FGD, Birth Narratives (BN)	Mothers, TBAs, grandmothers, husbands, asram healers	Ghana	Traditional illness
<b>30</b> P	Pati, Chauhan, Panda, et al.	2014	IDI	Mothers, TBA	India	General care practices with an emphasis on breastfeeding
	Premji, Khowaja, Meherali, et al.	2014	IDI, FGD	Mothers, fathers, grandmothers	Pakistan	General care practices
	Sacks, Moss, Winch et al.	2015	IDI, FGD, O	Mothers, TBA, hospital staff	Zambia	Skin, thermal, and cord care
	Shamba, Schellenberg, Hildon et al.	2014	IDI, FGD, BN	Mothers, TBA	Tanzania	Bathing, thermal, and skin to skin care practices
<b>34</b> T	Tawiah-Agyemang, Kirkwood, Edmond, et al.	2008	SSI, FGD	Mother, women of child bearing age, health workers, policy makers	Ghana	Initiation of breastfeeding
	Thairu and Pelto	2008	IDI	Mothers	Tanzania	General care practices
	Waiswa, Kemigisa, Kiguli, et al.	2008	IDI, FGD	Mothers, fathers, grandparents	Uganda	General care practices
<b>37</b> V	Walsh, Norr, Sankar, et al.	2014	FGD	TBA, pregnant women, stakeholders, traditional healers	Haiti	Cord care practices

N o.	Author(s)	Year	CASP 1	CAS P 2	CAS P 3	CAS P 4	CAS P 5	CAS P 6	CAS P 7	CAS P 8	CAS P 9	CASP 10	Overall Score
1	Aborigo, Moyer, Rominski et al.	2012	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10
2	Adejuyigbe, Bee, Amare et al.	2015	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	10/10
3	Alam, Ali, Sultana et al.	2008	Υ	Υ	Y	Υ	Υ	N	Y	Υ	С	Y	8/9
4	Amare	2014	Υ	Υ	Υ	Υ	Υ	N	Υ	Υ	Υ	Υ	9/10
5	Amare, Shamba, Manzi, et al.	2015	Υ	Υ	Υ	Υ	Υ	N	Υ	Υ	Υ	Υ	9/10
6	Atyeo, Frank, Vail et al.	2017	Υ	Y	N	С	N	Υ	Υ	Υ	Υ	Υ	7/9
7	Bazzano, Kirkwood, Tawiah-Agyemang, et al.	2008	Υ	Y	Υ	Υ	Υ	N	N	Υ	Y	Y	8/10
8	Bazzano, Oberhelman, Potts, et al.	2015	Y	Υ	Υ	Υ	Υ	С	Υ	Y	Y	Y	9/9
9	Bazzano, Var, Grossman, et al.	2017	Υ	Y	Y	Y	Υ	С	Y	Υ	Υ	Y	9/9
10	Byaruhanga, Nsungwa-Sabiti, Kiguli, et al.	2011	Υ	Υ	N	Y	Υ	N	Y	Υ	Y	С	7/9
11	Degefie, Amare, and Mulligan	2014	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8
12	Dhingra, Gittelsohn, Suleiman, et al.	2014	Υ	Υ	Υ	Y	Υ	N	Y	Υ	Y	Υ	9/10
13	Engmann, Adongo, Akawire, et al.	2013	Υ	Y	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	10/10
14	Gondwe, Munthali, Ashorn, et al.	2014	Υ	Υ	Υ	Υ	С	N	Υ	Υ	Υ	Υ	8/9
15	Herlihy, Shaikh, Mazimba, et al.	2013	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8
16	Hill, Tawiah- Agyemang, Manu, et al.	2010	Y	Y	Y	Υ	Υ	N	N	С	Y	Y	7/9
17	Hunter, Callaghan- Koru, Mahmud, et al.	2014	Υ	Υ	Y	Υ	Y	Υ	Y	Y	Υ	Y	10/10
18	Kesterton and Cleland	2009	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Y	10/10
19	Khadduri, Marsh, Rasmussen, et al.	2008	Υ	Υ	Υ	Υ	С	N	N	С	Υ	Y	7/9
20	Lee, Durham, Booth, et al.	2013	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8
21	Lunze, Yeboah- Antwi, Marsh, et al.	2014	Υ	Υ	Υ	Υ	Υ	N	Υ	С	Υ	Υ	8/9
22	Melesse-Salasibew, Filteau, and Marchant	2014	Y	Υ	Υ	N	Υ	N	Υ	N	Y	С	7/9
23	Moran, Choudhury, Khan, et al.	2009	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8
24	Moyer, Aborigo, Logonia, et al.	2012	Υ	Υ	Υ	Υ	Υ	Y	Υ	Y	Υ	Υ	10/10
25	Mrisho, Schellenberg, Mushi, et al.	2008	Y	Υ	Y	Υ	С	N	Υ	N	Υ	Υ	7/9
26	Nabiwemba, Atuyambe, Criel, et	2014	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8

28		Nalwadda, Waiswa, Guwatudde, et al.	2012	Υ	Υ	Y	Y	С	N	Y	С	Y	Y	7/8
29       Okyere, Tawaiah-Agyeman, Manu, et al.       2006       Y </td <td>28</td> <td>·</td> <td>2010</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>С</td> <td>N</td> <td>Υ</td> <td>N</td> <td>Υ</td> <td>Y</td> <td>7/9</td>	28	·	2010	Υ	Υ	Υ	Υ	С	N	Υ	N	Υ	Y	7/9
Panda, et al.         2014         Y	29	Okyere, Tawaiah- Agyeman, Manu, et	2006	Y	Υ	Υ	Υ	С	N	Y	N	Y	Y	7/9
31       Premji, Khowaja, Meherali, et al.       2014       Y	30		2014	Υ	Υ	Υ	Υ	N	N	Υ	N	N		5/10
et al.       33       Shamba, Schellenberg, Hildon, et al.       2014       Y <td< td=""><td>31</td><td></td><td>2014</td><td>Y</td><td></td><td>Υ</td><td>Y</td><td>Υ</td><td>Y</td><td>Υ</td><td>Y</td><td>Υ</td><td>Y</td><td>10/10</td></td<>	31		2014	Y		Υ	Y	Υ	Y	Υ	Y	Υ	Y	10/10
Schellenberg, Hildon, et al.       2008       Y       Y       Y       Y       Y       N       N       Y       C       Y       7/9         34       Tawiah-Agyemang, Kirkwood, Edmond, et al.       Y<	32	Sacks, Moss, Winch,	2015	Υ	Υ	Υ	Υ	Υ	N	Y	Υ	Υ	Y	9/10
Kirkwood, Edmond, et al.       9/10         35       Thairu and Pelto       2008       Y	33	Schellenberg, Hildon,	2014	Υ	Y	Y	Υ	Y	С	Υ	Y	Y	Y	8/9
35 Thairu and Pelto 2008 Y Y Y Y Y N Y Y Y 9/10 36 Waiswa, Kemigisa 2008 Y Y Y N Y N Y Y Y X 8/10	34	Kirkwood, Edmond,	2008	Υ	Υ	Υ	Υ	Υ	N	N	Y	С	Y	7/9
36         Waiswa, Kemigisa, Kiguli, et al.         2008         Y         Y         Y         N         Y	35		2008	Υ	Υ	Υ	Υ	Υ	N	Υ	Υ	Υ	Υ	9/10
37 Walsh, Norr, Sankar, 2015 Y Y Y Y Y N Y Y Y 9/10 et al.	36	_	2008	Y	Υ	Υ	N	Υ	N	Υ	Υ	Υ	Y	8/10
et al.	37		2015	Υ	Υ	Υ	Υ	Υ	N	Υ	Υ	Υ	Υ	9/10

Table 3. Barriers and facilitators described in articles reviewed

Domain of newborn care	Barriers	Facilitators	Article Number per Table 2, Year	Total Number of Article Mentions
Cord care	Lack of supplies, including water or infection prevention supplies	Knowledge about cord care	3, 2018	19/37
	Using surgical spirits and powder	Community stakeholder recognition that infants are susceptible to cord infection	4, 2014	
	Unhygienic cutting practices, including used, unsterilized razor blades or scissors	Delivery in hospital	9, 2017	
	Unskilled attendants	Informed at health facility	11, 2014	
	Delayed cord cutting, resulting in infection	Tailored behavior change communication	12, 2014	
	Mixed perception about the length at	Appropriate compromises between	15, 2013	
	which cord should detach and heal	existing and recommended practices	18, 2009	
	Use of topical applications to the cord, including herbs, butter, and indigenously-	Community education	19, 2008	
	made substances, for medicinal/protective purposes	Outreach education	22, 2014	
	Application of traditional remedies and	Inclusion of grandmothers and other female household members, who are	23, 2009	
	substances on the cord to moisturize or dry it and facilitate its separation and	key decision makers and caregivers	24, 2012	
	promote healing	Participatory health promotion techniques, such as women's groups	25, 2008	
	Belief that cord infections caused by	, ,	26, 2014	
	mother's diet	Programs targeting TBAs and community women	27, 2015	
	Lack of understanding about cord cleaning	Sterile instrument use by TBAs	30, 2014	
	Lack of understanding of risks and infections affecting the cord and certain	Use of new razor blades	32, 2015	
	signs of infection, such as redness	Cutting cord before the emergence of the placenta	36, 2008	
	Cultural belief and newborn care practices not conforming to recommended practices	Special thread provided by hospital to tie cord	37, 2014	
	Cost of supplies, including CHX solution	Educational messages about using sterile thread and ensuring dry cord		
	Religious and cultural beliefs about cord cutting and cleaning	care		
	Umbilical cord thought to make baby vulnerable to witchcraft	Boiling the cutting instruments  Importance of cord care and tying recognized in community and		
	Mothers cutting the cord themselves	understood culturally		
	Umbilical cord not tied prior to cutting, can lead to tetanus	Recognition of cord problems, such as delayed healing, bleeding, or swelling		
	Practice of only tying to cord on the side of the baby	TBAs counsel mothers to protect the cord from infections		
	Recontamination of washed hands before	Consensus regarding liquid cord		

Seclusion of mother and baby in postpartum period may lead to late identification of illness and delay to seeking care  Utilizing materials, such as rope and twigs, in cord dying  Disconnect between healthcare providers and community  Local conceptions regarding role of cord tying in stemming blood flow  Concerns regarding the length of time until cord detachment  Presence of blood dots associated with curses  Pregarms, promoting cord cleaning with antiseptics, should provide balance between the breefits and the likelihood that separation of unbillical cord may be slightly delayed  Using materials, such as obean cotton, other than fingers to apply medicine/artiseptic  Programs in urban slum areas finceventions to improve social support to women, especially first-time mothers  Educating healthcare providers about unwinkly (notitional practices to they are specifically addressed  Espoising residuable for tying the cord on both sides of the cut.  Cultural health systems model that depicts all stakeholders  Presence of blood clots leading to seeking medical treatment at health curters.  Promotion of chlorhexidine in place of comminity reported application of harmful sharing into account health system harriers and financial burden.  Drying and wrapping  Behaviors vary among home deliveries  Prorograms that both sphould be 8, 8, 2011				1	
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Perception of dirtiness of baby Understanding that baby should be 8, 2011	Drying and wrapping	Behaviors vary among home deliveries	Knowledge about drying and wrapping	2, 2015	11/37
		Perception of dirtiness of baby	Understanding that baby should be	8, 2011	

		kept warm	
	Perception of birthing process as polluting	Delivery in hospital	10, 2014
	Vulnerability of baby	Informed at health facility	14, 2010
	, ,	·	16, 2009
	Opinions of other household stakeholders, such as the mother-in-law	Tailored behavior change communication	19, 2014
	Home and hospital delivery	Appropriate compromises between existing and recommended practices	20, 2014
	Not attending to baby until placenta delivered	Community education	21, 2009
		·	28, 2014
	Prioritization of the mothers	Outreach education	30, 2015
•		Inclusion of grandmothers who are key decision makers	31, 2014
		Participatory health promotion techniques, such as women's groups	
	0	Traditional practice of wrapping in new clean cloth	
		Use of warm water and traditional herbs to protect baby	
		Behavior change communication messages beginning at pregnancy	
		Babies dried and wrapped due to awareness of reduction of cold	
	`	Having more than one attendant to help both the mother and baby	
		Programs in urban slum areas	
		Interventions to improve social support to women, especially first-time mothers	

Bathing	Traditional or historical practice	Delayed bathing when delivery in	2, 2015	17/37
	Lack of knowledge of when to bathe baby, especially in home deliveries	hospital Informed at health facility	3, 2008	
		·	8, 2011	
1	Early bathing due to societal pressure	Quality of care in health facility	9, 2014	
	Cultural norm of frequent bathing	Health worker advice	10, 2014	
	Cultural belief and newborn care practices not conforming to recommended practices	Tailored behavior change communication, addressing community norms and based on formative	14, 2010	
	Negative perception of vernix, including	research	16, 2009	
	association with sperm	Appreciation of newborn vulnerability to encourage behavior change	19, 2014	
	Vernix considered dangerous for HIV- exposed infants	Appropriate compromises between	20, 2014	
		existing and recommended practices	21, 2009	
	Bathing in close proximity to smoking fires	Community education	24, 2014	
	Early bathing due to association with dirtiness as well as body odor later in life	Outreach education	26, 2014	
	Differences in practice by untrained TBAs	Inclusion of grandmothers who are key decision makers	28, 2014	
	Spiritual beliefs attached to use of local	Participatory health promotion	30, 2015	
	herbs for bathing	techniques, such as women's groups	31, 2014	
	Bathing practices, such as using pond water	Behavior change communication messages beginning at pregnancy	33, 2008	
	Substances added to water, including Dettol or Savlon	Having more than one attendant to help both the mother and baby	34, 2008	
	Bathing immediately after birth due to concerns about 'ritual pollution' can cause hypothermia	Delayed bathing due to concerns about pneumonia		
	Early bathing linked to shaping the baby's head	Identifying and addressing cultural rationales that underlie negative practices		
	Early bathing to help the baby sleep and feel clean	Reinforcing ad protecting beliefs that support positive practices		
	Early bathing in facilities	Improving health worker communication skills and social		
Thermal control	Lack of practice when delivery at home or with TBA	Informed at health facility Beliefs about importance of thermal	2, 2015	12/37
	Lack of knowledge of keeping baby indoors	care  Quality of care in health facility	3, 2008 8, 2011	
	Suboptimal practices	Tailored behavior change	9, 2014	
	Early bathing	communication based on formative research	10, 2014	
	Length of time baby undressed during bathing	Appropriate compromises between existing and recommended practices	14, 2010	
	Bathing with warm water	Community education	17, 2008	
	Use of blankets, rather than skin-to-skin	Outreach education	19, 2014	
	care	- Cutt Cutti Cutton	24, 2014	

_				,
		Inclusion of grandmothers who are key	20 2014	
	Newborn massage, including use of	decision makers	28, 2014	
	mustard oil, can compromise the skin barrier function	Participatory health promotion techniques, such as women's groups	30, 2015	
	barrier function	techniques, such as women's groups	30, 2013	
	Cultural belief and newborn care	Behavior change communication	31, 2014	
	practices not conforming to	messages beginning at pregnancy		
	recommended practices			
		Knowledge and practice that baby		
	Lack of maintaining thermoprotective	should be kept warm		
	practices in the first few hours			
	postpartum, when newborns are at	Having more than one attendant to		
	greatest risk	help both the mother and baby		
		Use of low-cost newborn warmers		
		Ose of low-cost flewborn warmers		
		Community-based practices on		
		hypothermia prevention and		
		management		
Chin to alice contact	Face and the second sec	Debasias abases interceptions based	2 2015	0/27
Skin to skin contact	Few mothers given baby immediately after birth	Behavior change interventions based on formative research	2, 2015	9/37
	arter birtir	on formative research	3, 2008	
	Concerns of disease transmission, harm	Quality of care in health facility	3, 2000	
	to umbilicus		8, 2011	
		Tailored behavior change		
	Perception of dirtiness after birth	communication	9, 2014	
	Maternal rest	Appropriate compromises between	14, 2010	
	Company of habit has a wine cold	existing and recommended practices	15 2014	
	Concerns of baby becoming cold	Community education	15, 2014	
	Delayed due to early bathing	Community education	16, 2009	
	Belayed due to early butting	Outreach education	10, 2005	
	Perception that it might be harmful to		19, 2014	
	fragile newborns	Inclusion of grandmothers who are key		
		decision makers	31, 2014	
	Lack of understanding that kangaroo			
	mother care is a protective method of	Participatory health promotion		
	caring for healthy newborns	techniques, such as women's groups		
	Use of blankets, rather than skin-to-skin	Behavior change communication		
	care	messages beginning at pregnancy		
	50.0	messages segiming at pregnancy		
	Lack of continued skin to skin contact	Association with reduced risk of cord		
		infection		
	Cultural belief and newborn care			
	practices not conforming to	Concept easily understood and women		
	recommended practices	willing to try if good for the baby		
	Women feeling responsible for	Appreciation of kangaroo mother care		
	household duties	as an appropriate treatment for ill		
		babies		
		Biomedical advice from healthcare		
		providers reaching community through		
		word-of-mouth and television		
		campaigns		
		Receiving help from family members		
		Receiving neith from failing members		
		Witnessing other women perform		
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		kangaroo mother care with positive		
		outcomes  Focusing intervention messages on		
		building supportive a environment for kangaroo mother care practice		
			2 2000	6 107
Hygiene	Lack of knowledge on hand-washing with soap	Health education	3, 2008	6/37
	Recontamination of washed hands before	Tailored behavior change communication	9, 2014	
	attending to the newborn	Appropriate compromises between	16, 2009	
	Cultural belief and newborn care practices not conforming to	existing and recommended practices	17, 2008	
	recommended practices	Community education	22, 2012	
		Outreach education	24, 2014	
		Inclusion of grandmothers who are key decision makers		
		Participatory health promotion techniques, such as women's groups		
		Efforts to promote hand-washing and to avoid recontamination		
	6	Understanding of keeping babies and their surroundings clean		
		Educating healthcare providers about harmful, traditional practices so they are specifically addressed		
	·			
		2		
Breast feeding (initiation of and provision of colostrum)	Traditional or historical practice	Community members knowledgeable about importance of breast-feeding	1, 2012	18/37
,	Belief that it is unhealthy	Delivery in a health facility, where staff	6, 2017	
	Mother's exhaustion	encouraged early breast-feeding	9, 2017	
	Limited knowledge	Culturally-tailored health education	10, 2011	
	Maternal education status	Targeting isolated villages	11, 2014	
	Geographic isolation	Cross-generational education	12, 2014	
	Inconsistency in health education	interventions	18, 2009	
	Learning from relatives	Interventions through community health clinic workers	19, 2008	
	Pre-lacteal feeds given on fingertip, increasing risk of infection	Appropriate compromises between existing and recommended practices	20, 2013	
	_		22, 2014	
	Low urgency in initiating breastfeeding as mother and child believed to be polluted	Community education	23, 2009	
	after birth	Outreach education	25, 2008	
	Negative beliefs regarding colostrum	Inclusion of grandmothers/mother-in- laws and religious leaders who are key	26, 2014	

bitterness		T		,	,
Perception of a lack of breast milk Onset of posts birth activities, such as batting Perception that baby needs rest Baby not crying for milk Perception of inadequate maternal nutrition and breast milk Perception of inadequate maternal nutrition and breast milk Perception of inadequate maternal nutrition and breast milk Premature breast milk supplementation (water and other fluids), which may expose newborns to pathogens Works served as a barrier Offference in advice received from different people by first-time mothers Cultural belief and newborn care prartices prartices Perception that hunger is not met or satisfied by breast-milk alone  Output belief and newborn are practices Perception that hunger is not met or satisfied by breast-milk alone  Perception that hunger is not met or satisfied by breast-milk alone  Output belief and newborn care practices Perception that hunger is not met or satisfied by breast-milk alone  Output belief and newborn care practices Perception that hunger is not met or satisfied by breast-milk alone  Output belief and newborn care practices Perception that hunger is not met or satisfied by breast-milk alone  Output belief and newborn care practices Perception that hunger is not met or satisfied by breast-milk alone  Output belief and newborn care practices  Perception that hunger is not met or satisfied by breast-milk alone  Output belief and previous gradient practices  Reinforcing ad protecting beliefs that support possible practices in morphisms of the profile practices  Reinforcing ad protecting beliefs that support possible practices  Reinforcing ad protecting beliefs that support protections to improve social support to women, especially first-time mothers' mothers  Using religious bedens, trained beliefs  Researc		1	decision makers	28, 2014	
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10006/11001 01 dunger 31613   20, 2014			Recognition of danger signs	26, 2014	

	Community understanding of the newborn period and cultural expectations	Targeted behavior-change communication programs	27, 2010	
	Caretaker knowledge about newborn sickness	Using religious leaders, trained health workers, family health action groups, and radio to disseminate messages		
	Individual experiences in household and caretaker autonomy	Understanding traditional illnesses in designing care-seeking interventions		
	Women's inability to seek care without being accompanied by a male relative			
	Healthcare decisions influenced by community members			
	Perceived health system gaps			
	Confidence in healthcare providers is issue-specific			
	Sequential care-seeking practices, with traditional medicine as first-line of treatment for 7 days			
	Untimely action after recognition of danger signs			
	Previous negative experiences with health services facilities			
	Local understanding of illness affects treatment practices			
	Mothers blamed for infant illness			
	Use of traditional home remedies and self-medication instead of care in health facilities	2		
	Shame about utilization of maternal and neonatal services	0.		
	Care-seeking for local community members for serious health concerns	7/		
	Post-partum depression			
	'Asram' perceived as common illness which cannot be treated at health facilities			
	'Asram' treatments including frequent cold herbal baths, air-dying, and oral treatments			
	Modification of 'asram' treatment required the sanction of a healer			
Other newborn care	Cultural perception of emollients as improving the skin, keeping the baby warm, and shaping the baby	Association of emollient therapy in reduction of mortality among preterm infants	4, 2014 20, 2014	4/37
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	Social pressure to use emollients  Emollient choice influenced by cost, availability, and traditional norms  Massage, associated with application of emollients, is potentially damaging to skin  Potential impact of emollients, such as engine oil, on harm and even mortality  TBAs applying mild pressure inside baby's mouth on the soft palate with water and local herb  Application of powders directly into dermal incisions of ill children to ward off malevolent spirits	Newborn emollient trials, specifically designed to reflect contextual differences  If emollients are proven effective, policy makers deciding whether to provide emollients free of charge or through social marketing  Improving practice of massage associated with emollient application  Understanding traditional illnesses in designing care-seeking interventions	26, 2010 30, 2015	
Low birth weight recognition	Babies not weighed  Belief in supernatural powers  Less knowledge of home care practices when baby delivered at home or in lower level health facility  Lack of knowledge of how to provide care or when to take baby to health facility  Perceptions of preterm birth, including young and old maternal age, heredity, sexual impurity, and maternal illness during pregnancy  Poverty  Women placed with main responsibility for preterm newborns  High time burden of care for preterm babies leading to neglect of household, farming, and business duties	Better knowledge of home care practices when delivery at health facility  Health education at community level to reach mothers that deliver at home  Mechanisms to support mothers  Provision of warmth to preterm newborns  Addressing cultural practices for preterm babies among community members  Vernix considered important for preterm newborns	9, 2014 12, 2014 24, 2014	3/37

#### **Contibutorship statement**

All authors meet ICMJE criteria for authorship, and all have read and approved the final manuscript.

**Competing interests:** All authors declare they have no conflicts of interest.

**Funding:** The study received no financial support.

**Data sharing statement:** All data came from published articles available from electronic databases which are openly accessible.

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#### **Appendix 1. Search Strategy**

"infant, newborn"[mesh] OR newborn[Title/Abstract] OR "newborn care"[tiab])) AND ("breast feeding"[MeSH Terms] OR "immediate breastfeeding"[Title/Abstract] OR "exclusive breastfeeding"[tiab] OR "exclusive breast feeding"[tiab] OR "initiation of breastfeeding"[tiab] OR "thermal care"[tiab] OR "Cord care"[tiab]) OR "Thermal care"[tiab] OR "Thermal
newborn[Title/Abstract] OR "newborn care"[tiab])) AND ("breast feeding"[MeSH Terms] OR "immediate breastfeeding"[Title/Abstract] OR "exclusive breastfeeding"[tiab] OR "exclusive breast feeding"[tiab] OR "initiation of breastfeeding"[tiab] OR "thermal care"[tiab] OR "cord care"[tiab])
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"umbilical cord care"[tiab] OR "umbilical
cord care"[ot] OR "health knowledge,
attitudes, practice"[MeSH Terms]
"mothers"[MeSH Terms] OR Parent Perspective
mothers[Title/Abstract] OR Concept
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interview"[OT] OR "unstructured interview"[TIAB] OR "unstructured interviewing"[TIAB] OR "unstructured interviews"[TIAB] OR "unstructured interview"[OT] OR "in depth interview"[TIAB] OR "in depth interviewees"[TIAB] OR" in depth interviewing"[TIAB] OR "in depth interviews"[TIAB] OR "in depth interview"[OT] OR "in depth interviewing"[OT] OR "in depth interviews"[OT] OR "Focus Groups"[Mesh] OR "focus group" [TIAB] OR "focus groups"[TIAB] OR "focus group"[OT] OR "focus groups"[OT] OR "group interview"[OT] OR "group interview"[TIAB] OR "Direct observation"[tiab] OR "Participant observation"[tiab] OR "Nonparticipant observation"[tiab] OR "Direct observation"[OT] OR "Participant observation"[ot] OR "Non-participant observation"[OT] OR "Ethnology"[Mesh] OR "ethnographic research"[OT] OR "ethnographic research"[TIAB] OR ethnology[OT] OR ethnology[TIAB] OR "ethnographic study"[tiab] OR "ethnographic study"[ot] OR "Community-Based Participatory Research" [Mesh] OR "community-based participatory research"[OT] OR "community-based participatory research"[TIAB] OR "action research"[TIAB] OR "action research"[OT] OR "Formative research"[tiab] OR "Formative research"[ot] OR "Key informant"[tiab] OR "Key informant"[OT] OR "Interpretative perspective" [TIAB] OR "Phenomenological Research"[TIAB] OR Phenomenology[tiab] OR Phenomenology[ot] OR "Phenomenological Research"[OT])) ALL LMIC terms and ALL countries names (not pig OR hen) OR Developing country/LMIC terms (see above) Country names

"infant, newborn"[mesh] OR	This is our main
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AND #101)) Filters: Publication date from	
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care"[tiab])) AND ((#110 AND #93 AND #94	
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published in the last 10 years; Humans;	
English	`\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\\

# Reporting checklist for systematic review and meta-analysis.

Based on the PRISMA guidelines.

#### Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

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In your methods section, say that you used the PRISMA reporting guidelines, and cite them as:

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		Reporting Item	Page Number
	#1	Identify the report as a systematic review, meta-analysis, or both.	0-1
Structured summary	#2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	0-1
Rationale	#3	Describe the rationale for the review in the context of what is already known.	1
Objectives	#4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
Protocol and registration	<b>#5</b> For	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address) and, if available, provide registration information including the registration number.  peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	0-1

	Eligibility criteria	#6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rational	3
ı	Information sources	#7	Describe all information sources in the search (e.g., databases with dates of coverage, contact with study authors to identify additional studies) and date last searched.	3
!	Search	#8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	See note
	Study selection	#9	State the process for selecting studies (i.e., for screening, for determining eligibility, for inclusion in the systematic review, and, if applicable, for inclusion in the meta-analysis).	4-5
	Data collection process	#10	Describe the method of data extraction from reports (e.g., piloted forms, independently by two reviewers) and any processes for obtaining and confirming data from investigators.	5
	Data items	#11	List and define all variables for which data were sought (e.g., PICOS, funding sources), and any assumptions and simplifications made.	5-6
	Risk of bias in individual studies	#12	Describe methods used for assessing risk of bias in individual studies (including specification of whether this was done at the study or outcome level, or both), and how this information is to be used in any data synthesis.	6-7
; )	Summary measures	#13	State the principal summary measures (e.g., risk ratio, difference in means).	6-7
	Planned methods of analyis	#14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	6-7
, , ,	Risk of bias across studies	#15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6-7
	Additional analyses	#16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-7
;	Study selection	#17	Give numbers of studies screened, assessed for eligibility, and	7-8
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#### **Author notes**

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1. 4, Appendix

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### **BMJ Open**

## Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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### Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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Figures: 1 Tables: 3

#### **ABSTRACT**

#### **Objectives**

To understand family and parent perspectives on newborn care provided at home to infants in the first 28 days of life, in order to inform behavioral interventions for improving care in low income countries, where the majority of newborn deaths occur.

#### Design

A comprehensive, qualitative systematic review was conducted. MEDLINE/PubMed, Embase, and Cumulative Index of Nursing and Allied Health databases were systematically searched for studies examining the views of parents and family members on newborn care at home. The search period included all studies published from 2006 to 2017. Studies using qualitative approaches or mixed-methods studies with substantial use of qualitative techniques in both the methods and analysis sections were included. Studies meeting the inclusion criteria were extracted and evaluated using Critical Appraisal Skills Programme guidelines. Following the initial selection and appraisal, barriers and facilitators to recommended care practices across several domains were synthesized.

#### **Results**

Of 411 results retrieved, 37 met both inclusion and quality appraisal criteria for methodology and reporting. Geographic representation largely reflected that of newborn health outcomes globally, with the majority of studies conducted in the region of Sub-Saharan Africa and South Asia. Specific barriers and facilitators were identified among a range of domains including: cord care, drying and wrapping, thermal control, skin to skin contact, hygiene, breast feeding, care seeking for illness, low birth weight recognition. Cross cutting facilitators, common to all domains were also evident, including delivering at a health facility, including female relatives in counseling, lower health care costs, and exposure to newborn care messaging in the community.

#### **Conclusions**

When designing behavioral interventions to address newborn mortality at scale, policy makers and practitioners must include barriers and facilitators important to families in low income settings. **Review registration number** CRD42016035674.

#### **Article Summary**

#### **Strengths and limitations:**

- Strengths of the review include having had a librarian/information scientist in the research team, and multiple reviewers experienced in qualitative research in lowincome countries, primary qualitative data collection, and analysis.
- Other strengths of the study was the comprehensive search strategy covering multiple
  relevant databases; appraisal of quality among included studies based on critical
  appraisal skills guidelines; and a comprehensive description of study findings.
- Limitations included: the exclusion of documents not available in English, and those that may have been relevant, but were outside the defined date limitations.

#### Introduction

Approximately 46% of all under-five deaths in 2016 occurred during the neonatal period, the initial 28 days following birth. Southern Asia and sub-Saharan Africa account for nearly 80 percent of the newborn deaths. By 2030, the Sustainable Development Goals (SDG) target to reduce neonatal mortality to at least as low as 12 per 1,000 live births. However, per current trends, over 50 countries will fail to meet this target on newborn survival. Yet, the majority of these deaths are preventable.

During the neonatal period, care provided by parents and caregivers is critical for newborn survival.<sup>3</sup> Optimal or essential newborn care practices as defined by the World Health Organization include immediate drying and wrapping of newborns after birth, initiating skin-to-skin (STS) contact, clean cord care, dry cord care, immediate initiation of breastfeeding and

exclusive breastfeeding until 6 months of age, as well as ensuring warmth (thermal control) of the newborn through delayed bathing.<sup>4</sup> In addition, parents or caregivers at home must also provide nurturing care, safety and security, and responsiveness to the newborn's needs. The provision of quality, effective care at the home and community level is critical for improving newborn health outcomes and promoting optimal early childhood development. A reduction in neonatal mortality by 25% can be achieved by scaling up community interventions, including provision of optimal home care.<sup>5</sup> Although feasible interventions exist to reduce newborn mortality, uptake of these interventions is low.<sup>6</sup>

In order to increase scale up of coverage and implementation of effective home and community-based newborn care practices, providing data on research priorities for newborn health is key.<sup>7</sup> Researchers have identified specific domains related to caregiver perceptions and behaviors as priorities.<sup>8</sup> Qualitative research was deemed particularly useful for obtaining information on newborn care practices at home, which vary based on the sociocultural context in low-income countries.<sup>9</sup>

Despite the existence of multiple individual qualitative and formative research studies on home and community-based newborn care, a systematic review of the available qualitative research is lacking. Therefore, we conducted a systematic review to provide data to improve both programming and policy for home and community care for newborns.<sup>7</sup>

The primary objective of this study was to systematically review qualitative literature to understand parent and family experiences with home newborn care practice in low-income countries, presenting information related to barriers and facilitators to inform behavioral interventions focused on improving newborn survival and care.

#### **Methods**

This systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO): registration number CRD42016035674. The review followed guidelines from the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) statement. Due to the emphasis on qualitative research, the review primarily employed the ENTREQ guidelines for reporting, while also drawing guidance from PRISMA, which is more specific to the requirements of quantitative literature reviews. 10,11

Newborn care practices were defined as all actions taken by parents/caregivers that provide for the essential biological, physiological and psychological needs of the newborn infant following delivery and up to the end of the newborn period (28 days of life). These included, but were not limited to, the essential newborn care practices as defined by WHO: cord care, drying and wrapping after delivery, initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness.<sup>12</sup>

Four of five researchers involved in conducting the review, analyzing the results, and writing up the manuscript had strong experience in qualitative research methods, and hold graduate and/or doctoral level qualification in public health, with a specialization in research methods (ANB, EFK, AK, and SE). One researcher (RH) is an information scientist with a qualification in library sciences and specialization in support to research in science and biomedicine.

Inclusion and exclusion criteria

Studies were included if they used qualitative data collection methods such as

interviews, focus groups, direct observation, and participatory action research. Inclusion requirements also stipulated that studies needed to have a well-described methodology section and a clear description of the qualitative data analysis methods and process (e.g., grounded theory, narrative analysis, content analysis, thematic analysis). Finally, data on newborn care at home must have been directly obtained from parents or caregivers of newborns (infants under 28 days of age, including low birthweight or small babies), whether born at home or at a facility, with or without skilled attendance, and regardless of whether the study also included additional data from non-family members or health workers such as TBAs (which data was not used for this review). Caregivers were defined as mothers/fathers or other adult family or community members who provided day-to-day physical and psychological support to meet the basic needs of newborn infants. Data gathered from community health workers, and from professional or non-professional health care providers, were not used or included in this study although it may have been presented in one of the articles included in the review.

Excluded studies were those for which it was difficult to extract qualitative data (e.g., mixed methods studies without clearly labeled data, or studies in settings where perceptions of parents'/caregivers' experiences of newborn care practices could not be clearly identified, such as summaries or aggregate data). Commentaries, protocols, and systematic reviews were not included in the analysis. Additionally, studies from countries other than those defined by the World Bank as low-income countries and lower-middle income countries (which have a Gross National Income per capita of less than \$4,125) were excluded.<sup>13</sup>

Search strategy

The review was begun in 2016 and targeted to the previous ten years and was then

extended a further year due to delays in the publication process to encompass the timeframe 2006-2017. The following electronic databases were searched: MEDLINE (PubMed), Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL: EBSCOhost). A health sciences librarian (RH) developed the database searching strategy and conducted the final searches. The initial search strategy was developed for MEDLINE and then adapted for other databases. Medical Subject Headings (MeSH) were used followed by free-text terms using controlled vocabulary (see the Appendix for a detailed description of the search strategy). Only articles in English were included due to potential difficulties in translating and interpreting foreign language qualitative data by native English-speaking reviewers, and to ensure that the review covered the most current literature on infant and young child feeding practices.

Figure 1 presents the selection process which followed the PRISMA guidelines for reporting of systematic reviews. Search results were initially imported into Endnote reference management software (Thomson Reuters (Scientific) LLC) and duplicates and irrelevant studies were removed. Four independent reviewers screened study titles and abstracts for suitability against inclusion and exclusion criteria. The decision to include or exclude a study was required by two reviewers. If after consultation a decision wasn't reached, a third reviewer (AK) made the final decision.

## Figure 1. Selection flow chart of review process See attached figure file

#### Data extraction

For organization of extracted data, a unified matrix was utilized to record specific characteristics of included studies. Extracted data included reference details (author/data/publication), methodological approach (e.g., interviews/focus groups), conceptual framework (e.g., Grounded Theory), objectives or aims of the study, sampling methodology, socio-demographic characteristics of participants, country/region, and analysis method(s). The initial results of the selection process and data extraction, with selected characteristics, are presented in **Table 1**.

#### Quality appraisal

Each selected article was initially assessed by two reviewers (AB, AK) according to the Critical Appraisal Skills Program checklist<sup>14</sup> to ensure quality and internal validity. Where reviewers had any differing opinions a third reviewer was consulted for consensus (EFK). Selected studies met minimum criteria defined through the checklist including domains such as appropriateness of study design, data collection techniques, and analysis methods. Appraisal results are presented in Table 2 using the following questions for analysis:

- 1. Was there a clear statement of the aims of the research?
- 2. Is a qualitative methodology appropriate?
- 3. Was the research design appropriate to address the aims of the research?
- 4. Was the recruitment strategy appropriate to the aims of the research?
- 5. Was the data collected in a way that addressed the research issue?
- 6. Has the relationship between researcher and participants been adequately considered?
- 7. Have ethical issues been taken into consideration?
- 8. Was the data analysis sufficiently rigorous?
- 9. Is there a clear statement of findings?
- 10. How valuable is the research?

Possible Responses: Yes, No, and Cannot assess due to missing information

#### **Table 2. CASP Criteria Analysis**

Following data extraction, relevant text from the results, discussion and conclusion sections, which provided information directly pertinent to home care of newborns from the perspectives of family caregivers, were imported into NVivo 11 qualitative software (NVivo qualitative data analysis software; QSR International Pty Ltd. Version 11, 2015).

Following the appraisal, content analysis<sup>15</sup> was employed to identify domains for investigation and presentation within a framework analysis approach <sup>16</sup> using the WHO guidelines. The focus of analysis was on manifest content rather than latent content <sup>17</sup>. A narrative summary of the identified domains and themes, developed according to content, was reviewed by the research team (SE, ANB, EFK) to produce a consensus-based listing including barriers and facilitators to recommended newborn care practices. This review was undertaken by the authors alone and no patients or public participants were involved.

#### **RESULTS**

#### Geographic overview of studies reviewed

The vast majority of studies identified emerged from research carried out in the Sub-Saharan

region, while the South Asian region was also well represented in the qualitative literature relating to newborn care practices at home.

Sub-Saharan Africa

Studies from the African region comprised 24 of 37 included for review, and information presented in the studies described the full range of home based newborn care practices.

South Asia

From the South Asian region, 8 of 37 studies presented information on newborn care practices, covering more general rather than specific domains of newborn care, though one focused on breastfeeding.

Southeast Asia

Three studies, two related to breastfeeding in Cambodia and Lao PDR, along with another from Cambodia related to skin care, were identified from the Southeast Asian region.

Latin America / Caribbean

Two qualitative studies were identified from the Latin America/Caribbean region, from Guatemala and Haiti, related to breastfeeding and cord care respectively.

#### **Barriers and facilitators**

A comprehensive list of barriers and facilitators stratified by the recommended care practice that were generated through the data synthesis exercise appears in **Table 3**. For each domain of newborn care, study findings were extracted, and information on barriers and facilitators synthesized. Among the 37 studies in this review, many of the reported barriers and facilitators

were cross-cutting for recommended newborn care practices (i.e. cord care, drying and wrapping after delivery, prompt initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness). Across all practices, delivering at a health facility, including grandmothers in decision-making processes during and after pregnancy, low health care costs, and exposure to newborn care messaging in the community were reported as important facilitators for adoption of recommended newborn care practices. Common barriers across the recommended practices included traditional and historical beliefs and practices, cultural and gender norms, geographic location, conflicting health messaging, and societal pressures.

Barriers that influenced adoption of recommended **cord care practices** included lack of resources (e.g. clean water and razor blades), misinformation on timeliness of cord cutting, religious and cultural beliefs, and untrained birth attendants. Facilitators included institutional delivery, exposure to educational campaigns on safe and hygienic cord cutting practices, community outreach activities promoting handwashing and provision of clean razor blades, decision-making by grandmothers and women leaders, and cord-care counseling by TBAs.

Barriers to timely **drying and wrapping** included perceptions of newborn vulnerability and dirtiness, conflicting advice household stakeholders, and waiting for delivery of the placenta. Facilitators included institutional delivery, exposure to educational campaigns on newborn thermal regulation, traditional wrapping practices, and the presence of two TBAs during delivery.

Factors impeding **delayed bathing** included societal pressure for cleanliness, preference for immediate bathing due to concerns about ritual pollution and hypothermia, negative perceptions of the vernix, and immediate bathing at health facilities. Factors that facilitated delayed bathing after delivery included hospital-based birth, exposure to newborn care messaging on the radio during pregnancy, communication between health care workers in the community and at the facility during pregnancy, and social support from other women in the household.

Factors inhibiting **skin-to-skin care** and **thermal control** practices included use of blankets instead of skin-to-skin contact, not immediately releasing baby to mother following delivery, early bathing, concerns of disease transmission, and maternal household duties.

Facilitators included exposure to kangaroo care messaging during pregnancy, observing positive newborn health outcomes of other mothers who used kangaroo care practices, medical advice from health care providers, and prior participation in behavior change interventions.

Barriers to care-seeking for illness included lack of transport, minimal financial resources, distances to health facility, gender norms, prior negative experiences at health facilities, and cultural norms such as protective isolation during the postpartum period.

Facilitators included family knowledge and recognition of danger signs and illness symptoms, lower health care costs, community education and support from religious leaders, and exposure to newborn health campaigns.

Barriers to **initiating breastfee**ding included spatial/physical isolation, conflicting health messages, mother exhaustion, baby not crying for milk, historical and traditional beliefs to discard colostrum, and education. Facilitating factors included community and family member knowledge, information provided during health facility-based birth, attendance by trained TBAs, being a first time mother, and exposure to breast feeding education and policy campaigns.

#### **DISCUSSION**

Effective interventions to improve newborn survival require information on a number of complex factors related to essential newborn care <sup>18</sup>. In addition to collecting improved quantitative data for neonatal survival, qualitative data are essential for behavioral interventions targeted to specific populations. <sup>19</sup> Few qualitative systematic reviews exist to synthesize information from perspectives of parents on newborn care. One review from 2014 focused on skin-to-skin contact and included 29 studies containing data from 9 countries<sup>20</sup>. Findings from that review centred on the experience of becoming a parent under unfamiliar circumstances, and thoughtfully considered the experiences of parents in the unique practice of skin-to-skin care. The authors did not restrict the review to low income settings, though studies from Uganda, Brazil, and South Africa were included. Our findings add further information to the peer reviewed literature from low income countries, where the majority of newborn deaths occur.

Another review was recently conducted in relation to thermal care for newborns in Sub-Saharan Africa<sup>21</sup>. The review focused on sociocultural factors and identified a number of potentially harmful cultural norms and traditions which influence care across African settings. As in the present review, caregiver factors and contextual barriers as well as facilitating factors were identified, but these were specific to thermal control, which may not represent the full range perspectives for other newborn care practices. Further, the restriction to Sub-Saharan Africa settings limits the potential for transferability of the findings to other geographic settings and data from parents or family caregivers was not the focus.

A systematic review covering neonatal care practices in Sub-Saharan Africa was recently undertaken<sup>22</sup>. The authors of that review included both quantitative data and qualitative data published from 2001-2014, whereas our review focused on qualitative data only, and covered the period 2006-2017. Bee et al. also included studies of facility-based and home-based care (unlike our study which focused on data from parents regarding home care) and noted the limitation of data having come mainly from 5 countries, highlighting a need for research from a wider geographic area, such as has been provided in the present review. Given that birth at home presents unique risks to the newborn<sup>23</sup>, information from these settings is key. Whereas the present review focused on barriers and facilitators identified through qualitative research, the review by Bee et al. centered on the prevalence of key immediate newborn care practices.<sup>22</sup>

Policy recommendations and current approaches to reducing newborn mortality have not yet been appropriately scaled to reduce newborn mortality to levels targeted by the Sustainable Development Goals<sup>24</sup>. In the context of international calls for reduction of newborn mortality and stillbirths<sup>25</sup>, it will be essential for interventions to meet the needs of families and parents caring for newborns. This systematic review of qualitative research, drawn from the literature across low income countries, is an important step to providing data on the range of newborn care practices at home, which is specifically relevant to behavior change in settings where high newborn mortality continues.

#### **Conclusions**

This systematic review identified qualitative studies reporting on the experiences and first-hand accounts of family members and caregivers in low income countries who are responsible for providing essential newborn care for their infants up to the first 28 days of life. The review identified barriers and facilitators commonly reported in studies of newborn care practices. The findings presented here are directly applicable to social and behavioral change initiatives aimed at improving care practices for better newborn health outcomes in low resource settings.

No.	Author(s)	Year	Qualitative Methods	Participants**	Country (s)	Newborn Care Practices
1	Aborigo, Moyer, Rominski, et al.	2012	In depth interviews (IDI), Focus Group Discussions (FGD)	Mothers, health care providers, TBA, community leaders, grandmothers, compound heads, heads of households	Ghana	Breastfeeding practices
2	Adejuyigbe, Bee, Amare et al.	2015	IDI, Narrative Interviews, and Observations (O)	Mothers, fathers, health workers, grandmothers, TBA	Nigeria, Tanzania, Ethiopia	Thermal care and bathing
3	Alam, Ali, Sultana et al.	2008	IDI, O	Mothers, fathers, grandmother, family members, TBA	Bangladesh	Cord care practices
4	Amare	2014	IDI	Mothers, grandmothers, TBA	Ethiopia	Cord care practices
5	Amare, Shamba, Manzi, et al.	2015	IDI, FGD, (O)	Mothers, fathers, health workers, TBA, grandmothers, merchants	Four African sites	Emollient use for skin care
6	Atyeo, Frank, Vail et al.	2017	Semi structured interviews (SSI)	Mothers	Guatemala	Breastfeeding practices
7	Bazzano, Kirkwood, Tawiah-Agyeman, et al.	2008	IDI, FGD, Participant Observation, Case Study (CS), SSI	Mothers, grandmothers, health providers, community members	Ghana	Care seeking behaviors
8	Bazzano, Oberhelman, Potts et al.	2015	IDI, O, FGD, visual media	Mothers, grandmothers, fathers	Cambodia	Breastfeeding practices
9	Bazzano, Var, Grossman, et al.	2017	O, SSI	Mothers	Cambodia	Newborn care practices with emphasis on use of emollients
10	Byaruhanga, Nsungwa- Sabiiti, Kiguli, et al.	2011	IDI, FGD	Mothers, TBA, elderly care takers	Uganda	Care seeking behaviors
11	Degefie, Amare, and Mulligan	2014	IDI, Key informant interviews (KII)	Mothers, grandmothers, TBA, fathers	Ethiopia	General care practices
12	Dhinga, Gittelsohn, Suleiman, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, health care providers	Tanzania	Cord care practices
13	Engmann et al.	2013	IDI, FGD	Mothers, grandmothers, health care providers	Ghana	Newborn illness, danger signs, and care seeking behavior
14	Gondwe, Munthali, Ashorn, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, traditional healers,	Malawi	Pre-term birth and care seeking practices
15	Herlihy, Shaikh, Mazimba, et al.	2013	IDI, FGD	Mothers, grandmothers, TBA, community members	Zambia	Cord care practices
16	Hill, Tawaiah-Agyemang, Manu et al.	2010	IDI, FGD, and Narratives (N)	Mothers, grandmothers, TBA, fathers, pregnant women	Ghana	Thermal care practices
17	Hunter, Callaghan-Koru, Mahmud, et al.	2014	IDI, FGD	Pregnant women, mothers, husbands, grandmothers, traditional healers, community leaders, religious leaders, health care providers	Bangladesh	Skin to Skin practices
L8	Kesterton and Cleland	2009	IDI, FGD	Mothers, grandmothers, TBA	India	General care practices
19	Khadduri, Marsh, Rasmussen et al.	2008	SSI, FGD	Women of reproductive age, health service providers, mothers, fathers	Pakistan	General care practices
20	Lee, Durham, Booth, et al.		IDI, FGD	Mothers, health care staff, key informants	Lao PDR	Breastfeeding practices

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21	Lunze, Yeboah-Antwi,	2014	IDI, FGD	Mothers, community leaders, health	Zambia	Neonatal hypothermia
	and Marsh			officers, grandmothers		and thermal care
		2011	151 661 565			practices
22	Melesse-Salasibew,	2014	IDI, SSI, FGD	Mothers, local experts on newborn	Ethiopia	General care practices
	Filteau, and Marchant	2000	IDI	care practices	5 1 1 1	following home births
23	Moran, Choudhury, Khan, et al.	2009	IDI	Pregnant women, mothers	Bangladesh	General care practices
24	Moyer, Aborgio, Logonia et al.	2012	IDI, FGD	Women with newborns, grandmothers, compound heads, community leaders, TBA, health care providers	Ghana	Cord care practices
25	Mrisho, Schellenberg, Mushi et al.	2008	IDI, FGD, CS	Female community informants	Tanzania	Home-based care practices
26	Nabiwemba, Atuyambe, Criel, et al.	2014	IDI	Mothers	Uganda	Care practices for LBW babies
27	Nalwadda, Waiswa, Guwatudde, et al.	2015	IDI, FGD	Mothers, fathers, TBA	Uganda	General care practices with emphasis on cord care
28	Newbrander, Natiq, Shahim, et al.	2014	IDI, FGD, O	Household members of perinatal woman, community members	Afghanistan	General care practices
29	Okeyere, Tawiah- Agyemang, Manu, et al.	2010	IDI, FGD, Birth Narratives (BN)	Mothers, TBAs, grandmothers, husbands, asram healers	Ghana	Traditional illness
30	Pati, Chauhan, Panda, et al.	2014	IDI	Mothers, TBA	India	General care practices with an emphasis on breastfeeding
31	Premji, Khowaja, Meherali, et al.	2014	IDI, FGD	Mothers, fathers, grandmothers	Pakistan	General care practices
32	Sacks, Moss, Winch et al.	2015	IDI, FGD, O	Mothers, TBA, hospital staff	Zambia	Skin, thermal, and cord care
33	Shamba, Schellenberg, Hildon et al.	2014	IDI, FGD, BN	Mothers, TBA	Tanzania	Bathing, thermal, and skin to skin care practices
34	Tawiah-Agyemang, Kirkwood, Edmond, et al.	2008	SSI, FGD	Mother, women of child bearing age, health workers, policy makers	Ghana	Initiation of breastfeeding
35	Thairu and Pelto	2008	IDI	Mothers	Tanzania	General care practices
36	Waiswa, Kemigisa, Kiguli, et al.	2008	IDI, FGD	Mothers, fathers, grandparents	Uganda	General care practices
37	Walsh, Norr, Sankar, et al.	2014	FGD	TBA, pregnant women, stakeholders, traditional healers	Haiti	Cord care practices

<sup>\*</sup>Color coding indicates geographic regions

<sup>\*\*</sup>Data for the review were only extracted from participants who were family members (including mothers of newborns or mothers-to-be) and non-professionals who provided care at home to the newborn.

N o.	Author(s)	Yea r	CASP 1	CAS P 2	CAS P 3	CAS P 4	CAS P 5	CAS P 6	CAS P 7	CAS P 8	CAS P 9	CASP 10	Overall Score
1	Aborigo, Moyer, Rominski et al.	2012	Y	Υ	Y	Y	Y	Υ	Y	Υ	Υ	Υ	10/10
2	Adejuyigbe, Bee, Amare et al.	2015	Υ	Υ	Y	Υ	Υ	Υ	Y	Υ	Υ	Y	10/10
3	Alam, Ali, Sultana et al.	2008	Y	Υ	Y	Υ	Υ	N	Y	Υ	С	Y	8/9
4	Amare	2014	Υ	Y	Y	Y	Υ	N	Υ	Υ	Υ	Υ	9/10
5	Amare, Shamba, Manzi, et al.	2015	Υ	Υ	Υ	Υ	Υ	N	Y	Υ	Υ	Υ	9/10
6	Atyeo, Frank, Vail et al.	2017	Y	Υ	N	С	N	Υ	Υ	Υ	Υ	Y	7/9
7	Bazzano, Kirkwood, Tawiah-Agyemang, et al.	2008	Y	Y	Y	Y	Υ	N	N	Y	Y	Y	8/10
8	Bazzano, Oberhelman, Potts, et al.	2015	Y	Υ	Y	Y	Y	С	Y	Y	Y	Y	9/9
9	Bazzano, Var, Grossman, et al.	2017	Υ	Υ	Υ	Y	Υ	С	Υ	Υ	Υ	Y	9/9
10	Byaruhanga, Nsungwa-Sabiti, Kiguli, et al.	2011	Y	Y	N	Y	Y	N	Y	Y	Y	С	7/9
11	Degefie, Amare, and Mulligan	2014	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8
12	Dhingra, Gittelsohn, Suleiman, et al.	2014	Y	Υ	Y	Y	Y	N	Y	Y	Υ	Υ	9/10
13	Engmann, Adongo, Akawire, et al.	2013	Υ	Υ	Υ	Y	Y	Y	Y	Υ	Υ	Υ	10/10
14	Gondwe, Munthali, Ashorn, et al.	2014	Y	Υ	Υ	Υ	С	N	Y	Υ	Υ	Y	8/9
15	Herlihy, Shaikh, Mazimba, et al.	2013	Y	Υ	Y	Υ	С	N	Y	С	Υ	Υ	7/8
16	Hill, Tawiah- Agyemang, Manu, et al.	2010	Y	Y	Y	Y	Y	N	N	С	Υ	Y	7/9
17	Hunter, Callaghan- Koru, Mahmud, et al.	2014	Y	Y	Y	Υ	Υ	Y	Υ	Υ	Y	Y	10/10
18	Kesterton and Cleland	2009	Υ	Υ	Υ	Y	Υ	Υ	Y	Υ	Υ	Y	10/10
19	Khadduri, Marsh, Rasmussen, et al.	2008	Υ	Υ	Y	Y	С	N	N	С	Υ	Υ	7/9
20	Lee, Durham, Booth, et al.	2013	Υ	Υ	Y	Υ	С	N	Υ	С	Υ	Υ	7/8
21	Lunze, Yeboah- Antwi, Marsh, et al.	2014	Υ	Υ	Y	Y	Υ	N	Y	С	Υ	Y	8/9
22	Melesse-Salasibew, Filteau, and Marchant	2014	Y	Y	Y	N	Y	N	Y	N	Y	С	7/9
23	Moran, Choudhury, Khan, et al.	2009	Y	Υ	Υ	Y	С	N	Υ	С	Υ	Υ	7/8
24	Moyer, Aborigo, Logonia, et al.	2012	Υ	Υ	Υ	Y	Υ	Y	Υ	Y	Υ	Y	10/10
25	Mrisho, Schellenberg,	2008	Υ	Υ	Υ	Υ	С	N	Υ	N	Υ	Y	7/9

Atuyambe, Criel, et al.  Atuyambe, Criel, et al.  Alwadda, Waiswa, Guwatudde, et al.  Rewbrander, Natiq, Shahim, et al.  2010 Y Y Y Y Y C N Y N Y Y Y 7/9  Chayere, Tawaiah-Agyeman, Manu, et al.  Apada, et al.  2014 Y Y Y Y Y N N Y N N Y Y Y Y Y Y Y Y Y		Mushi, et al.												
Guwatudde, et al.  28 Newbrander, Natiq, Shahim, et al.  29 Okyere, Tawaiah-Agyeman, Manu, et al.  30 Pati, Chauhan, Panda, et al.  31 Premji, Khowaja, Meherali, et al.  32 Sacks, Moss, Winch, et al.  33 Shamba, Schellenberg, Hildon, et al.  34 Tawiah-Agyemang, Kirkwood, Edmond, et al.  35 Thairu and Pelto  2008 Y Y Y Y Y Y N Y Y Y Y Y Y Y Y Y Y Y Y	26	Atuyambe, Criel, et	2014	Y	Y	Y	Y	С	N	Y	С	Y	Y	7/8
Shahim, et al.	27		2012	Y	Y	Y	Y	С	N	Υ	С	Y	Υ	7/8
Agyeman, Manu, et al.  30 Pati, Chauhan, Panda, et al.  31 Premji, Khowaja, Meherali, et al.  32 Sacks, Moss, Winch, et al.  33 Shamba, Schellenberg, Hildon, et al.  34 Tawiah-Agyemang, Kirkwood, Edmond, et al.  35 Thairu and Pelto  2008 Y Y Y Y N Y N Y Y Y Y Y Y Y Y Y Y Y Y	28		2010	Υ	Y	Y	Y	С	N	Υ	N	Y	Y	7/9
Panda, et al.	29	Agyeman, Manu, et	2006	Y	Y	Υ	Y	С	N	Y	N	Y	Y	7/9
31         Premji, Khowaja, Meherali, et al.         2014         Y	30		2014	Y	Y	Υ	Υ	N	N	Υ	N	N	С	5/10
32       Sacks, Moss, Winch, et al.       2015       Y       <	31	Premji, Khowaja,	2014	Y	Y	Υ	Υ	Υ	Y	Υ	Υ	Υ	Y	10/10
33       Shamba, Schellenberg, Hildon, et al.       2014       Y <td>32</td> <td>Sacks, Moss, Winch,</td> <td>2015</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>N</td> <td>Υ</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>9/10</td>	32	Sacks, Moss, Winch,	2015	Υ	Υ	Υ	Υ	Υ	N	Υ	Y	Y	Y	9/10
34       Tawiah-Agyemang, Kirkwood, Edmond, et al.       2008       Y       Y       Y       Y       Y       N       Y       C       Y       7/9         35       Thairu and Pelto       2008       Y	33	Shamba, Schellenberg,	2014	Y	Υ		Y	Y	С	Y	Y	Y	Y	8/9
36 Waiswa, Kemigisa, 2008 Y Y Y N Y N Y Y Y 8/10	34	Tawiah-Agyemang, Kirkwood, Edmond,	2008	Y	'	Y	Υ	Υ	N	N	Y	С	Y	7/9
Kinuli et al	35	Thairu and Pelto	2008	Υ	Y	Υ	Υ	Y	N	Υ	Υ	Υ	Y	9/10
37 Walsh, Norr, Sankar, 2015 Y Y Y Y Y N Y Y Y 9/10 et al.	36		2008	Y	Υ	Υ								
	37	Walsh, Norr, Sankar,	2015	Υ	Υ	Υ	Y	Υ	N	Υ	Υ	Y	Y	9/10

Table 3. Barriers and facilitators described in articles reviewed

Domain of newborn care	Barriers	Facilitators	Article Number per Table 2, Year	Total Number of Article Mentions
Cord care	Lack of supplies, including water or	Knowledge about cord care	3, 2018	19/37
	infection prevention supplies	Community stakeholder recognition	4, 2014	
	Using surgical spirits and powder	that infants are susceptible to cord	9, 2017	
	Unhygienic cutting practices, including used, unsterilized razor blades or	Delivery in hospital	10, 2011	
	scissors	Informed at health facility	11, 2014	
	Unskilled attendants	Tailored behavior change	12, 2014	
	Delayed cord cutting, resulting in infection	communication	15, 2013	
		Appropriate compromises between	,	
	Mixed perception about the length at which cord should detach and heal	existing and recommended practices	18, 2009	
	Use of topical applications to the cord,	Community education	19, 2008	
	including herbs, butter, and indigenously-made substances, for	Outreach education	22, 2014	
	medicinal/protective purposes	Inclusion of grandmothers and other female household members, who are	23, 2009	
	Application of traditional remedies and substances on the cord to moisturize or	key decision makers and caregivers	24, 2012	
	dry it and facilitate its separation and promote healing	Participatory health promotion techniques, such as women's groups	25, 2008	
	Pallafillation of infantian and add	Some and the section To division I Bright	26, 2014	
	Belief that cord infections caused by mother's diet	Programs targeting Traditional Birth Attendants (TBAs) and community mothers	27, 2015	
	Lack of understanding about cord cleaning	4	30, 2014	
	Lack of understanding of risks and	Importance of cord care and tying recognized in community and	32, 2015	
	infections affecting the cord and certain signs of infection, such as redness	understood culturally	36, 2008	
	Cultural belief and newborn care	Recognition of cord problems, such as delayed healing, bleeding, or swelling	37, 2014	
	practices not conforming to recommended practices	TBAs counselling mothers to protect		
	Cost of supplies, including CHX solution	the cord from infections		
	Cost of supplies, including CHA solution	Consensus regarding liquid cord		
	Religious and cultural beliefs about cord cutting and cleaning	cleaning		
	Umbilical cord thought to make baby vulnerable to witchcraft	Raising awareness about usefulness of CHX in cord cleaning		
	Mothers cutting the cord themselves	Willingness to adopt practices that would protect the newborn and alter traditional cord care practices		
	Umbilical cord not tied prior to cutting, can lead to tetanus	Behavior change communication		
	Practice of only tying to cord on the side	messages beginning at pregnancy		
	of the baby	Prescribed practices making their way into traditional care		

	Recontamination of washed hands			
	before attending to newborn	Efforts to promote hand-washing and		
		to avoid recontamination		
	Seclusion of mother and baby in			
	postpartum period may lead to late	Promotion of efforts to avoid unclean		
	identification of illness and delay to	home applications to the cord		
	seeking care			
	_	Programs, promoting cord cleansing		
	Utilizing materials, such as rope and	with antiseptics, should provide		
	twigs, in cord tying	educational messages about the		
		balance between the benefits and the		
	Disconnect between healthcare	likelihood that separation of umbilical		
	providers and community	cord may be slightly delayed		
	providers and community	cord may be slightly delayed		
	Local conceptions regarding role of cord	Using materials, such as clean cotton,		
	tying in stemming blood flow	other than fingers to apply		
	tying in sternining blood now	medicine/antiseptic		
	Concorns regarding the length of time	medicine/antiseptic		
	Concerns regarding the length of time	Dunana in cuban alcun anna		
	until cord detachment	Programs in urban slum areas		
		1		
	Presence of blood clots associated with	Interventions to improve social		
	curses	support to women, especially first-		
		time mothers		
		Educating healthcare providers about		
		harmful, traditional practices so they		
		are specifically addressed		
	curses			
		Explaining rationale for tying the cord		
		on both sides of the cut		
		Cultural health systems model that		
		depicts all stakeholders		
		Presence of blood clots leading to		
		seeking medical treatment at health		
		centers		
		Promotion of chlorhexidine in place of		
		commonly-reported application of		
		harmful substances		
		narmar substances		
		Scale-up of evidenced based practices		
		Scale-up of evidenced based practices		
		Health promotion programs taking		
		into account health system barriers		
		and financial burden		
Drying and wranning	Robaviors vary among home deliveries	Knowledge about draing and	2 2015	11/37
Drying and wrapping	Behaviors vary among home deliveries	Knowledge about drying and	2, 2015	11/3/
	Percention of dirtiness of habit	wrapping	0 2011	
	Perception of dirtiness of baby	Understanding that haby should be	8, 2011	
	December of highlight and a second	Understanding that baby should be	40 2044	
	Perception of birthing process as	kept warm	10, 2014	
	polluting			
		Delivery in hospital	14, 2010	
	Vulnerability of baby			
		Informed at health facility	16, 2009	
	Opinions of other household			
	stakeholders, such as the mother-in-law	Tailored behavior change	19, 2014	
		communication		
	Home and hospital delivery		20, 2014	
		Appropriate compromises between		
	Not attending to haby until placents	existing and recommended practices	21, 2009	
	Not attending to baby until placenta	existing and reconnicioed practices	,	
	delivered	existing and recommended practices	,	
	_ : :	Community education	28, 2014	

Prioritization of the mothers	Outreach education	30, 2015
	Inclusion of grandmothers who are key decision makers	31, 2014
	Participatory health promotion techniques, such as women's groups	
	Traditional practice of wrapping in new clean cloth	
	Use of warm water and traditional herbs to protect baby	
	Behavior change communication messages beginning at pregnancy	
	Babies dried and wrapped due to awareness of reduction of cold	
	Having more than one attendant to help both the mother and baby	
	Programs in urban slum areas	
	Interventions to improve social support to women, especially first-time mothers	

Bathing	Traditional or historical practice	Delayed bathing when delivery in	2, 2015	17/37
	Lack of knowledge of when to bathe baby, especially in home deliveries	hospital Informed at health facility	3, 2008	
	Early bathing due to societal pressure	Quality of care in health facility	8, 2011	
	Cultural norm of frequent bathing	Health worker advice	9, 2014	
	Cultural belief and newborn care	Tailored behavior change	10, 2014	
	practices not conforming to recommended practices	communication, addressing community norms and based on	14, 2010	
	Negative perception of vernix, including	formative research	16, 2009	
	association with sperm	Appreciation of newborn vulnerability to encourage behavior change	19, 2014	
	Vernix considered dangerous for HIV- exposed infants	Appropriate compromises between	20, 2014	
	Bathing in close proximity to smoking	existing and recommended practices	21, 2009	
	fires	Community education	24, 2014	
	Early bathing due to association with dirtiness as well as body odor later in	Outreach education	26, 2014	
	life	Inclusion of grandmothers who are key decision makers	28, 2014	
	Differences in practice by untrained TBAs	Participatory health promotion	30, 2015	
	Spiritual beliefs attached to use of local	techniques, such as women's groups	31, 2014	
	herbs for bathing  Bathing practices, such as using pond	Behavior change communication messages beginning at pregnancy	33, 2008 34, 2008	
	water	Having more than one attendant to help both the mother and baby	34, 2008	
	Substances added to water, including Dettol or Savion	Delayed bathing due to concerns about pneumonia		
	Bathing immediately after birth due to concerns about 'ritual pollution' can cause hypothermia	Identifying and addressing cultural rationales that underlie negative practices		
	Early bathing linked to shaping the baby's head	Reinforcing ad protecting beliefs that support positive practices		
	Early bathing to help the baby sleep and feel clean	Improving health worker communication skills and social		
Thermal control	Lack of practice when delivery at home or with TBA	Informed at health facility Beliefs about importance of thermal	2, 2015	12/37
	Lack of knowledge of keeping baby	care	3, 2008	
	indoors	Quality of care in health facility	8, 2011	
	Suboptimal practices	Tailored behavior change communication based on formative	9, 2014	
	Early bathing  Length of time baby undressed during	research  Appropriate compromises between	10, 2014	
	bathing	existing and recommended practices	17, 2008	
	Bathing with warm water	Community education	19, 2014	
	Use of blankets, rather than skin-to-skin care	Outreach education		
		Outreach education	24, 2014	

			<b>.</b>	
	Newborn massage, including use of mustard oil, can compromise the skin barrier function	Inclusion of grandmothers who are key decision makers Participatory health promotion techniques, such as women's groups	28, 2014	
	Cultural belief and newborn care practices not conforming to recommended practices  Lack of maintaining thermoprotective practices in the first few hours postpartum, when newborns are at	Behavior change communication messages beginning at pregnancy  Knowledge and practice that baby should be kept warm  Having more than one attendant to	31, 2014	
	greatest risk	help both the mother and baby  Use of low-cost newborn warmers  Community-based practices on hypothermia prevention and management		
Skin to skin contact	Few mothers given baby immediately	Behavior change interventions based	2, 2015	9/37
SMIT TO SMIT COILECT	after birth	on formative research	3, 2008	5/5/
	Concerns of disease transmission, harm to umbilicus	Quality of care in health facility  Tailored behavior change	8, 2011	
	Perception of dirtiness after birth	communication	9, 2014	
	Maternal rest  Concerns of baby becoming cold	Appropriate compromises between existing and recommended practices	14, 2010 15, 2014	
	Delayed due to early bathing	Community education	16, 2009	
	Perception that it might be harmful to fragile newborns	Outreach education  Inclusion of grandmothers who are key decision makers	19, 2014 31, 2014	
	Lack of understanding that kangaroo mother care is a protective method of caring for healthy newborns	Participatory health promotion techniques, such as women's groups	31, 2011	
	Use of blankets, rather than skin-to-skin care	Behavior change communication messages beginning at pregnancy		
	Lack of continued skin to skin contact	Association with reduced risk of cord infection		
	Cultural belief and newborn care practices not conforming to recommended practices  Women feeling responsible for	Concept easily understood and women willing to try if good for the baby		
	household duties	Appreciation of kangaroo mother care as an appropriate treatment for ill babies		
		Biomedical advice from healthcare providers reaching community through word-of-mouth and television campaigns		
		Receiving help from family members		

		Witnessing other women perform kangaroo mother care with positive outcomes  Focusing intervention messages on building supportive a environment for		
		kangaroo mother care practice		
Hygiene	Lack of knowledge on hand-washing with soap	Health education	3, 2008	6/37
	Recontamination of washed hands	Tailored behavior change communication	9, 2014	
	before attending to the newborn	Appropriate compromises between	16, 2009	
	Cultural belief and newborn care practices not conforming to	existing and recommended practices	17, 2008	
	recommended practices	Community education	22, 2012	
		Outreach education Inclusion of grandmothers who are	24, 2014	
	10	key decision makers		
		Participatory health promotion techniques, such as women's groups		
	Teconinended practices	Efforts to promote hand-washing and to avoid recontamination		
		Understanding of keeping babies and their surroundings clean		
	2	Educating healthcare providers about harmful, traditional practices so they are specifically addressed		
		12		
Breast feeding (initiation of	Traditional or historical practice	Community members knowledgeable	1, 2012	18/37
and provision of colostrum)	Belief that it is unhealthy	about importance of breast-feeding  Delivery in a health facility, where	6, 2017	
	Mother's exhaustion	staff encouraged early breast-feeding	9, 2017	
	Limited knowledge	Culturally-tailored health education	10, 2011	
	Maternal education status	Targeting isolated villages	11, 2014	
	Geographic isolation	Cross-generational education interventions	12, 2014	
	Inconsistency in health education	Interventions through community	18, 2009	
	Learning from relatives  Pre-lacteal feeds given on fingertip,	health clinic workers  Appropriate compromises between	19, 2008 20, 2013	
	increasing risk of infection	existing and recommended practices	22, 2014	
	Low urgency in initiating breastfeeding as mother and child believed to be	Community education	23, 2009	
	polluted after birth	Outreach education	25, 2008	
	Negative beliefs regarding colostrum			

	<b>▼</b>	Inclusion of grandmothers/mother-in-	26, 2014	
	Traditional practices to test colostrum for bitterness	laws and religious leaders who are key decision makers	28, 2014	
	Perception of a lack of breast milk	Participatory health promotion techniques, such as women's groups	30, 2014	
	Onset of post-birth activities, such as		31, 2014	
	bathing	Awareness of nutritive value of breast milk	33, 2008	
	Perception that baby needs rest	Desitive personaling regarding infent	25 2000	
	Baby not crying for milk	Positive perception regarding infant feeding	35, 2008	
	Perception of inadequate maternal nutrition and breast milk	TBAs trained by Ministry of Health		
		Raising awareness of early initiation of		
	Premature breast milk supplementation (water and other fluids), which may	breast-feeding in the policy arena		
	expose newborns to pathogens	Cultural belief and practices		
	Work served as a barrier	Identifying and addressing cultural rationales that underlie negative		
	Difference in advice received from	practices		
	different people by first-time mothers	Reinforcing ad protecting beliefs that		
	Cultural belief and newborn care practices not conforming to	support positive practices		
	recommended practices	Improving health worker		
	Perception that hunger is not met or	communication skills and social		
	satisfied by breast-milk alone	management of patients		
		Lowering healthcare costs		
		Programs in urban slum areas		
		Interventions to improve social		
		support to women, especially first- time mothers		
		First-time mothers' mothers		
		Working with employers and developing supportive employment policies		
		Providing postnatal support and working with lay people and health professionals		
		Research to identify optimal combination of interventions		
		Using religious leaders, trained health workers, family health action groups, and radio to disseminate messages		
Care seeking for illness	Lack of transportation	Addressing locally existing cultural beliefs	7, 2008	7/37
	Geographic isolation/remoteness from health facilities	Strengthening facility care	8, 2011	
			11, 2013	
	Financial ability/constraints	Urging families to seek medical care for any symptom of illness in a	17, 2008	
	Seclusion of mother and baby in postpartum period may lead to late	newborn	25, 2015	

identification of illness and delay to seeking care  Community understanding of the newborn period and cultural expectations  Caretaker knowledge about newborn sickness  Individual experiences in household and caretaker autonomy  Women's inability to seek care without being accompanied by a male relative  Healthcare decisions influenced by community members  Perceived health system gaps  Confidence in healthcare providers is issue-specific  Sequential care-seeking practices, with traditional medicine as first-line of treatment for 7 days  Untimely action after recognition of danger signs  Previous negative experiences with health services facilities  Local understanding of illness affects treatment practices  Mothers blamed for infant illness	Addressing financial barriers  Recognition of danger signs  Targeted behavior-change communication programs  Using religious leaders, trained health workers, family health action groups, and radio to disseminate messages  Understanding traditional illnesses in designing care-seeking interventions	26, 2014 27, 2010	
treatment for 7 days  Untimely action after recognition of danger signs  Previous negative experiences with health services facilities  Local understanding of illness affects treatment practices			
Shame about utilization of maternal and neonatal services  Care-seeking for local community members for serious health concerns  Post-partum depression  'Asram' perceived as common illness which cannot be treated at health facilities  'Asram' treatments including frequent cold herbal baths, air-dying, and oral treatments  Modification of 'asram' treatment required the sanction of a healer			

Other newborn care	Cultural perception of emollients as improving the skin, keeping the baby	Association of emollient therapy in reduction of mortality among preterm	4, 2014	4/37
	warm, and shaping the baby	infants	20, 2014	
	Social pressure to use emollients	Newborn emollient trials, specifically designed to reflect contextual	26, 2010	
	Emollient choice influenced by cost, availability, and traditional norms	differences	30, 2015	
	Massage, associated with application of emollients, is potentially damaging to skin	If emollients are proven effective, policy makers deciding whether to provide emollients free of charge or through social marketing		
	Potential impact of emollients, such as engine oil, on harm and even mortality	Improving practice of massage associated with emollient application		
	TBAs applying mild pressure inside baby's mouth on the soft palate with water and local herb	Understanding traditional illnesses in designing care-seeking interventions		
	Application of powders directly into dermal incisions of ill children to ward off malevolent spirits			
Low birth weight	Babies not weighed	Better knowledge of home care	9, 2014	3/37
recognition	Belief in supernatural powers	practices when delivery at health facility	12, 2014	
	Less knowledge of home care practices when baby delivered at home or in	Health education at community level to reach mothers that deliver at home	24, 2014	
	lower level health facility	Mechanisms to support mothers		
	Lack of knowledge of how to provide care or when to take baby to health facility	Provision of warmth to preterm newborns		
	Perceptions of preterm birth, including young and old maternal age, heredity, sexual impurity, and maternal illness during pregnancy	Addressing cultural practices for preterm babies among community members		
	Poverty	Vernix considered important for preterm newborns		
	Women placed with main responsibility for preterm newborns	31		
	High time burden of care for preterm babies leading to neglect of household, farming, and business duties	7		

#### **Contributorship statement:**

Authors have contributed as follows to this work. Conception and design of the work: ANB, RH; Data collection: ANB, AK, EFK, RH; Data analysis and interpretation: ANB, AK, EFK; Drafting the article: ANB, AK, EFK, SE, RH; Critical revision of the article: ANB, AK, EFK, SE, RH; Final approval of the version to be published: ANB, AK, EFK, SE, RH.

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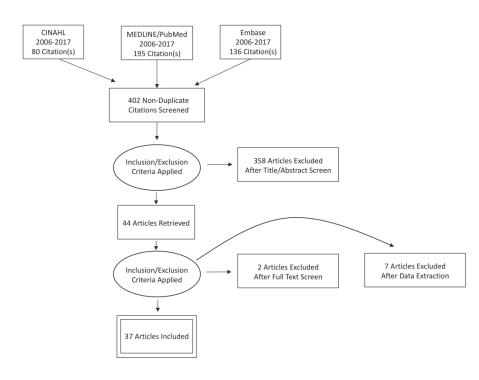


Figure 1
264x190mm (300 x 300 DPI)

#### **Appendix 1. Search Strategy**

Search String	Notes
"infant, newborn"[mesh] OR	Includes "health
newborn[Title/Abstract] OR "newborn	knowledge, attitudes,
care"[tiab])) AND ("breast feeding"[MeSH	practices"
Terms] OR "immediate	
breastfeeding"[Title/Abstract] OR	
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# Reporting checklist for systematic review and meta-analysis.

Based on the PRISMA guidelines.

#### Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA reporting guidelines, and cite them as:

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement

		Reporting Item	Page Number
	#1	Identify the report as a systematic review, meta-analysis, or both.	0-1
Structured summary	#2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	0-1
Rationale	#3	Describe the rationale for the review in the context of what is already known.	1
Objectives	#4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
Protocol and registration	<b>#5</b> For	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address) and, if available, provide registration information including the registration number.  peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	0-1

	Eligibility criteria	#6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rational	3
ı	Information sources	#7	Describe all information sources in the search (e.g., databases with dates of coverage, contact with study authors to identify additional studies) and date last searched.	3
!	Search	#8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	See note
	Study selection	#9	State the process for selecting studies (i.e., for screening, for determining eligibility, for inclusion in the systematic review, and, if applicable, for inclusion in the meta-analysis).	4-5
	Data collection process	#10	Describe the method of data extraction from reports (e.g., piloted forms, independently by two reviewers) and any processes for obtaining and confirming data from investigators.	5
	Data items	#11	List and define all variables for which data were sought (e.g., PICOS, funding sources), and any assumptions and simplifications made.	5-6
	Risk of bias in individual studies	#12	Describe methods used for assessing risk of bias in individual studies (including specification of whether this was done at the study or outcome level, or both), and how this information is to be used in any data synthesis.	6-7
; )	Summary measures	#13	State the principal summary measures (e.g., risk ratio, difference in means).	6-7
	Planned methods of analyis	#14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	6-7
, , ,	Risk of bias across studies	#15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6-7
	Additional analyses	#16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-7
;	Study selection	#17	Give numbers of studies screened, assessed for eligibility, and	7-8
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		included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	#18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citation.	7-8
Risk of bias within studies	#19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	7
Results of individual studies	#20	For all outcomes considered (benefits and harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	7
Synthesis of results	#21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	8-10
Risk of bias across studies	#22	Present results of any assessment of risk of bias across studies (see Item 15).	7
Additional analysis	#23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	8-10
Summary of Evidence	#24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers	11
Limitations	#25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	#26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12
Funding	#27	Describe sources of funding or other support (e.g., supply of data) for the systematic review; role of funders for the systematic review.	12

#### **Author notes**

1. 4, Appendix

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## **BMJ Open**

# Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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Secondary Subject Heading:	Public health, Paediatrics
Keywords:	infant, newborn, postnatal care, QUALITATIVE RESEARCH, care seeking, Cambodia

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### Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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Keywords: infant, newborn, post-natal care, care seeking, qualitative research, health equity

Word count: 3005

Figures: 1 Tables: 3

#### **ABSTRACT**

#### **Objectives**

To understand family and parent perspectives on newborn care provided at home to infants in the first 28 days of life, in order to inform behavioral interventions for improving care in low income countries, where the majority of newborn deaths occur.

#### Design

A comprehensive, qualitative systematic review was conducted. MEDLINE/PubMed, Embase, and Cumulative Index of Nursing and Allied Health databases were systematically searched for studies examining the views of parents and family members on newborn care at home. The search period included all studies published from 2006 to 2017. Studies using qualitative approaches or mixed-methods studies with substantial use of qualitative techniques in both the methods and analysis sections were included. Studies meeting the inclusion criteria were extracted and evaluated using Critical Appraisal Skills Programme guidelines. Following the initial selection and appraisal, barriers and facilitators to recommended care practices across several domains were synthesized.

#### **Results**

Of 411 results retrieved, 37 met both inclusion and quality appraisal criteria for methodology and reporting. Geographic representation largely reflected that of newborn health outcomes globally, with the majority of studies conducted in the region of Sub-Saharan Africa and South Asia. Specific barriers and facilitators were identified among a range of domains including: cord care, drying and wrapping, thermal control, skin to skin contact, hygiene, breast feeding, care seeking for illness, low birth weight recognition. Cross cutting facilitators, common to all domains were also evident, including delivering at a health facility, including female relatives in counseling, lower health care costs, and exposure to newborn care messaging in the community.

#### **Conclusions**

When designing behavioral interventions to address newborn mortality at scale, policy makers and practitioners must include barriers and facilitators important to families in low income settings. **Review registration number** CRD42016035674.

#### **Article Summary**

#### **Strengths and limitations:**

- Strengths of the review include having had a librarian/information scientist in the research team, and multiple reviewers experienced in qualitative research in lowincome countries, primary qualitative data collection, and analysis.
- Other strengths of the study was the comprehensive search strategy covering multiple relevant databases; appraisal of quality among included studies based on critical appraisal skills guidelines; and a comprehensive description of study findings.
- Limitations included: the exclusion of documents not available in English, and those that
  may have been relevant, but were outside the defined date limitations. A further
  limitation is that because findings are presented in the aggregate, care practices from
  different geographic areas may require different interventions.

#### Introduction

Approximately 46% of all under-five deaths in 2016 occurred during the neonatal period, the initial 28 days following birth (global incidence). Southern Asia and sub-Saharan Africa account for nearly 80 percent of the newborn deaths. By 2030, the Sustainable Development Goals (SDG) target is to reduce neonatal mortality to at least as low as 12 deaths per 1,000 live births. However, per current trends, over 50 countries will fail to meet this target on newborn survival. Yet, the majority of these deaths are preventable.

During the neonatal period, care provided by parents and caregivers is critical for newborn survival.<sup>3</sup> Optimal or essential newborn care practices as defined by the World Health

Organization (WHO) include immediate drying and wrapping of newborns after birth, initiating skin-to-skin (STS) contact, clean cord care, dry cord care, immediate initiation of breastfeeding and exclusive breastfeeding until 6 months of age, as well as ensuring warmth (thermal control) of the newborn through delayed bathing. In addition, parents or caregivers at home must also provide nurturing care, safety and security, and responsiveness to the newborn's needs. The provision of quality, effective care at the home and community level is critical for improving newborn health outcomes and promoting optimal early childhood development. A reduction in neonatal mortality by 25% can be achieved by scaling up community interventions, including provision of optimal home care. Although feasible interventions exist to reduce newborn mortality, uptake of these interventions is low.

In order to increase scale up of coverage and implementation of effective home and community-based newborn care practices, providing data on research priorities for newborn health is key.<sup>7</sup> Researchers have identified specific domains related to caregiver perceptions and behaviors as priorities.<sup>8</sup> Qualitative research has been particularly useful for obtaining information on newborn care practices at home, which often vary based on the sociocultural context in low-income countries.<sup>9</sup>

Despite the existence of multiple individual qualitative and formative research studies on home and community-based newborn care, a systematic review of the available qualitative research is lacking. Therefore, we conducted a systematic review to provide data to improve both programming and policy for home and community care for newborns.<sup>7</sup>

The primary objective of this study was to systematically review qualitative literature to understand parent and family experiences with home newborn care practice in low-income

countries, presenting information related to barriers and facilitators to inform behavioral interventions focused on improving newborn survival and care.

#### Methods

This systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO): registration number CRD42016035674. The review followed guidelines from the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) statement. Due to the emphasis on qualitative research, the review primarily employed the ENTREQ guidelines for reporting, while also drawing guidance from PRISMA, which is more specific to the requirements of quantitative literature reviews. 10,11

Newborn care practices were defined as all actions taken by parents/caregivers that provide for the essential biological, physiological and psychological needs of the newborn infant following delivery and up to the end of the newborn period (28 days of life). These included, but were not limited to, the essential newborn care practices as defined by WHO: cord care, drying and wrapping after delivery, initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness.<sup>12</sup>

Four of five researchers involved in conducting the review, analyzing the results, and writing up the manuscript had strong experience in qualitative research methods, and hold graduate and/or doctoral level qualification in public health, with a specialization in research methods (ANB, EFK, AK, and SE). One researcher (RH) is an information scientist with a qualification in library sciences and specialization in support to research in science and biomedicine.

Patient and public involvement

No medical patients and or members of the public were involved in this systematic review of existing published research.

Inclusion and exclusion criteria

Studies were included if they used qualitative data collection methods such as interviews, focus groups, direct observation, and participatory action research. Inclusion requirements also stipulated that studies needed to have a well-described methodology section and a clear description of the qualitative data analysis methods and process (e.g., grounded theory, narrative analysis, content analysis, thematic analysis). Finally, data on newborn care at home must have been directly obtained from parents or caregivers of newborns (infants under 28 days of age, including low birthweight or small babies), whether born at home or at a facility, with or without skilled attendance, and regardless of whether the study also included additional data from non-family members or health workers such as TBAs (which data was not used for this review). Caregivers were defined as mothers/fathers or other adult family or community members who provided day-to-day physical and psychological support to meet the basic needs of newborn infants. Data gathered from community health workers, and from professional or non-professional health care providers, were not used or included in this study although it may have been presented in one of the articles included in the review.

Excluded studies were those for which it was difficult to extract qualitative data (e.g., mixed methods studies without clearly labeled data, or studies in settings where perceptions of parents'/caregivers' experiences of newborn care practices could not be clearly identified, such

Search strategy

as summaries or aggregate data). Commentaries, protocols, and systematic reviews were not included in the analysis. Additionally, studies from countries other than those defined by the World Bank as low-income countries and lower-middle income countries (which have a Gross National Income per capita of less than \$4,125) were excluded.<sup>13</sup>

The review began in 2016 and initially targeted literature published in the previous ten years. Due to delays in the publication process, however, we extended a further year to encompass the timeframe 2006-2017. The following electronic databases were searched:

MEDLINE (PubMed), Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL: EBSCOhost). A health sciences librarian (RH) developed the database searching strategy and conducted the final searches. The initial search strategy was developed for MEDLINE and then adapted for other databases. Medical Subject Headings (MeSH) were used followed by free-text terms using controlled vocabulary (see the Appendix for a detailed description of the search strategy). Only articles in English were included due to potential difficulties in translating and interpreting foreign language qualitative data by native English-speaking reviewers, and to ensure that the review covered the most current literature on infant and young child feeding practices.

Figure 1 presents the selection process which followed the PRISMA guidelines for reporting of systematic reviews. <sup>11</sup> Search results were initially imported into Endnote reference management software (Thomson Reuters (Scientific) LLC) and duplicates and irrelevant studies were removed. Four independent reviewers screened study titles and abstracts for suitability against inclusion and exclusion criteria. The decision to include or exclude a study was required

by two reviewers. If after consultation a decision was not reached, a third reviewer (made the final decision.

#### Figure 1. Selection flow chart of review process

#### See attached figure file

#### Data extraction

For organization of extracted data, a unified matrix was utilized to record specific characteristics of included studies. Extracted data included reference details (author/data/publication), methodological approach (e.g., interviews/focus groups), conceptual framework (e.g., Grounded Theory), objectives or aims of the study, sampling methodology, socio-demographic characteristics of participants, country/region, and analysis method(s). The results of the selection process and data extraction, with selected characteristics, are presented in **Table 1. Characteristics of included studies**.

#### Quality appraisal

Each selected article was initially assessed by two reviewers (AB, EFK) according to the Critical Appraisal Skills Program checklist<sup>14</sup> to ensure quality and internal validity. Where reviewers had any differing opinions a third reviewer was consulted for consensus (AK). Selected studies met minimum criteria defined through the checklist including domains such as appropriateness of study design, data collection techniques, and analysis methods. Findings from the quality appraisal are presented in Table 2 using the following questions for analysis:

- 1. Was there a clear statement of the aims of the research?
- 2. Is a qualitative methodology appropriate?
- 3. Was the research design appropriate to address the aims of the research?
- 4. Was the recruitment strategy appropriate to the aims of the research?
- 5. Was the data collected in a way that addressed the research issue?
- 6. Has the relationship between researcher and participants been adequately considered?
- 7. Have ethical issues been taken into consideration?
- 8. Was the data analysis sufficiently rigorous?
- 9. Is there a clear statement of findings?
- 10. How valuable is the research?

Possible Responses: Yes, No, and Cannot assess due to missing information

#### **Table 2. CASP Criteria Analysis**

Following data extraction, relevant text from the results, discussion and conclusion sections, which provided information directly pertinent to home care of newborns from the perspectives of family caregivers, were imported into NVivo 11 qualitative software (NVivo qualitative data analysis software; QSR International Pty Ltd. Version 11, 2015).

Following the appraisal, deductive content analysis based on the WHO guidelines<sup>15</sup> was employed to identify domains for investigation and presentation within a framework analysis approach<sup>16</sup>. The focus of analysis was on manifest content rather than latent content <sup>17</sup>. For each domain of newborn care, study findings were extracted, and information on barriers and facilitators synthesized. Then, a narrative summary of the identified domains and themes, developed according to content, was reviewed by the research team (SE, ANB, EFK) to produce a consensus-based listing including barriers and facilitators to recommended newborn care practices. This review was undertaken by the authors alone and no patients or public participants were involved.

#### **RESULTS**

#### Geographic overview of studies reviewed

The vast majority of studies identified emerged from research carried out in the Sub-Saharan region, while the South Asian region was also well represented in the qualitative literature relating to newborn care practices at home.

Sub-Saharan Africa

Studies from the African region comprised 24 of 37 included for review, and information presented in the studies described the full range of home based newborn care practices.

South Asia

From the South Asian region, 8 of 37 studies presented information on newborn care practices, covering more general rather than specific domains of newborn care, though one focused on breastfeeding.

Southeast Asia

Three studies, two related to breastfeeding in Cambodia and Lao PDR, along with another from Cambodia related to skin care, were identified from the Southeast Asian region.

Latin America / Caribbean

Two qualitative studies were identified from the Latin America/Caribbean region, from Guatemala and Haiti, related to breastfeeding and cord care respectively.

#### **Barriers and facilitators**

A comprehensive list of barriers and facilitators stratified by the recommended care practice that were generated through the data synthesis exercise appears in **Table 3**. Among the 37 studies in this review, many of the reported barriers and facilitators were cross-cutting for recommended newborn care practices (i.e. cord care, drying and wrapping after delivery, prompt initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness). Across all practices, delivering at a health facility, including grandmothers in decision-making processes during and after pregnancy, low health care costs, and exposure to newborn care messaging in the community were reported as important facilitators for adoption of recommended newborn care practices. Common barriers across the recommended practices included traditional and historical beliefs and practices, cultural and gender norms, geographic location, conflicting health messaging, and societal pressures.

Barriers that influenced adoption of recommended **cord care practices** included lack of resources (e.g. clean water and razor blades), misinformation on timeliness of cord cutting, religious and cultural beliefs, and untrained birth attendants. Facilitators included institutional delivery, exposure to educational campaigns on safe and hygienic cord cutting practices, community outreach activities promoting handwashing and provision of clean razor blades, decision-making by grandmothers and women leaders, and cord-care counseling by TBAs.

Barriers to timely **drying and wrapping** included perceptions of newborn vulnerability and dirtiness, conflicting advice household stakeholders, and waiting for delivery of the placenta. Facilitators included institutional delivery, exposure to educational campaigns on

newborn thermal regulation, traditional wrapping practices, and the presence of two TBAs during delivery.

Factors impeding **delayed bathing** included societal pressure for cleanliness, preference for immediate bathing due to concerns about ritual pollution and hypothermia, negative perceptions of the vernix, and immediate bathing at health facilities. Factors that facilitated delayed bathing after delivery included hospital-based birth, exposure to newborn care messaging on the radio during pregnancy, communication between health care workers in the community and at the facility during pregnancy, and social support from other women in the household.

Factors inhibiting **skin-to-skin care** and **thermal control** practices included use of blankets instead of skin-to-skin contact, not immediately releasing baby to mother following delivery, early bathing, concerns of disease transmission, and maternal household duties.

Facilitators included exposure to kangaroo care messaging during pregnancy, observing positive newborn health outcomes of other mothers who used kangaroo care practices, medical advice from health care providers, and prior participation in behavior change interventions.

Barriers to care-seeking for illness included lack of transport, minimal financial resources, distances to health facility, gender norms, prior negative experiences at health facilities, and cultural norms such as protective isolation during the postpartum period.

Facilitators included family knowledge and recognition of danger signs and illness symptoms, lower health care costs, community education and support from religious leaders, and exposure to newborn health campaigns.

Barriers to **initiating breastfee**ding included spatial/physical isolation, conflicting health messages, mother exhaustion, baby not crying for milk, historical and traditional beliefs to discard colostrum, and education. Facilitating factors included community and family member knowledge, information provided during health facility-based birth, attendance by trained TBAs, being a first time mother, and exposure to breast feeding education and policy campaigns.

#### **DISCUSSION**

Effective interventions to improve newborn survival require information on a number of complex factors related to essential newborn care <sup>18</sup>. In addition to collecting improved quantitative data for neonatal survival, qualitative data are essential for behavioral interventions targeted to specific populations. <sup>19</sup> Few qualitative systematic reviews exist to synthesize information from perspectives of parents on newborn care. One review from 2014 focused on skin-to-skin contact and included 29 studies containing data from 9 countries<sup>20</sup>. Findings from that review centred on the experience of becoming a parent under unfamiliar circumstances, and thoughtfully considered the experiences of parents in the unique practice of skin-to-skin care. The authors did not restrict the review to low income settings, though studies from Uganda, Brazil, and South Africa were included. Our findings add further information to the peer reviewed literature from low income countries, where the majority of newborn deaths occur.

Another review was recently conducted in relation to thermal care for newborns in Sub-Saharan Africa<sup>21</sup>. The review focused on sociocultural factors and identified a number of

potentially harmful cultural norms and traditions which influence care across African settings. Similar to what has been found in the present review, that review identified caregiver factors and contextual barriers as well as facilitating factors, but in contrast to this review these were specific to thermal control, which may not represent the full range perspectives for other newborn care practices. In contrast to this review, that review's restriction to Sub-Saharan Africa settings limits the potential for transferability of the findings to other geographic settings, and data from parents or family caregivers was not the focus.

A systematic review covering neonatal care practices in Sub-Saharan Africa was recently undertaken<sup>22</sup>. The authors of that review included both quantitative data and qualitative data published from 2001-2014, whereas our review focused on qualitative data only, and covered the period 2006-2017, though similar findings were identified in both reviews in relation to care practices, confirming the findings. Bee et al. also included studies of facility-based and homebased care (unlike our study which focused on data from parents regarding home care) and noted the limitation of data having come mainly from 5 countries, highlighting a need for research from a wider geographic area, such as has been provided in the present review. Given that birth at home presents unique risks to the newborn<sup>23</sup>, information from these settings is key. Whereas the present review focused on barriers and facilitators identified through qualitative research, the review by Bee et al. centered on the prevalence of key immediate newborn care practices, however, the findings of both reviews are concordant.<sup>22</sup>

Policy recommendations and current approaches to reducing newborn mortality have not yet been appropriately scaled to reduce newborn mortality to levels targeted by the Sustainable Development Goals<sup>24</sup>. In the context of international calls for reduction of newborn

mortality and stillbirths<sup>25</sup>, it will be essential for interventions to meet the needs of families and parents caring for newborns. This systematic review of qualitative research, drawn from the literature across low income countries, is an important step to providing data on the range of newborn care practices at home, which is specifically relevant to behavior change in settings where high newborn mortality continues.

#### **Conclusions**

This systematic review identified qualitative studies reporting on the experiences and first-hand accounts of family members and caregivers in low income countries who are responsible for providing essential newborn care for their infants up to the first 28 days of life. The review identified barriers and facilitators commonly reported in studies of newborn care practices. The findings presented here are directly applicable to social and behavioral change initiatives aimed at improving care practices for better newborn health outcomes in low resource settings.

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No.	Author(s)	Year	Qualitative Methods	Participants**	Country (s)	Newborn Care Practices
1	Aborigo, Moyer, Rominski, et al.	2012	In depth interviews (IDI), Focus Group Discussions (FGD)	Mothers, health care providers, TBA, community leaders, grandmothers, compound heads, heads of households	Ghana	Breastfeeding practices
2	Adejuyigbe, Bee, Amare et al.	2015	IDI, Narrative Interviews, and Observations (O)	Mothers, fathers, health workers, grandmothers, TBA	Nigeria, Tanzania, Ethiopia	Thermal care and bathing
3	Alam, Ali, Sultana et al.	2008	IDI, O	Mothers, fathers, grandmother, family members, TBA	Bangladesh	Cord care practices
4	Amare	2014	IDI	Mothers, grandmothers, TBA	Ethiopia	Cord care practices
5	Amare, Shamba, Manzi, et al.	2015	IDI, FGD, (O)	Mothers, fathers, health workers, TBA, grandmothers, merchants	Four African sites	Emollient use for skin care
6	Atyeo, Frank, Vail et al.	2017	Semi structured interviews (SSI)	Mothers	Guatemala	Breastfeeding practices
7	Bazzano, Kirkwood, Tawiah-Agyeman, et al.	2008	IDI, FGD, Participant Observation, Case Study (CS), SSI	Mothers, grandmothers, health providers, community members	Ghana	Care seeking behaviors
8	Bazzano, Oberhelman, Potts et al.	2015	IDI, O, FGD, visual media	Mothers, grandmothers, fathers	Cambodia	Breastfeeding practices
9	Bazzano, Var, Grossman, et al.	2017	O, SSI	Mothers	Cambodia	Newborn care practices with emphasis on use of emollients
10	Byaruhanga, Nsungwa- Sabiiti, Kiguli, et al.	2011	IDI, FGD	Mothers, TBA, elderly care takers	Uganda	Care seeking behaviors
11	Degefie, Amare, and Mulligan	2014	IDI, Key informant interviews (KII)	Mothers, grandmothers, TBA, fathers	Ethiopia	General care practices
12	Dhinga, Gittelsohn, Suleiman, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, health care providers	Tanzania	Cord care practices
13	Engmann et al.	2013	IDI, FGD	Mothers, grandmothers, health care providers	Ghana	Newborn illness, danger signs, and care seeking behavior
14	Gondwe, Munthali, Ashorn, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, traditional healers,	Malawi	Pre-term birth and care seeking practices
15	Herlihy, Shaikh, Mazimba, et al.	2013	IDI, FGD	Mothers, grandmothers, TBA, community members	Zambia	Cord care practices
16	Hill, Tawaiah-Agyemang, Manu et al.	2010	IDI, FGD, and Narratives (N)	Mothers, grandmothers, TBA, fathers, pregnant women	Ghana	Thermal care practices
17	Hunter, Callaghan-Koru, Mahmud, et al.	2014	IDI, FGD	Pregnant women, mothers, husbands, grandmothers, traditional healers, community leaders, religious leaders, health care providers	Bangladesh	Skin to Skin practices
18	Kesterton and Cleland	2009	IDI, FGD	Mothers, grandmothers, TBA	India	General care practices
19	Khadduri, Marsh, Rasmussen et al.	2008	SSI, FGD	Women of reproductive age, health service providers, mothers, fathers	Pakistan	General care practices
20	Lee, Durham, Booth, et al.		IDI, FGD	Mothers, health care staff, key informants	Lao PDR	Breastfeeding practices

24	Louis Valende Autod	2044	IDI ECD	Bash as a second by land as banks	7	No second library and second
21	Lunze, Yeboah-Antwi, and Marsh	2014	IDI, FGD	Mothers, community leaders, health officers, grandmothers	Zambia	Neonatal hypothermia and thermal care practices
22	Melesse-Salasibew, Filteau, and Marchant	2014	IDI, SSI, FGD	Mothers, local experts on newborn care practices	Ethiopia	General care practices following home births
23	Moran, Choudhury, Khan, et al.	2009	IDI	Pregnant women, mothers	Bangladesh	General care practices
24	Moyer, Aborgio, Logonia et al.	2012	IDI, FGD	Women with newborns, grandmothers, compound heads, community leaders, TBA, health care providers	Ghana	Cord care practices
25	Mrisho, Schellenberg, Mushi et al.	2008	IDI, FGD, CS	Female community informants	Tanzania	Home-based care practices
26	Nabiwemba, Atuyambe, Criel, et al.	2014	IDI	Mothers	Uganda	Care practices for LBW babies
27	Nalwadda, Waiswa, Guwatudde, et al.	2015	IDI, FGD	Mothers, fathers, TBA	Uganda	General care practices with emphasis on cord care
28	Newbrander, Natiq, Shahim, et al.	2014	IDI, FGD, O	Household members of perinatal woman, community members	Afghanistan	General care practices
29	Okeyere, Tawiah- Agyemang, Manu, et al.	2010	IDI, FGD, Birth Narratives (BN)	Mothers, TBAs, grandmothers, husbands, asram healers	Ghana	Traditional illness
30	Pati, Chauhan, Panda, et al.	2014	IDI	Mothers, TBA	India	General care practices with an emphasis on breastfeeding
31	Premji, Khowaja, Meherali, et al.	2014	IDI, FGD	Mothers, fathers, grandmothers	Pakistan	General care practices
32	Sacks, Moss, Winch et al.	2015	IDI, FGD, O	Mothers, TBA, hospital staff	Zambia	Skin, thermal, and cord care
33	Shamba, Schellenberg, Hildon et al.	2014	IDI, FGD, BN	Mothers, TBA	Tanzania	Bathing, thermal, and skin to skin care practices
34	Tawiah-Agyemang, Kirkwood, Edmond, et al.	2008	SSI, FGD	Mother, women of child bearing age, health workers, policy makers	Ghana	Initiation of breastfeeding
35	Thairu and Pelto	2008	IDI	Mothers	Tanzania	General care practices
36	Waiswa, Kemigisa, Kiguli, et al.	2008	IDI, FGD	Mothers, fathers, grandparents	Uganda	General care practices
37	Walsh, Norr, Sankar, et al.	2014	FGD	TBA, pregnant women, stakeholders, traditional healers	Haiti	Cord care practices

<sup>\*</sup>Color coding indicates geographic regions

<sup>\*\*</sup>Data for the review were only extracted from participants who were family members (including mothers of newborns or mothers-to-be) and non-professionals who provided care at home to the newborn.

N o.	Author(s)	Yea r	CASP 1	CAS P 2	CAS P 3	CAS P 4	CAS P 5	CAS P 6	CAS P 7	CAS P 8	CAS P 9	CASP 10	Overall Score
1	Aborigo, Moyer, Rominski et al.	2012	Υ	Υ	Y	Υ	Y	Y	Υ	Υ	Υ	Υ	10/10
2	Adejuyigbe, Bee, Amare et al.	2015	Y	Y	Y	Υ	Υ	Υ	Y	Υ	Y	Υ	10/10
3	Alam, Ali, Sultana et al.	2008	Y	Υ	Υ	Υ	Υ	N	Υ	Υ	С	Y	8/9
4	Amare	2014	Υ	Υ	Y	Υ	Υ	N	Υ	Υ	Y	Υ	9/10
5	Amare, Shamba, Manzi, et al.	2015	Y	Υ	Υ	Y	Υ	N	Y	Υ	Υ	Y	9/10
6	Atyeo, Frank, Vail et al.	2017	Y	Υ	N	С	N	Υ	Y	Υ	Υ	Y	7/9
7	Bazzano, Kirkwood, Tawiah-Agyemang, et al.	2008	Y	Y	Υ	Υ	Υ	N	N	Y	Y	Υ	8/10
8	Bazzano, Oberhelman, Potts, et al.	2015	Y	Y	Y	Y	Y	С	Y	Y	Y	Y	9/9
9	Bazzano, Var, Grossman, et al.	2017	Υ	Υ	Υ	Y	Υ	С	Y	Υ	Υ	Υ	9/9
10	Byaruhanga, Nsungwa-Sabiti, Kiguli, et al.	2011	Y	Y	N	Y	Y	N	Y	Y	Y	С	7/9
11	Degefie, Amare, and Mulligan	2014	Y	Υ	Υ	Υ	С	N	Υ	С	Υ	Y	7/8
12	Dhingra, Gittelsohn, Suleiman, et al.	2014	Y	Υ	Y	Y	Y	N	Y	Υ	Y	Y	9/10
13	Engmann, Adongo, Akawire, et al.	2013	Υ	Y	Υ	Υ	Υ	Y	Y	Υ	Υ	Υ	10/10
14	Gondwe, Munthali, Ashorn, et al.	2014	Y	Υ	Y	Υ	С	N	Y	Υ	Υ	Υ	8/9
15	Herlihy, Shaikh, Mazimba, et al.	2013	Y	Y	Υ	Υ	С	N	Y	С	Υ	Υ	7/8
16	Hill, Tawiah- Agyemang, Manu, et al.	2010	Y	Y	Y	Υ	Υ	N	N	С	Υ	Υ	7/9
17	Hunter, Callaghan- Koru, Mahmud, et al.	2014	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	10/10
18	Kesterton and Cleland	2009	Y	Y	Y	Y	Υ	Υ	Y	Y	Υ	Y	10/10
19	Khadduri, Marsh, Rasmussen, et al.	2008	Y	Υ	Y	Υ	С	N	N	С	Υ	Υ	7/9
20	Lee, Durham, Booth, et al.	2013	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8
21	Lunze, Yeboah- Antwi, Marsh, et al.	2014	Υ	Υ	Y	Υ	Y	N	Υ	С	Υ	Υ	8/9
22	Melesse-Salasibew, Filteau, and Marchant	2014	Y	Y	Y	N	Y	N	Y	N	Y	С	7/9
23	Moran, Choudhury, Khan, et al.	2009	Y	Υ	Υ	Υ	С	N	Υ	С	Υ	Y	7/8
24	Moyer, Aborigo, Logonia, et al.	2012	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	Υ	10/10
25	Mrisho, Schellenberg,	2008	Υ	Υ	Y	Υ	С	N	Y	N	Υ	Υ	7/9

	Mushi, et al.												
26	Nabiwemba, Atuyambe, Criel, et al.	2014	Y	Υ	Y	Y	С	N	Y	С	Y	Y	7/8
27	Nalwadda, Waiswa, Guwatudde, et al.	2012	Υ	Y	Υ	Y	С	N	Y	С	Y	Y	7/8
28	Newbrander, Natiq, Shahim, et al.	2010	Υ	Y	Υ	Υ	С	N	Y	N	Y	Υ	7/9
29	Okyere, Tawaiah- Agyeman, Manu, et al.	2006	Y	Y	Y	Y	С	N	Y	N	Y	Y	7/9
30	Pati, Chauhan, Panda, et al.	2014	Y	Υ	Y	Y	N	N	Y	N	N	С	5/10
31	Premji, Khowaja, Meherali, et al.	2014	Υ	Y	Υ	Υ	Υ	Y	Y	Y	Y	Υ	10/10
32	Sacks, Moss, Winch, et al.	2015	Υ	Υ	Y	Υ	Υ	N	Y	Υ	Y	Υ	9/10
33	Shamba, Schellenberg, Hildon, et al.	2014	Y	Υ	Y	Υ	Υ	С	Y	Υ	Y	Y	8/9
34	Tawiah-Agyemang, Kirkwood, Edmond, et al.	2008	Y	Y	Y	Υ	Υ	N	N	Y	С	Y	7/9
35	Thairu and Pelto	2008	Υ	Υ	Y	Y	Υ	N	Υ	Y	Υ	Υ	9/10
36	Waiswa, Kemigisa, Kiguli, et al.	2008	Υ	Y	Υ	N	Y	N	Υ	Y	Υ	Y	8/10
37	Walsh, Norr, Sankar, et al.	2015	Y	Υ	Υ	Υ	Υ	N	Y	Y	Y	Y	9/10
	et al.												

Table 3. Barriers and facilitators described in articles reviewed

Domain of newborn care	Barriers	Facilitators	Article Number per Table 2, Year	Total Number of Article Mentions
Cord care	Lack of supplies, including water or infection prevention supplies	Knowledge about cord care	3, 2018	19/37
	Using surgical spirits and powder	Community stakeholder recognition that infants are susceptible to cord	4, 2014	
	Unhygienic cutting practices, including	infection	9, 2017	
	used, unsterilized razor blades or scissors	Delivery in hospital	10, 2011	
	Unskilled attendants	Informed at health facility	11, 2014	
		Tailored behavior change	12, 2014	
	Delayed cord cutting, resulting in infection	communication	15, 2013	
	Mixed perception about the length at which cord should detach and heal	Appropriate compromises between existing and recommended practices	18, 2009	
	Use of topical applications to the cord,	Community education	19, 2008	
	including herbs, butter, and indigenously-made substances, for	Outreach education	22, 2014	
	medicinal/protective purposes	Inclusion of grandmothers and other female household members, who are	23, 2009	
	Application of traditional remedies and substances on the cord to moisturize or	key decision makers and caregivers	24, 2012	
	dry it and facilitate its separation and promote healing	Participatory health promotion techniques, such as women's groups	25, 2008	
	Belief that cord infections caused by	Programs targeting Traditional Birth	26, 2014	
	mother's diet	Attendants (TBAs) and community mothers	27, 2015	
	Lack of understanding about cord cleaning	modicis	30, 2014	
	Lack of understanding of risks and	Importance of cord care and tying recognized in community and	32, 2015	
	infections affecting the cord and certain signs of infection, such as redness	understood culturally	36, 2008	
	Cultural belief and newborn care practices not conforming to	Recognition of cord problems, such as delayed healing, bleeding, or swelling	37, 2014	
	recommended practices	TBAs counselling mothers to protect the cord from infections		
	Cost of supplies, including CHX solution  Religious and cultural beliefs about cord	Consensus regarding liquid cord cleaning		
	cutting and cleaning	Raising awareness about usefulness of		
	Umbilical cord thought to make baby vulnerable to witchcraft	CHX in cord cleaning		
	Mothers cutting the cord themselves	Willingness to adopt practices that would protect the newborn and alter traditional cord care practices		
	Umbilical cord not tied prior to cutting, can lead to tetanus	Behavior change communication messages beginning at pregnancy		
	Practice of only tying to cord on the side of the baby	Prescribed practices making their way into traditional care		

	Recontamination of washed hands			
	before attending to newborn	Efforts to promote hand-washing and		
		to avoid recontamination		
	Seclusion of mother and baby in			
	postpartum period may lead to late	Promotion of efforts to avoid unclean		
	identification of illness and delay to	home applications to the cord		
	seeking care			
	_	Programs, promoting cord cleansing		
	Utilizing materials, such as rope and	with antiseptics, should provide		
	twigs, in cord tying	educational messages about the		
		balance between the benefits and the		
	Disconnect between healthcare	likelihood that separation of umbilical		
	providers and community	cord may be slightly delayed		
	providers and community	cord may be slightly delayed		
	Local conceptions regarding role of cord	Using materials, such as clean cotton,		
	tying in stemming blood flow	other than fingers to apply		
	tying in sternining blood now	medicine/antiseptic		
	Concorns regarding the length of time	medicine/antiseptic		
	Concerns regarding the length of time	Dunana in cuban alcun anna		
	until cord detachment	Programs in urban slum areas		
		1		
	Presence of blood clots associated with	Interventions to improve social		
	curses	support to women, especially first-		
		time mothers		
		Educating healthcare providers about		
		harmful, traditional practices so they		
		are specifically addressed		
	curses			
		Explaining rationale for tying the cord		
		on both sides of the cut		
		Cultural health systems model that		
		depicts all stakeholders		
		Presence of blood clots leading to		
		seeking medical treatment at health		
		centers		
		Promotion of chlorhexidine in place of		
		commonly-reported application of		
		harmful substances		
		narmar substances		
		Scale-up of evidenced based practices		
		Scale-up of evidenced based practices		
		Health promotion programs taking		
		into account health system barriers		
		and financial burden		
Drying and wranning	Robaviors vary among home deliveries	Knowledge about draing and	2 2015	11/37
Drying and wrapping	Behaviors vary among home deliveries	Knowledge about drying and	2, 2015	11/3/
	Percention of dirtiness of habit	wrapping	0 2011	
	Perception of dirtiness of baby	Understanding that haby should be	8, 2011	
	December of highlight and a second	Understanding that baby should be	40 2044	
	Perception of birthing process as	kept warm	10, 2014	
	polluting			
		Delivery in hospital	14, 2010	
	Vulnerability of baby			
		Informed at health facility	16, 2009	
	Opinions of other household			
	stakeholders, such as the mother-in-law	Tailored behavior change	19, 2014	
		communication		
	Home and hospital delivery		20, 2014	
		Appropriate compromises between		
	Not attending to haby until placents	existing and recommended practices	21, 2009	
	Not attending to baby until placenta	existing and reconnicioed practices	,	
	delivered	existing and recommended practices	,	
	_ : :	Community education	28, 2014	

Prioritization of the mothers	Outreach education	30, 2015
	Inclusion of grandmothers who are key decision makers	31, 2014
	Participatory health promotion techniques, such as women's groups	
	Traditional practice of wrapping in new clean cloth	
	Use of warm water and traditional herbs to protect baby	
	Behavior change communication messages beginning at pregnancy	
O <sub>A</sub>	Babies dried and wrapped due to awareness of reduction of cold	
	Having more than one attendant to help both the mother and baby	
	Programs in urban slum areas	
	Interventions to improve social support to women, especially first-time mothers	

Bathing	Traditional or historical practice	Delayed bathing when delivery in	2, 2015	17/37
	Lack of knowledge of when to bathe	hospital	3, 2008	
	baby, especially in home deliveries	Informed at health facility	8, 2011	
	Early bathing due to societal pressure	Quality of care in health facility	9, 2014	
	Cultural norm of frequent bathing	Health worker advice		
	Cultural belief and newborn care	Tailored behavior change	10, 2014	
	practices not conforming to recommended practices	communication, addressing community norms and based on	14, 2010	
	Negative perception of vernix, including	formative research	16, 2009	
	association with sperm	Appreciation of newborn vulnerability to encourage behavior change	19, 2014	
	Vernix considered dangerous for HIV- exposed infants	Appropriate compromises between	20, 2014	
		existing and recommended practices	21, 2009	
	Bathing in close proximity to smoking fires	Community education	24, 2014	
	Early bathing due to association with dirtiness as well as body odor later in	Outreach education	26, 2014	
	life	Inclusion of grandmothers who are key decision makers	28, 2014	
	Differences in practice by untrained TBAs	Participatory health promotion	30, 2015	
	Spiritual beliefs attached to use of local	techniques, such as women's groups	31, 2014	
	herbs for bathing	Behavior change communication messages beginning at pregnancy	33, 2008	
	Bathing practices, such as using pond water	Having more than one attendant to	34, 2008	
		help both the mother and baby		
	Substances added to water, including Dettol or Savlon	Delayed bathing due to concerns about pneumonia		
	Bathing immediately after birth due to concerns about 'ritual pollution' can cause hypothermia	Identifying and addressing cultural rationales that underlie negative		
	Early bathing linked to shaping the baby's head	practices  Reinforcing ad protecting beliefs that		
	Early bathing to help the baby sleep and feel clean	support positive practices  Improving health worker communication skills and social		
Thermal control	Lack of practice when delivery at home	Informed at health facility	2, 2015	12/37
	or with TBA	Beliefs about importance of thermal care	3, 2008	
	Lack of knowledge of keeping baby indoors	Quality of care in health facility	8, 2011	
	Suboptimal practices	Tailored behavior change	9, 2014	
	Early bathing	communication based on formative research	10, 2014	
	Length of time baby undressed during bathing	Appropriate compromises between existing and recommended practices	14, 2010	
	Bathing with warm water	Community education	17, 2008	
	Use of blankets, rather than skin-to-skin	Outreach education	19, 2014	
	care		24, 2014	

	Nowborn massage including use of	Inclusion of grandmothers who are key decision makers	29 2014	
	Newborn massage, including use of mustard oil, can compromise the skin	Participatory health promotion	28, 2014	
	barrier function	techniques, such as women's groups	30, 2015	
	Cultural belief and newborn care practices not conforming to	Behavior change communication messages beginning at pregnancy	31, 2014	
	recommended practices	Knowledge and practice that baby		
	Lack of maintaining thermoprotective practices in the first few hours	should be kept warm		
	postpartum, when newborns are at greatest risk	Having more than one attendant to help both the mother and baby		
		Use of low-cost newborn warmers		
		Community-based practices on hypothermia prevention and management		
Skin to skin contact	Few mothers given baby immediately after birth	Behavior change interventions based on formative research	2, 2015	9/37
	Concerns of disease transmission, harm	Quality of care in health facility	3, 2008	
	to umbilicus	Tailored behavior change	8, 2011	
	Perception of dirtiness after birth	communication	9, 2014	
	Maternal rest	Appropriate compromises between existing and recommended practices	14, 2010	
	Concerns of baby becoming cold	Community education	15, 2014	
	Delayed due to early bathing	Outreach education	16, 2009	
	Perception that it might be harmful to fragile newborns	Inclusion of grandmothers who are	19, 2014	
	Lack of understanding that kangaroo	key decision makers	31, 2014	
	mother care is a protective method of caring for healthy newborns	Participatory health promotion techniques, such as women's groups		
	Use of blankets, rather than skin-to-skin care	Behavior change communication messages beginning at pregnancy		
	Lack of continued skin to skin contact	Association with reduced risk of cord infection		
	Cultural belief and newborn care practices not conforming to recommended practices	Concept easily understood and women willing to try if good for the baby		
	Women feeling responsible for household duties	Appreciation of kangaroo mother care as an appropriate treatment for ill babies		
		Biomedical advice from healthcare providers reaching community through word-of-mouth and television campaigns		
		Receiving help from family members		

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		Witnessing other women perform kangaroo mother care with positive outcomes  Focusing intervention messages on		
		building supportive a environment for kangaroo mother care practice		
Hygiene	Lack of knowledge on hand-washing with soap	Health education	3, 2008	6/37
	Recontamination of washed hands	Tailored behavior change communication	9, 2014	
	before attending to the newborn	Appropriate compromises between	16, 2009	
	Cultural belief and newborn care practices not conforming to	existing and recommended practices	17, 2008	
	recommended practices	Community education Outreach education	22, 2012	
	6	Inclusion of grandmothers who are key decision makers	24, 2014	
	recommended practices	Participatory health promotion techniques, such as women's groups		
		Efforts to promote hand-washing and to avoid recontamination		
		Understanding of keeping babies and their surroundings clean		
		Educating healthcare providers about harmful, traditional practices so they are specifically addressed		
		4		
Breast feeding (initiation of and provision of colostrum)	Traditional or historical practice	Community members knowledgeable about importance of breast-feeding	1, 2012	18/37
	Belief that it is unhealthy	Delivery in a health facility, where	6, 2017	
	Mother's exhaustion	staff encouraged early breast-feeding	9, 2017	
	Limited knowledge	Culturally-tailored health education	10, 2011	
	Maternal education status  Geographic isolation	Targeting isolated villages  Cross-generational education	11, 2014	
	Inconsistency in health education	interventions	12, 2014 18, 2009	
	Learning from relatives	Interventions through community health clinic workers	19, 2008	
	Pre-lacteal feeds given on fingertip,	Appropriate compromises between	20, 2013	
	increasing risk of infection	existing and recommended practices	22, 2014	
· · · · · · · · · · · · · · · · · · ·	Language and in initiation become it and			
	Low urgency in initiating breastfeeding as mother and child believed to be polluted after birth	Community education Outreach education	23, 2009	

	Traditional practices to test colostrum	Inclusion of grandmothers/mother-in- laws and religious leaders who are key	26, 2014	
	for bitterness	decision makers	28, 2014	
	Perception of a lack of breast milk	Participatory health promotion techniques, such as women's groups	30, 2014	
	Onset of post-birth activities, such as bathing	Awareness of nutritive value of breast	31, 2014	
	Perception that baby needs rest	milk	33, 2008	
	Baby not crying for milk	Positive perception regarding infant feeding	35, 2008	
	Perception of inadequate maternal nutrition and breast milk	TBAs trained by Ministry of Health		
	Premature breast milk supplementation	Raising awareness of early initiation of breast-feeding in the policy arena		
	(water and other fluids), which may expose newborns to pathogens	Cultural belief and practices		
	Work served as a barrier	Identifying and addressing cultural rationales that underlie negative		
	Difference in advice received from different people by first-time mothers	practices		
	Cultural belief and newborn care	Reinforcing ad protecting beliefs that support positive practices		
	practices not conforming to recommended practices	Improving health worker		
	Perception that hunger is not met or satisfied by breast-milk alone	communication skills and social management of patients		
	sutstice by breast tillik dione	Lowering healthcare costs		
		Programs in urban slum areas		
		Interventions to improve social support to women, especially first-		
		time mothers		
		First-time mothers' mothers		
		Working with employers and developing supportive employment policies		
		Providing postnatal support and working with lay people and health professionals		
		Research to identify optimal combination of interventions		
		Using religious leaders, trained health workers, family health action groups, and radio to disseminate messages		
Care seeking for illness	Lack of transportation	Addressing locally existing cultural beliefs	7, 2008	7/37
	Geographic isolation/remoteness from health facilities	Strengthening facility care	8, 2011	
	Financial ability/constraints	Urging families to seek medical care	11, 2013	
	Seclusion of mother and baby in	for any symptom of illness in a newborn	17, 2008	
	postpartum period may lead to late		25, 2015	

identification of illness and delay to seeking care  Community understanding of the newborn period and cultural expectations  Caretaker knowledge about newborn sickness individual experiences in household and caretaker autonomy  Women's inability to seek care without being accompanied by a male relative Healthcare decisions influenced by community members  Perceived health system gaps  Confidence in healthcare providers is issue-specific.  Sequential care seeking practices, with traditional medicine as first-line of treatment for 7 days  Untimely action after recognition of dianger signs  Previous negative experiences with health services facilities  Local understanding of illness affects treatment practices  Mothers biamed for infant illness  Use of traditional home remedies and self-medication instead of care in health facilities  Shame about utilization of maternal and neonatal services  Care-seeking for local community members for senous health concerns  Post-partum depression  'Asram' perceived as common illness which cannot be treated at health facilities  'Asram' repression  'Asram' retainments including frequent coild herball baths, air-dying, and oral treatments.  Modification of 'asram' treatment required the sanction of a healer	 		
	community understanding of the newborn period and cultural expectations  Caretaker knowledge about newborn sickness  Individual experiences in household and caretaker autonomy  Women's inability to seek care without being accompanied by a male relative  Healthcare decisions influenced by community members  Perceived health system gaps  Confidence in healthcare providers is issue-specific  Sequential care-seeking practices, with traditional medicine as first-line of treatment for 7 days  Untimely action after recognition of danger signs  Previous negative experiences with health services facilities  Local understanding of illness affects treatment practices  Mothers blamed for infant illness  Use of traditional home remedies and self-medication instead of care in health facilities  Shame about utilization of maternal and neonatal services  Care-seeking for local community members for serious health concerns  Post-partum depression  'Asram' perceived as common illness which cannot be treated at health facilities  'Asram' treatments including frequent cold herbal baths, air-dying, and oral treatments  Modification of 'asram' treatment	Recognition of danger signs  Targeted behavior-change communication programs  Using religious leaders, trained health workers, family health action groups, and radio to disseminate messages  Understanding traditional illnesses in designing care-seeking interventions	

Other newborn care	Cultural perception of emollients as	Association of emollient therapy in	4, 2014	4/37
	improving the skin, keeping the baby warm, and shaping the baby	reduction of mortality among preterm infants	20, 2014	
	Social pressure to use emollients	Newborn emollient trials, specifically designed to reflect contextual	26, 2010	
	Emollient choice influenced by cost, availability, and traditional norms	differences	30, 2015	
	Massage, associated with application of emollients, is potentially damaging to skin	If emollients are proven effective, policy makers deciding whether to provide emollients free of charge or through social marketing		
	Potential impact of emollients, such as engine oil, on harm and even mortality	Improving practice of massage associated with emollient application		
	TBAs applying mild pressure inside baby's mouth on the soft palate with water and local herb	Understanding traditional illnesses in designing care-seeking interventions		
	Application of powders directly into dermal incisions of ill children to ward off malevolent spirits			
Low birth weight	Babies not weighed	Better knowledge of home care	9, 2014	3/37
recognition	Belief in supernatural powers	practices when delivery at health facility	12, 2014	
	Less knowledge of home care practices when baby delivered at home or in lower level health facility	Health education at community level to reach mothers that deliver at home	24, 2014	
		Mechanisms to support mothers		
	Lack of knowledge of how to provide care or when to take baby to health facility	Provision of warmth to preterm newborns		
	Perceptions of preterm birth, including young and old maternal age, heredity, sexual impurity, and maternal illness during pregnancy	Addressing cultural practices for preterm babies among community members		
	Poverty	Vernix considered important for preterm newborns		
	Women placed with main responsibility for preterm newborns	7/		
	High time burden of care for preterm babies leading to neglect of household, farming, and business duties	7		

#### **Contributorship statement:**

Authors have contributed as follows to this work. Conception and design of the work: ANB, RH; Data collection: ANB, AK, EFK, RH; Data analysis and interpretation: ANB, AK, EFK; Drafting the article: ANB, AK, EFK, SE, RH; Critical revision of the article: ANB, AK, EFK, SE, RH; Final approval of the version to be published: ANB, AK, EFK, SE, RH.

**Competing interests:** All authors declare they have no conflicts of interest.

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**Data sharing statement:** All data came from published articles available from electronic databases which are openly accessible.

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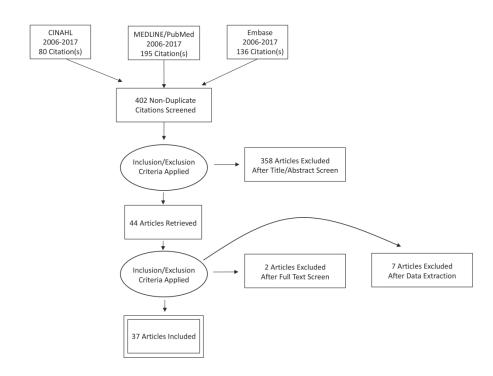


Figure 1
264x190mm (300 x 300 DPI)

#### **Appendix 1. Search Strategy**

Soarch String	Notos
Search String "infant, newborn"[mesh] OR	Notes Includes "health
newborn[Title/Abstract] OR "newborn	knowledge, attitudes,
care"[tiab])) AND ("breast feeding"[MeSH	practices"
Terms] OR "immediate	practices
breastfeeding"[Title/Abstract] OR	
"exclusive breastfeeding"[tiab] OR	
"exclusive breast feeding"[tiab] OR	
"initiation of breastfeeding"[tiab] OR	
"thermal care"[tiab] OR "cord care"[tiab])	
OR "Thermal care" [tiab] OR "Thermal	
care"[ot] OR "bathing"[tiab] OR bathing[ot]	
OR "cord care"[tiab] OR "cord care"[OT] OR	
"umbilical cord care"[tiab] OR "umbilical	
cord care"[ot] OR "health knowledge,	
attitudes, practice"[MeSH Terms]	
"mothers"[MeSH Terms] OR	Parent Perspective
mothers[Title/Abstract] OR	Concept
mother[Title/Abstract] OR "fathers"[MeSH	
Terms] OR fathers[Title/Abstract] OR	
"parents"[MeSH Terms] OR parents[Tiab]	· (O)
OR parent[Tiab] OR "Grandparents"[MeSH]	
OR grandmother[Tiab] OR	
grandmother's[Tiab] OR	
grandmothers[Tiab] OR	
grandmothers'[Tiab)	
(("Qualitative Research"[Mesh] OR	Qualitative concept
"qualitative research"[TIAB] OR "qualitative	(w/o exclusions)
research"[OT] OR "qualitative studies"[tiab]	
OR "qualitative study"[tiab] OR "qualitative	
studies"[OT] OR "qualitative studies"[OT]	
OR "qualitative study"[OT] OR "Interviews	
as Topic"[Mesh] OR "semi structured	
interview"[TIAB] OR "semi structured	
interviewer"[TIAB] OR "semi structured	
interviewing"[TIAB] OR "semi structured	
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interviews"[OT] OR "semistructured	
interview"[TIAB] OR "semistructured	

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interview"[OT] OR "unstructured interview"[TIAB] OR "unstructured interviewing"[TIAB] OR "unstructured interviews"[TIAB] OR "unstructured interview"[OT] OR "in depth interview"[TIAB] OR "in depth interviewees"[TIAB] OR" in depth interviewing"[TIAB] OR "in depth interviews"[TIAB] OR "in depth interview"[OT] OR "in depth interviewing"[OT] OR "in depth interviews"[OT] OR "Focus Groups"[Mesh] OR "focus group" [TIAB] OR "focus groups"[TIAB] OR "focus group"[OT] OR "focus groups"[OT] OR "group interview"[OT] OR "group interview"[TIAB] OR "Direct observation"[tiab] OR "Participant observation"[tiab] OR "Nonparticipant observation"[tiab] OR "Direct observation"[OT] OR "Participant observation"[ot] OR "Non-participant observation"[OT] OR "Ethnology"[Mesh] OR "ethnographic research"[OT] OR "ethnographic research"[TIAB] OR ethnology[OT] OR ethnology[TIAB] OR "ethnographic study"[tiab] OR "ethnographic study"[ot] OR "Community-Based Participatory Research" [Mesh] OR "community-based participatory research"[OT] OR "community-based participatory research"[TIAB] OR "action research"[TIAB] OR "action research"[OT] OR "Formative research"[tiab] OR "Formative research"[ot] OR "Key informant"[tiab] OR "Key informant"[OT] OR "Interpretative perspective" [TIAB] OR "Phenomenological Research"[TIAB] OR Phenomenology[tiab] OR Phenomenology[ot] OR "Phenomenological Research"[OT])) ALL LMIC terms and ALL countries names (not pig OR hen) OR Developing country/LMIC terms (see above) Country names

"infant, newborn"[mesh] OR	This is our main
newborn[Title/Abstract] OR "newborn	concept and prioirity.
care"[tiab]	Reintroduced within
	context of other
	concepts
(("infant, newborn"[mesh] OR	'
newborn[Title/Abstract] OR "newborn	
care"[tiab])) AND ((#110 AND #93 AND #94	
AND #101))	
(("infant, newborn"[mesh] OR	Published Jan 1, 2016 -
newborn[Title/Abstract] OR "newborn	Dec 31, 2017
care"[tiab])) AND ((#110 AND #93 AND #94	DCC 31, 2017
AND #101)) Filters: Publication date from	
2016/01/01 to 2017/12/31	
(("infant, newborn"[mesh] OR	Published English Jan 1,
newborn[Title/Abstract] OR "newborn	2016 -Dec 31, 2017
care"[tiab])) AND ((#110 AND #93 AND #94	2010 -Dec 31, 2017
AND #101)) Filters: Publication date from	
2016/01/01 to 2017/12/31; English	
(("infant, newborn"[mesh] OR	
newborn[Title/Abstract] OR "newborn	
care"[tiab])) AND ((#110 AND #93 AND #94	
AND #101)) Sort by: Relevance Filters:	. */
published in the last 10 years; Humans;	
English	
Liigiisii	

# Reporting checklist for systematic review and meta-analysis.

Based on the PRISMA guidelines.

### Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA reporting guidelines, and cite them as:

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement

			Page
		Reporting Item	Number
	#1	Identify the report as a systematic review, meta-analysis, or both.	0-1
Structured summary	#2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	0-1
Rationale	#3	Describe the rationale for the review in the context of what is already known.	1
Objectives	#4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
Protocol and registration	<b>#5</b> For	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address) and, if available, provide registration information including the registration number.  The peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	0-1

Eligibility criteria	#6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rational	3	
Information sources	#7	Describe all information sources in the search (e.g., databases with dates of coverage, contact with study authors to identify additional studies) and date last searched.	3	•
Search	#8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	See note	
Study selection	#9	State the process for selecting studies (i.e., for screening, for determining eligibility, for inclusion in the systematic review, and, if applicable, for inclusion in the meta-analysis).	4-5	-
Data collection process	#10	Describe the method of data extraction from reports (e.g., piloted forms, independently by two reviewers) and any processes for obtaining and confirming data from investigators.	5	
Data items	#11	List and define all variables for which data were sought (e.g., PICOS, funding sources), and any assumptions and simplifications made.	5-6	
Risk of bias in individual studies	#12	Describe methods used for assessing risk of bias in individual studies (including specification of whether this was done at the study or outcome level, or both), and how this information is to be used in any data synthesis.	6-7	
Summary measures	#13	State the principal summary measures (e.g., risk ratio, difference in means).	6-7	
Planned methods of analyis	#14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	6-7	
Risk of bias across studies	#15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6-7	,
Additional analyses	#16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-7	
Study selection	#17 For p	Give numbers of studies screened, assessed for eligibility, and peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	7-8	(

		included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	#18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citation.	7-8
Risk of bias within studies	#19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	7
Results of individual studies	#20	For all outcomes considered (benefits and harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	7
Synthesis of results	#21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	8-10
Risk of bias across studies	#22	Present results of any assessment of risk of bias across studies (see Item 15).	7
Additional analysis	#23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	8-10
Summary of Evidence	#24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers	11
Limitations	#25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	#26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12
Funding	#27	Describe sources of funding or other support (e.g., supply of data) for the systematic review; role of funders for the systematic review.	12

# **Author notes**

1. 4, Appendix

The PRISMA checklist is distributed under the terms of the Creative Commons Attribution License CC-BY. This checklist was completed on 17. July 2018 using <a href="http://www.goodreports.org/">http://www.goodreports.org/</a>, a tool made by the <a href="EQUATOR Network">EQUATOR Network</a> in collaboration with <a href="Penelope.ai">Penelope.ai</a>



# **BMJ Open**

# Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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Article Type:	Research
Date Submitted by the Author:	18-Mar-2019
Complete List of Authors:	Bazzano, Alessandra; Tulane University School of Public Health, Global Community Health and Behavioral Sciences Felker-Kantor, Erica; Tulane University School of Public Health, Global Community Health and Behavioral Sciences Eragoda, Shalini; Tulane University School of Public Health, Global Community Health and Behavioral Sciences Kaji, Aiko; Tulane University School of Public Health, Global Community Health and Behavioral Sciences Horlick, Raquel; Tulane University, Howard Tilton Memorial Library
<b>Primary Subject Heading</b> :	Global health
Secondary Subject Heading:	Public health, Paediatrics
Keywords:	infant, newborn, postnatal care, QUALITATIVE RESEARCH, care seeking, Cambodia

SCHOLARONE™ Manuscripts

# Parent and family perspectives on home-based newborn care practices in lower-income countries: a systematic review of qualitative studies

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Keywords: infant, newborn, post-natal care, care seeking, qualitative research, health equity

Word count: 3005

Figures: 1 Tables: 3

#### **ABSTRACT**

#### **Objectives**

To understand family and parent perspectives on newborn care provided at home to infants in the first 28 days of life, in order to inform behavioral interventions for improving care in low income countries, where the majority of newborn deaths occur.

#### Design

A comprehensive, qualitative systematic review was conducted. MEDLINE/PubMed, Embase, and Cumulative Index of Nursing and Allied Health databases were systematically searched for studies examining the views of parents and family members on newborn care at home. The search period included all studies published from 2006 to 2017. Studies using qualitative approaches or mixed-methods studies with substantial use of qualitative techniques in both the methods and analysis sections were included. Studies meeting the inclusion criteria were extracted and evaluated using Critical Appraisal Skills Programme guidelines. Following the initial selection and appraisal, barriers and facilitators to recommended care practices across several domains were synthesized.

#### **Results**

Of 411 results retrieved, 37 met both inclusion and quality appraisal criteria for methodology and reporting. Geographic representation largely reflected that of newborn health outcomes globally, with the majority of studies conducted in the region of Sub-Saharan Africa and South Asia. Specific barriers and facilitators were identified among a range of domains including: cord care, drying and wrapping, thermal control, skin to skin contact, hygiene, breast feeding, care seeking for illness, low birth weight recognition. Cross cutting facilitators, common to all domains were also evident, including delivering at a health facility, including female relatives in counseling, lower health care costs, and exposure to newborn care messaging in the community.

#### **Conclusions**

When designing behavioral interventions to address newborn mortality at scale, policy makers and practitioners must include barriers and facilitators important to families in low income settings. **Review registration number** CRD42016035674.

#### **Article Summary**

### **Strengths and limitations:**

- Strengths of the review include having had a librarian/information scientist in the research team, and multiple reviewers experienced in qualitative research in lowincome countries, primary qualitative data collection, and analysis.
- Other strengths of the study was the comprehensive search strategy covering multiple relevant databases; appraisal of quality among included studies based on critical appraisal skills guidelines; and a comprehensive description of study findings.
- Limitations included: the exclusion of documents not available in English, and those that
  may have been relevant, but were outside the defined date limitations. A further
  limitation is that because findings are presented in the aggregate, care practices from
  different geographic areas may require different interventions.

#### Introduction

Approximately 46% of all under-five deaths in 2016 occurred during the neonatal period, the initial 28 days following birth (global incidence). Southern Asia and sub-Saharan Africa account for nearly 80 percent of the newborn deaths. By 2030, the Sustainable Development Goals (SDG) target is to reduce neonatal mortality to at least as low as 12 deaths per 1,000 live births. However, per current trends, over 50 countries will fail to meet this target on newborn survival. Yet, the majority of these deaths are preventable.

During the neonatal period, care provided by parents and caregivers is critical for newborn survival.<sup>3</sup> Optimal or essential newborn care practices as defined by the World Health

Organization (WHO) include immediate drying and wrapping of newborns after birth, initiating skin-to-skin (STS) contact, clean cord care, dry cord care, immediate initiation of breastfeeding and exclusive breastfeeding until 6 months of age, as well as ensuring warmth (thermal control) of the newborn through delayed bathing. In addition, parents or caregivers at home must also provide nurturing care, safety and security, and responsiveness to the newborn's needs. The provision of quality, effective care at the home and community level is critical for improving newborn health outcomes and promoting optimal early childhood development. A reduction in neonatal mortality by 25% can be achieved by scaling up community interventions, including provision of optimal home care. Although feasible interventions exist to reduce newborn mortality, uptake of these interventions is low.

In order to increase scale up of coverage and implementation of effective home and community-based newborn care practices, providing data on research priorities for newborn health is key.<sup>7</sup> Researchers have identified specific domains related to caregiver perceptions and behaviors as priorities.<sup>8</sup> Qualitative research has been particularly useful for obtaining information on newborn care practices at home, which often vary based on the sociocultural context in low-income countries.<sup>9</sup>

Despite the existence of multiple individual qualitative and formative research studies on home and community-based newborn care, a systematic review of the available qualitative research is lacking. Therefore, we conducted a systematic review to provide data to improve both programming and policy for home and community care for newborns.<sup>7</sup>

The primary objective of this study was to systematically review qualitative literature to understand parent and family experiences with home newborn care practice in low-income

countries, presenting information related to barriers and facilitators to inform behavioral interventions focused on improving newborn survival and care.

#### **Methods**

This systematic review was registered with the International Prospective Register of Systematic Reviews (PROSPERO): registration number CRD42016035674. The review followed guidelines from the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) statement. Due to the emphasis on qualitative research, the review primarily employed the ENTREQ guidelines for reporting, while also drawing guidance from PRISMA, which is more specific to the requirements of quantitative literature reviews. 10,11

Newborn care practices were defined as all actions taken by parents/caregivers that provide for the essential biological, physiological and psychological needs of the newborn infant following delivery and up to the end of the newborn period (28 days of life). These included, but were not limited to, the essential newborn care practices as defined by WHO: cord care, drying and wrapping after delivery, initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness.<sup>12</sup>

Four of five researchers involved in conducting the review, analyzing the results, and writing up the manuscript had strong experience in qualitative research methods, and hold graduate and/or doctoral level qualification in public health, with a specialization in research methods (ANB, EFK, AK, and SE). One researcher (RH) is an information scientist with a qualification in library sciences and specialization in support to research in science and biomedicine. Patient and public involvement: No patients and or public were involved in this

systematic review.

Inclusion and exclusion criteria

Studies were included if they used qualitative data collection methods such as interviews, focus groups, direct observation, and participatory action research. Inclusion requirements also stipulated that studies needed to have a well-described methodology section and a clear description of the qualitative data analysis methods and process (e.g., grounded theory, narrative analysis, content analysis, thematic analysis). Finally, data on newborn care at home must have been directly obtained from parents or caregivers of newborns (infants under 28 days of age, including low birthweight or small babies), whether born at home or at a facility, with or without skilled attendance, and regardless of whether the study also included additional data from non-family members or health workers such as traditional birth attendants (TBAs) (which data was not used for this review). Caregivers were defined as mothers/fathers or other adult family or community members who provided day-to-day physical and psychological support to meet the basic needs of newborn infants. Data gathered from community health workers, and from professional or non-professional health care providers, were not used or included in this study although it may have been presented in one of the articles included in the review.

Excluded studies were those for which it was difficult to extract qualitative data (e.g., mixed methods studies without clearly labeled data, or studies in settings where perceptions of parents'/caregivers' experiences of newborn care practices could not be clearly identified, such as summaries or aggregate data). Commentaries, protocols, and systematic reviews were not included in the analysis. Additionally, studies from countries other than those defined by the

World Bank as low-income countries and lower-middle income countries (which have a Gross National Income per capita of less than \$4,125) were excluded.<sup>13</sup>

Search strategy

The review began in 2016 and initially targeted literature published in the previous ten years. Due to delays in the publication process, however, we extended a further year to encompass the timeframe 2006-2017. The following electronic databases were searched:

MEDLINE (PubMed), Embase, Cumulative Index to Nursing and Allied Health Literature (CINAHL: EBSCOhost). A health sciences librarian (RH) developed the database searching strategy and conducted the final searches. The initial search strategy was developed for MEDLINE and then adapted for other databases. Medical Subject Headings (MeSH) were used followed by free-text terms using controlled vocabulary (see the Appendix for a detailed description of the search strategy). Only articles in English were included due to potential difficulties in translating and interpreting foreign language qualitative data by native English-speaking reviewers, and to ensure that the review covered the most current literature on infant and young child feeding practices.

Figure 1 presents the selection process which followed the PRISMA guidelines for reporting of systematic reviews. <sup>11</sup> Search results were initially imported into Endnote reference management software (Thomson Reuters (Scientific) LLC) and duplicates and irrelevant studies were removed. Four independent reviewers screened study titles and abstracts for suitability against inclusion and exclusion criteria. The decision to include or exclude a study was required by two reviewers. If after consultation a decision was not reached, a third reviewer (made the final decision.

#### Figure 1. Selection flow chart of review process

#### See attached figure file

#### Data extraction

For organization of extracted data, a unified matrix was utilized to record specific characteristics of included studies. Extracted data included reference details (author/data/publication), methodological approach (e.g., interviews/focus groups), conceptual framework (e.g., Grounded Theory), objectives or aims of the study, sampling methodology, socio-demographic characteristics of participants, country/region, and analysis method(s). The results of the selection process and data extraction, with selected characteristics, are presented in Table 1. Characteristics of included studies.

#### Quality appraisal

After all articles were selected for review inclusion, each article was assessed and scored by two reviewers (AB, EFK) according to the Critical Appraisal Skills Program (CASP) checklist<sup>14</sup> to appraise quality and internal validity. All the selected studies met at least half of criteria defined by the CASP checklist (see 1-10 below) including domains such as appropriateness of study design, data collection techniques, and analysis methods. The detailed CASP criteria are as follows:

- 1. Was there a clear statement of the aims of the research?
- 2. Is a qualitative methodology appropriate?
- 3. Was the research design appropriate to address the aims of the research?
- 4. Was the recruitment strategy appropriate to the aims of the research?
- 5. Was the data collected in a way that addressed the research issue?
- 6. Has the relationship between researcher and participants been adequately considered?
- 7. Have ethical issues been taken into consideration?
- 8. Was the data analysis sufficiently rigorous?
- 9. Is there a clear statement of findings?
- 10. How valuable is the research?

Possible Responses: Yes, No, and Cannot assess due to missing information

For each checklist item, studies were scored with a 1 if a CASP criterion were met and 0 if not.

These scores are available in Table 2 below.

### **Table 2. CASP Criteria Analysis**

Following data extraction, relevant text from the results, discussion and conclusion sections, which provided information directly pertinent to home care of newborns from the perspectives of family caregivers, were imported into NVivo 11 qualitative software (NVivo qualitative data analysis software; QSR International Pty Ltd. Version 11, 2015).

Following the appraisal, deductive content analysis based on the WHO guidelines<sup>15</sup> was employed to identify domains for investigation and presentation within a framework analysis approach<sup>16</sup>. The focus of analysis was on manifest content rather than latent content <sup>17</sup>. For each domain of newborn care, study findings were extracted, and information on barriers and facilitators synthesized. Then, a narrative summary of the identified domains and themes, developed according to content, was reviewed by the research team (SE, ANB, EFK) to produce a consensus-based listing including barriers and facilitators to recommended newborn care practices.

#### **RESULTS**

#### Geographic overview of studies reviewed

The vast majority of studies identified emerged from research carried out in the Sub-Saharan region, while the South Asian region was also well represented in the qualitative literature relating to newborn care practices at home.

Sub-Saharan Africa

Studies from the African region comprised 24 of 37 included for review, and information presented in the studies described the full range of home based newborn care practices.

South Asia

From the South Asian region, 8 of 37 studies presented information on newborn care practices, covering more general rather than specific domains of newborn care, though one focused on breastfeeding.

Southeast Asia

Three studies, two related to breastfeeding in Cambodia and Lao PDR, along with another from Cambodia related to skin care, were identified from the Southeast Asian region.

Latin America / Caribbean

Two qualitative studies were identified from the Latin America/Caribbean region, from Guatemala and Haiti, related to breastfeeding and cord care respectively.

#### **Barriers and facilitators**

A comprehensive list of barriers and facilitators stratified by the recommended care practice that were generated through the data synthesis exercise appears in **Table 3**. Among the 37 studies in this review, many of the reported barriers and facilitators were cross-cutting for recommended newborn care practices (i.e. cord care, drying and wrapping after delivery, prompt initiation of breast feeding, bathing, thermal control, breast feeding and care seeking for newborn illness). Across all practices, delivering at a health facility, including grandmothers in decision-making processes during and after pregnancy, low health care costs, and exposure to newborn care messaging in the community were reported as important facilitators for adoption of recommended newborn care practices. Common barriers across the recommended practices included traditional and historical beliefs and practices, cultural and gender norms, geographic location, conflicting health messaging, and societal pressures.

Barriers that influenced adoption of recommended **cord care practices** included lack of resources (e.g. clean water and razor blades), misinformation on timeliness of cord cutting, religious and cultural beliefs, and untrained birth attendants. Facilitators included institutional delivery, exposure to educational campaigns on safe and hygienic cord cutting practices, community outreach activities promoting handwashing and provision of clean razor blades, decision-making by grandmothers and women leaders, and cord-care counseling by Traditional Birth Attendants (TBA).

Barriers to timely **drying and wrapping** included perceptions of newborn vulnerability and dirtiness, conflicting advice household stakeholders, and waiting for delivery of the

placenta. Facilitators included institutional delivery, exposure to educational campaigns on newborn thermal regulation, traditional wrapping practices, and the presence of two TBAs during delivery.

Factors impeding **delayed bathing** included societal pressure for cleanliness, preference for immediate bathing due to concerns about ritual pollution and hypothermia, negative perceptions of the vernix, and immediate bathing at health facilities. Factors that facilitated delayed bathing after delivery included hospital-based birth, exposure to newborn care messaging on the radio during pregnancy, communication between health care workers in the community and at the facility during pregnancy, and social support from other women in the household.

Factors inhibiting **skin-to-skin care** and **thermal control** practices included use of blankets instead of skin-to-skin contact, not immediately releasing baby to mother following delivery, early bathing, concerns of disease transmission, and maternal household duties.

Facilitators included exposure to kangaroo care messaging during pregnancy, observing positive newborn health outcomes of other mothers who used kangaroo care practices, medical advice from health care providers, and prior participation in behavior change interventions.

Barriers to care-seeking for illness included lack of transport, minimal financial resources, distances to health facility, gender norms, prior negative experiences at health facilities, and cultural norms such as protective isolation during the postpartum period.

Facilitators included family knowledge and recognition of danger signs and illness symptoms, lower health care costs, community education and support from religious leaders, and exposure to newborn health campaigns.

Barriers to **initiating breastfee**ding included spatial/physical isolation, conflicting health messages, mother exhaustion, baby not crying for milk, historical and traditional beliefs to discard colostrum, and education. Facilitating factors included community and family member knowledge, information provided during health facility-based birth, attendance by trained TBAs, being a first time mother, and exposure to breast feeding education and policy campaigns.

#### **DISCUSSION**

Effective interventions to improve newborn survival require information on a number of complex factors related to essential newborn care <sup>18</sup>. In addition to collecting improved quantitative data for neonatal survival, qualitative data are essential for behavioral interventions targeted to specific populations. <sup>19</sup> Few qualitative systematic reviews exist to synthesize information from perspectives of parents on newborn care. One review from 2014 focused on skin-to-skin contact and included 29 studies containing data from 9 countries<sup>20</sup>. Findings from that review centred on the experience of becoming a parent under unfamiliar circumstances, and thoughtfully considered the experiences of parents in the unique practice of skin-to-skin care. The authors did not restrict the review to low income settings, though studies from Uganda, Brazil, and South Africa were included. Our findings add further information to the peer reviewed literature from low income countries, where the majority of newborn deaths occur.

Another review was recently conducted in relation to thermal care for newborns in Sub-

Saharan Africa<sup>21</sup>. The review focused on sociocultural factors and identified a number of potentially harmful cultural norms and traditions which influence care across African settings. Similar to what has been found in the present review, that review identified caregiver factors and contextual barriers as well as facilitating factors, but in contrast to this review these were specific to thermal control, which may not represent the full range perspectives for other newborn care practices. In contrast to this review, that review's restriction to Sub-Saharan Africa settings limits the potential for transferability of the findings to other geographic settings, and data from parents or family caregivers was not the focus.

A systematic review covering neonatal care practices in Sub-Saharan Africa was recently undertaken<sup>22</sup>. The authors of that review included both quantitative data and qualitative data published from 2001-2014, whereas our review focused on qualitative data only, and covered the period 2006-2017, though similar findings were identified in both reviews in relation to care practices, confirming the findings. Bee et al. also included studies of facility-based and home-based care (unlike our study which focused on data from parents regarding home care) and noted the limitation of data having come mainly from 5 countries, highlighting a need for research from a wider geographic area, such as has been provided in the present review. Given that birth at home presents unique risks to the newborn<sup>23</sup>, information from these settings is key. Whereas the present review focused on barriers and facilitators identified through qualitative research, the review by Bee et al. centered on the prevalence of key immediate newborn care practices, however, the findings of both reviews are concordant.<sup>22</sup>

Policy recommendations and current approaches to reducing newborn mortality have not yet been appropriately scaled to reduce newborn mortality to levels targeted by the

Sustainable Development Goals<sup>24</sup>. In the context of international calls for reduction of newborn mortality and stillbirths<sup>25</sup>, it will be essential for interventions to meet the needs of families and parents caring for newborns. This systematic review of qualitative research, drawn from the literature across low income countries, is an important step to providing data on the range of newborn care practices at home, which is specifically relevant to behavior change in settings where high newborn mortality continues.

#### **Conclusions**

This systematic review identified qualitative studies reporting on the experiences and first-hand accounts of family members and caregivers in low income countries who are responsible for providing essential newborn care for their infants up to the first 28 days of life. The review identified barriers and facilitators commonly reported in studies of newborn care practices. The findings presented here are directly applicable to social and behavioral change initiatives aimed at improving care practices for better newborn health outcomes in low resource settings.

No.	Author(s)	Year	Qualitative Methods	Participants**	Country (s)	Newborn Care Practices
1	Aborigo, Moyer, Rominski, et al.	2012	In depth interviews (IDI), Focus Group Discussions (FGD)	Mothers, health care providers, TBA, community leaders, grandmothers, compound heads, heads of households	Ghana	Breastfeeding practices
2	Adejuyigbe, Bee, Amare et al.	2015	IDI, Narrative Interviews, and Observations (O)	Mothers, fathers, health workers, grandmothers, TBA	Nigeria, Tanzania, Ethiopia	Thermal care and bathing
3	Alam, Ali, Sultana et al.	2008	IDI, O	Mothers, fathers, grandmother, family members, TBA	Bangladesh	Cord care practices
4	Amare	2014	IDI	Mothers, grandmothers, TBA	Ethiopia	Cord care practices
5	Amare, Shamba, Manzi, et al.	2015	IDI, FGD, (O)	Mothers, fathers, health workers, TBA, grandmothers, merchants	Four African sites	Emollient use for skin care
6	Atyeo, Frank, Vail et al.	2017	Semi structured interviews (SSI)	Mothers	Guatemala	Breastfeeding practices
7	Bazzano, Kirkwood, Tawiah-Agyeman, et al.			_	Ghana	Care seeking behaviors
8	Bazzano, Oberhelman, Potts et al.	2015	IDI, O, FGD, visual media	Mothers, grandmothers, fathers	Cambodia	Breastfeeding practices
9	Bazzano, Var, Grossman, et al.	2017	O, SSI	Mothers	Cambodia	Newborn care practices with emphasis on use of emollients
10	Byaruhanga, Nsungwa- Sabiiti, Kiguli, et al.	2011	IDI, FGD	Mothers, TBA, elderly care takers	Uganda	Care seeking behaviors
11	Degefie, Amare, and Mulligan	2014	IDI, Key informant interviews (KII)	Mothers, grandmothers, TBA, fathers	Ethiopia	General care practices
12	Dhinga, Gittelsohn, Suleiman, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, health care providers	Tanzania	Cord care practices
13	Engmann et al.	2013	IDI, FGD	Mothers, grandmothers, health care providers	Ghana	Newborn illness, danger signs, and care seeking behavior
14	Gondwe, Munthali, Ashorn, et al.	2014	IDI, FGD	Mothers, fathers, TBA, grandmothers, traditional healers,	Malawi	Pre-term birth and care seeking practices
15	Herlihy, Shaikh, Mazimba, et al.	2013	IDI, FGD	Mothers, grandmothers, TBA, community members	Zambia	Cord care practices
16	Hill, Tawaiah-Agyemang, Manu et al.	2010	IDI, FGD, and Narratives (N)	Mothers, grandmothers, TBA, fathers, pregnant women	Ghana	Thermal care practices
17	Hunter, Callaghan-Koru, Mahmud, et al.	2014	IDI, FGD	Pregnant women, mothers, husbands, grandmothers, traditional healers, community leaders, religious leaders, health care providers	Bangladesh	Skin to Skin practices
L8	Kesterton and Cleland	2009	IDI, FGD	Mothers, grandmothers, TBA	India	General care practices
19	Khadduri, Marsh, Rasmussen et al.	2008	SSI, FGD	Women of reproductive age, health service providers, mothers, fathers	Pakistan	General care practices
20	Lee, Durham, Booth, et al.		IDI, FGD	Mothers, health care staff, key informants	Lao PDR	Breastfeeding practices

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21	Lunze, Yeboah-Antwi,	2014	IDI, FGD	Mothers, community leaders, health	Zambia	Neonatal hypothermia
	and Marsh			officers, grandmothers		and thermal care
		2011	151 661 565			practices
22	Melesse-Salasibew,	2014	IDI, SSI, FGD	Mothers, local experts on newborn	Ethiopia	General care practices
	Filteau, and Marchant	2000	IDI	care practices	5 1 1 1	following home births
23	Moran, Choudhury, Khan, et al.	2009	IDI	Pregnant women, mothers	Bangladesh	General care practices
24	Moyer, Aborgio, Logonia et al.	2012	IDI, FGD	Women with newborns, grandmothers, compound heads, community leaders, TBA, health care providers	Ghana	Cord care practices
25	Mrisho, Schellenberg, Mushi et al.	2008	IDI, FGD, CS	Female community informants	Tanzania	Home-based care practices
26	Nabiwemba, Atuyambe, Criel, et al.	2014	IDI	Mothers	Uganda	Care practices for LBW babies
27	Nalwadda, Waiswa, Guwatudde, et al.	2015	IDI, FGD	Mothers, fathers, TBA	Uganda	General care practices with emphasis on cord care
28	Newbrander, Natiq, Shahim, et al.	2014	IDI, FGD, O	Household members of perinatal woman, community members	Afghanistan	General care practices
29	Okeyere, Tawiah- Agyemang, Manu, et al.	2010	IDI, FGD, Birth Narratives (BN)	Mothers, TBAs, grandmothers, husbands, asram healers	Ghana	Traditional illness
30	Pati, Chauhan, Panda, et al.	2014	IDI	Mothers, TBA	India	General care practices with an emphasis on breastfeeding
31	Premji, Khowaja, Meherali, et al.	2014	IDI, FGD	Mothers, fathers, grandmothers	Pakistan	General care practices
32	Sacks, Moss, Winch et al.	2015	IDI, FGD, O	Mothers, TBA, hospital staff	Zambia	Skin, thermal, and cord care
33	Shamba, Schellenberg, Hildon et al.	2014	IDI, FGD, BN	Mothers, TBA	Tanzania	Bathing, thermal, and skin to skin care practices
34	Tawiah-Agyemang, Kirkwood, Edmond, et al.	2008	SSI, FGD	Mother, women of child bearing age, health workers, policy makers	Ghana	Initiation of breastfeeding
35	Thairu and Pelto	2008	IDI	Mothers	Tanzania	General care practices
36	Waiswa, Kemigisa, Kiguli, et al.	2008	IDI, FGD	Mothers, fathers, grandparents	Uganda	General care practices
37	Walsh, Norr, Sankar, et al.	2014	FGD	TBA, pregnant women, stakeholders, traditional healers	Haiti	Cord care practices

<sup>\*</sup>Color coding indicates geographic regions

<sup>\*\*</sup>Data for the review were only extracted from participants who were family members (including mothers of newborns or mothers-to-be) and non-professionals who provided care at home to the newborn.

N o.	Author(s)	Yea r	CASP 1	CAS P 2	CAS P 3	CAS P 4	CAS P 5	CAS P 6	CAS P 7	CAS P 8	CAS P 9	CASP 10	Overall Score
1	Aborigo, Moyer, Rominski et al.	2012	Y	Υ	Y	Y	Y	Υ	Y	Υ	Υ	Υ	10/10
2	Adejuyigbe, Bee, Amare et al.	2015	Υ	Υ	Y	Υ	Υ	Υ	Y	Υ	Υ	Y	10/10
3	Alam, Ali, Sultana et al.	2008	Y	Υ	Y	Υ	Υ	N	Y	Υ	С	Y	8/9
4	Amare	2014	Υ	Y	Υ	Y	Υ	N	Υ	Υ	Υ	Υ	9/10
5	Amare, Shamba, Manzi, et al.	2015	Υ	Υ	Y	Υ	Υ	N	Y	Υ	Υ	Υ	9/10
6	Atyeo, Frank, Vail et al.	2017	Y	Υ	N	С	N	Υ	Υ	Υ	Υ	Y	7/9
7	Bazzano, Kirkwood, Tawiah-Agyemang, et al.	2008	Y	Y	Y	Y	Υ	N	N	Y	Y	Y	8/10
8	Bazzano, Oberhelman, Potts, et al.	2015	Y	Υ	Y	Y	Y	С	Y	Y	Y	Y	9/9
9	Bazzano, Var, Grossman, et al.	2017	Υ	Υ	Υ	Y	Υ	С	Υ	Υ	Υ	Y	9/9
10	Byaruhanga, Nsungwa-Sabiti, Kiguli, et al.	2011	Y	Y	N	Y	Y	N	Y	Y	Y	С	7/9
11	Degefie, Amare, and Mulligan	2014	Υ	Υ	Υ	Υ	С	N	Υ	С	Υ	Υ	7/8
12	Dhingra, Gittelsohn, Suleiman, et al.	2014	Y	Υ	Y	Y	Y	N	Y	Υ	Υ	Υ	9/10
13	Engmann, Adongo, Akawire, et al.	2013	Υ	Υ	Υ	Y	Y	Y	Y	Υ	Υ	Υ	10/10
14	Gondwe, Munthali, Ashorn, et al.	2014	Y	Υ	Υ	Υ	С	N	Y	Υ	Υ	Y	8/9
15	Herlihy, Shaikh, Mazimba, et al.	2013	Y	Υ	Y	Υ	С	N	Y	С	Υ	Υ	7/8
16	Hill, Tawiah- Agyemang, Manu, et al.	2010	Y	Y	Y	Y	Y	N	N	С	Υ	Y	7/9
17	Hunter, Callaghan- Koru, Mahmud, et al.	2014	Y	Y	Y	Υ	Υ	Υ	Υ	Υ	Y	Y	10/10
18	Kesterton and Cleland	2009	Υ	Υ	Υ	Υ	Y	Υ	Y	Υ	Υ	Y	10/10
19	Khadduri, Marsh, Rasmussen, et al.	2008	Y	Υ	Y	Y	С	N	N	С	Υ	Υ	7/9
20	Lee, Durham, Booth, et al.	2013	Υ	Υ	Y	Υ	С	N	Υ	С	Υ	Υ	7/8
21	Lunze, Yeboah- Antwi, Marsh, et al.	2014	Υ	Υ	Y	Y	Υ	N	Y	С	Υ	Y	8/9
22	Melesse-Salasibew, Filteau, and Marchant	2014	Y	Y	Y	N	Y	N	Y	N	Y	С	7/9
23	Moran, Choudhury, Khan, et al.	2009	Y	Υ	Υ	Y	С	N	Υ	С	Υ	Υ	7/8
24	Moyer, Aborigo, Logonia, et al.	2012	Υ	Υ	Υ	Υ	Υ	Y	Υ	Y	Υ	Y	10/10
25	Mrisho, Schellenberg,	2008	Υ	Υ	Υ	Υ	С	N	Υ	N	Υ	Y	7/9

Atuyambe, Criel, et al.  Atuyambe, Criel, et al.  Alwadda, Waiswa, Guwatudde, et al.  Rewbrander, Natiq, Shahim, et al.  2010 Y Y Y Y Y C N Y N Y Y Y 7/9  Chayere, Tawaiah-Agyeman, Manu, et al.  Apada, et al.  2014 Y Y Y Y Y N N Y N N Y Y Y Y Y Y Y Y Y		Mushi, et al.												
Guwatudde, et al.  28 Newbrander, Natiq, Shahim, et al.  29 Okyere, Tawaiah-Agyeman, Manu, et al.  30 Pati, Chauhan, Panda, et al.  31 Premji, Khowaja, Meherali, et al.  32 Sacks, Moss, Winch, et al.  33 Shamba, Schellenberg, Hildon, et al.  34 Tawiah-Agyemang, Kirkwood, Edmond, et al.  35 Thairu and Pelto  2008 Y Y Y Y Y Y N Y Y Y Y Y Y Y Y Y Y Y Y	26	Atuyambe, Criel, et	2014	Y	Y	Y	Y	С	N	Y	С	Y	Y	7/8
Shahim, et al.	27		2012	Υ	Y	Y	Y	С	N	Υ	С	Y	Υ	7/8
Agyeman, Manu, et al.  30 Pati, Chauhan, Panda, et al.  31 Premji, Khowaja, Meherali, et al.  32 Sacks, Moss, Winch, et al.  33 Shamba, Schellenberg, Hildon, et al.  34 Tawiah-Agyemang, Kirkwood, Edmond, et al.  35 Thairu and Pelto  2008 Y Y Y Y N Y N Y Y Y Y Y Y Y Y Y Y Y Y	28		2010	Υ	Y	Y	Y	С	N	Υ	N	Y	Y	7/9
Panda, et al.	29	Agyeman, Manu, et	2006	Y	Y	Υ	Y	С	N	Y	N	Y	Y	7/9
31         Premji, Khowaja, Meherali, et al.         2014         Y	30		2014	Y	Y	Υ	Υ	N	N	Υ	N	N	С	5/10
32       Sacks, Moss, Winch, et al.       2015       Y       <	31	Premji, Khowaja,	2014	Y	Y	Υ	Υ	Υ	Y	Υ	Υ	Υ	Y	10/10
33       Shamba, Schellenberg, Hildon, et al.       2014       Y <td>32</td> <td>Sacks, Moss, Winch,</td> <td>2015</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>Υ</td> <td>N</td> <td>Υ</td> <td>Y</td> <td>Y</td> <td>Y</td> <td>9/10</td>	32	Sacks, Moss, Winch,	2015	Υ	Υ	Υ	Υ	Υ	N	Υ	Y	Y	Y	9/10
34       Tawiah-Agyemang, Kirkwood, Edmond, et al.       2008       Y       Y       Y       Y       Y       N       Y       C       Y       7/9         35       Thairu and Pelto       2008       Y	33	Shamba, Schellenberg,	2014	Y	Υ		Y	Y	С	Y	Y	Y	Y	8/9
36 Waiswa, Kemigisa, 2008 Y Y Y N Y N Y Y Y 8/10	34	Tawiah-Agyemang, Kirkwood, Edmond,	2008	Y	'	Y	Υ	Y	N	N	Y	С	Y	7/9
Kinuli et al	35	Thairu and Pelto	2008	Υ	Y	Υ	Υ	Y	N	Υ	Υ	Υ	Y	9/10
37 Walsh, Norr, Sankar, 2015 Y Y Y Y Y N Y Y Y 9/10 et al.	36		2008	Y	Υ	Υ								
	37	Walsh, Norr, Sankar,	2015	Υ	Υ	Υ	Y	Υ	N	Υ	Y	Y	Y	9/10

Table 3. Barriers and facilitators described in articles reviewed

Domain of newborn care	Barriers	Facilitators	Article Number per Table 2, Year	Total Number of Article Mentions
Cord care	Lack of supplies, including water or	Knowledge about cord care	3, 2018	19/37
	infection prevention supplies	Community stakeholder recognition	4, 2014	
	Using surgical spirits and powder	that infants are susceptible to cord	9, 2017	
	Unhygienic cutting practices, including used, unsterilized razor blades or	Delivery in hospital	10, 2011	
	scissors	Informed at health facility	11, 2014	
	Unskilled attendants	Tailored behavior change	12, 2014	
	Delayed cord cutting, resulting in infection	communication	15, 2013	
		Appropriate compromises between	,	
	Mixed perception about the length at which cord should detach and heal	existing and recommended practices	18, 2009	
	Use of topical applications to the cord,	Community education	19, 2008	
	including herbs, butter, and indigenously-made substances, for	Outreach education	22, 2014	
	medicinal/protective purposes	Inclusion of grandmothers and other female household members, who are	23, 2009	
	Application of traditional remedies and substances on the cord to moisturize or	key decision makers and caregivers	24, 2012	
	dry it and facilitate its separation and promote healing	Participatory health promotion techniques, such as women's groups	25, 2008	
	Pallafillation of infantian and and h	Some and the section To division I Bright	26, 2014	
	Belief that cord infections caused by mother's diet	Programs targeting Traditional Birth Attendants (TBAs) and community mothers	27, 2015	
	Lack of understanding about cord cleaning	4	30, 2014	
	Lack of understanding of risks and	Importance of cord care and tying recognized in community and	32, 2015	
	infections affecting the cord and certain signs of infection, such as redness	understood culturally	36, 2008	
	Cultural belief and newborn care	Recognition of cord problems, such as delayed healing, bleeding, or swelling	37, 2014	
	practices not conforming to recommended practices	TBAs counselling mothers to protect		
	Cost of supplies, including CHX solution	the cord from infections		
	Cost of supplies, including CHA solution	Consensus regarding liquid cord		
	Religious and cultural beliefs about cord cutting and cleaning	cleaning		
	Umbilical cord thought to make baby vulnerable to witchcraft	Raising awareness about usefulness of CHX in cord cleaning		
	Mothers cutting the cord themselves	Willingness to adopt practices that would protect the newborn and alter traditional cord care practices		
	Umbilical cord not tied prior to cutting, can lead to tetanus	Behavior change communication		
	Practice of only tying to cord on the side	messages beginning at pregnancy		
	of the baby	Prescribed practices making their way into traditional care		

	Recontamination of washed hands			
	before attending to newborn	Efforts to promote hand-washing and		
		to avoid recontamination		
	Seclusion of mother and baby in			
	postpartum period may lead to late	Promotion of efforts to avoid unclean		
	identification of illness and delay to	home applications to the cord		
	seeking care			
	_	Programs, promoting cord cleansing		
	Utilizing materials, such as rope and	with antiseptics, should provide		
	twigs, in cord tying	educational messages about the		
		balance between the benefits and the		
	Disconnect between healthcare	likelihood that separation of umbilical		
	providers and community	cord may be slightly delayed		
	providers and community	cord may be slightly delayed		
	Local conceptions regarding role of cord	Using materials, such as clean cotton,		
	tying in stemming blood flow	other than fingers to apply		
	tying in sternining blood now	medicine/antiseptic		
	Concerns regarding the length of time	medicine/antiseptic		
	Concerns regarding the length of time	Dunana in cuban alcun anna		
	until cord detachment	Programs in urban slum areas		
		1		
	Presence of blood clots associated with	Interventions to improve social		
	curses	support to women, especially first-		
		time mothers		
		Educating healthcare providers about		
		harmful, traditional practices so they		
		are specifically addressed		
	curses			
		Explaining rationale for tying the cord		
		on both sides of the cut		
		Cultural health systems model that		
		depicts all stakeholders		
		Presence of blood clots leading to		
		seeking medical treatment at health		
		centers		
		Promotion of chlorhexidine in place of		
		commonly-reported application of		
		harmful substances		
		narmar substances		
		Scale-up of evidenced based practices		
		Scale-up of evidenced based practices		
		Health promotion programs taking		
		into account health system barriers		
		and financial burden		
Drying and wranning	Robaviors vary among home deliveries	Knowledge about draing and	2 2015	11/37
Drying and wrapping	Behaviors vary among home deliveries	Knowledge about drying and	2, 2015	11/3/
	Percention of dirtiness of habit	wrapping	0 2011	
	Perception of dirtiness of baby	Understanding that haby should be	8, 2011	
	December of highlight and a second	Understanding that baby should be	40 2044	
	Perception of birthing process as	kept warm	10, 2014	
	polluting			
		Delivery in hospital	14, 2010	
	Vulnerability of baby			
		Informed at health facility	16, 2009	
	Opinions of other household			
	stakeholders, such as the mother-in-law	Tailored behavior change	19, 2014	
		communication		
	Home and hospital delivery		20, 2014	
		Appropriate compromises between		
	Not attending to haby until placents	existing and recommended practices	21, 2009	
	Not attending to baby until placenta	existing and reconnicioed practices	,	
	delivered	existing and recommended practices	,	
	_ : :	Community education	28, 2014	

Prioritization of the mothers	Outreach education	30, 2015
	Inclusion of grandmothers who are key decision makers	31, 2014
	Participatory health promotion techniques, such as women's groups	
	Traditional practice of wrapping in new clean cloth	
	Use of warm water and traditional herbs to protect baby	
	Behavior change communication messages beginning at pregnancy	
	Babies dried and wrapped due to awareness of reduction of cold	
	Having more than one attendant to help both the mother and baby	
	Programs in urban slum areas	
	Interventions to improve social support to women, especially first-time mothers	

Bathing	Traditional or historical practice	Delayed bathing when delivery in	2, 2015	17/37
	Lack of knowledge of when to bathe baby, especially in home deliveries	hospital Informed at health facility	3, 2008	
	Early bathing due to societal pressure	Quality of care in health facility	8, 2011	
	Cultural norm of frequent bathing	Health worker advice	9, 2014	
	Cultural belief and newborn care	Tailored behavior change	10, 2014	
	practices not conforming to recommended practices	communication, addressing community norms and based on	14, 2010	
	Negative perception of vernix, including	formative research	16, 2009	
	association with sperm	Appreciation of newborn vulnerability to encourage behavior change	19, 2014	
	Vernix considered dangerous for HIV- exposed infants	Appropriate compromises between	20, 2014	
	Bathing in close proximity to smoking	existing and recommended practices	21, 2009	
	fires	Community education	24, 2014	
	Early bathing due to association with dirtiness as well as body odor later in	Outreach education	26, 2014	
	life	Inclusion of grandmothers who are key decision makers	28, 2014	
	Differences in practice by untrained TBAs	Participatory health promotion	30, 2015	
	Spiritual beliefs attached to use of local	techniques, such as women's groups	31, 2014	
	herbs for bathing  Bathing practices, such as using pond	Behavior change communication messages beginning at pregnancy	33, 2008 34, 2008	
	water	Having more than one attendant to help both the mother and baby	34, 2008	
	Substances added to water, including Dettol or Savion	Delayed bathing due to concerns about pneumonia		
	Bathing immediately after birth due to concerns about 'ritual pollution' can cause hypothermia	Identifying and addressing cultural rationales that underlie negative practices		
	Early bathing linked to shaping the baby's head	Reinforcing ad protecting beliefs that support positive practices		
	Early bathing to help the baby sleep and feel clean	Improving health worker communication skills and social		
Thermal control	Lack of practice when delivery at home or with TBA	Informed at health facility Beliefs about importance of thermal	2, 2015	12/37
	Lack of knowledge of keeping baby	care	3, 2008	
	indoors	Quality of care in health facility	8, 2011	
	Suboptimal practices	Tailored behavior change communication based on formative	9, 2014	
	Early bathing  Length of time baby undressed during	research  Appropriate compromises between	10, 2014	
	bathing	existing and recommended practices	17, 2008	
	Bathing with warm water	Community education	19, 2014	
	Use of blankets, rather than skin-to-skin care	Outreach education		
		Outreach education	24, 2014	

			<b>.</b>	
	Newborn massage, including use of mustard oil, can compromise the skin barrier function	Inclusion of grandmothers who are key decision makers Participatory health promotion techniques, such as women's groups	28, 2014	
	Cultural belief and newborn care practices not conforming to recommended practices  Lack of maintaining thermoprotective practices in the first few hours postpartum, when newborns are at	Behavior change communication messages beginning at pregnancy  Knowledge and practice that baby should be kept warm  Having more than one attendant to	31, 2014	
	greatest risk	help both the mother and baby  Use of low-cost newborn warmers  Community-based practices on hypothermia prevention and management		
Skin to skin contact	Few mothers given baby immediately	Behavior change interventions based	2, 2015	9/37
SMIT TO SMIT COILECT	after birth	on formative research	3, 2008	5/5/
	Concerns of disease transmission, harm to umbilicus	Quality of care in health facility  Tailored behavior change	8, 2011	
	Perception of dirtiness after birth	communication	9, 2014	
	Maternal rest  Concerns of baby becoming cold	Appropriate compromises between existing and recommended practices	14, 2010 15, 2014	
	Delayed due to early bathing	Community education	16, 2009	
	Perception that it might be harmful to fragile newborns	Outreach education  Inclusion of grandmothers who are key decision makers	19, 2014 31, 2014	
	Lack of understanding that kangaroo mother care is a protective method of caring for healthy newborns	Participatory health promotion techniques, such as women's groups	31, 2011	
	Use of blankets, rather than skin-to-skin care	Behavior change communication messages beginning at pregnancy		
	Lack of continued skin to skin contact	Association with reduced risk of cord infection		
	Cultural belief and newborn care practices not conforming to recommended practices  Women feeling responsible for	Concept easily understood and women willing to try if good for the baby		
	household duties	Appreciation of kangaroo mother care as an appropriate treatment for ill babies		
		Biomedical advice from healthcare providers reaching community through word-of-mouth and television campaigns		
		Receiving help from family members		

		Witnessing other women perform kangaroo mother care with positive outcomes  Focusing intervention messages on building supportive a environment for		
		kangaroo mother care practice		
Hygiene	Lack of knowledge on hand-washing with soap	Health education	3, 2008	6/37
	Recontamination of washed hands	Tailored behavior change communication	9, 2014	
	before attending to the newborn	Appropriate compromises between	16, 2009	
	Cultural belief and newborn care practices not conforming to	existing and recommended practices	17, 2008	
	recommended practices	Community education	22, 2012	
	4	Outreach education  Inclusion of grandmothers who are	24, 2014	
	10	key decision makers		
		Participatory health promotion techniques, such as women's groups		
		Efforts to promote hand-washing and to avoid recontamination		
	Teconimiented practices	Understanding of keeping babies and their surroundings clean		
		Educating healthcare providers about harmful, traditional practices so they are specifically addressed		
		12		
Breast feeding (initiation of	Traditional or historical practice	Community members knowledgeable	1, 2012	18/37
and provision of colostrum)	Belief that it is unhealthy	about importance of breast-feeding  Delivery in a health facility, where	6, 2017	
	Mother's exhaustion	staff encouraged early breast-feeding	9, 2017	
	Limited knowledge	Culturally-tailored health education	10, 2011	
	Maternal education status	Targeting isolated villages	11, 2014	
	Geographic isolation	Cross-generational education interventions	12, 2014	
	Inconsistency in health education	Interventions through community	18, 2009	
	Learning from relatives  Pre-lacteal feeds given on fingertip,	health clinic workers  Appropriate compromises between	19, 2008 20, 2013	
	increasing risk of infection	existing and recommended practices	22, 2014	
	Low urgency in initiating breastfeeding as mother and child believed to be	Community education	23, 2009	
	polluted after birth	Outreach education	25, 2008	
	Negative beliefs regarding colostrum			

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		Inclusion of grandmothers/mother-in-	26, 2014	
	Traditional practices to test colostrum for bitterness	laws and religious leaders who are key decision makers	28, 2014	
	Perception of a lack of breast milk	Participatory health promotion techniques, such as women's groups	30, 2014	
	Onset of post-birth activities, such as	a communication of the contract of the contrac	31, 2014	
	bathing	Awareness of nutritive value of breast milk	33, 2008	
	Perception that baby needs rest	Bartis a constitution of the state of	25 2000	
	Baby not crying for milk	Positive perception regarding infant feeding	35, 2008	
	Perception of inadequate maternal nutrition and breast milk	TBAs trained by Ministry of Health		
		Raising awareness of early initiation of		
	Premature breast milk supplementation (water and other fluids), which may	breast-feeding in the policy arena		
	expose newborns to pathogens	Cultural belief and practices		
	Work served as a barrier	Identifying and addressing cultural rationales that underlie negative		
	Difference in advice received from different people by first-time mothers	practices		
	amerent people by hist-time mothers	Reinforcing ad protecting beliefs that		
	Cultural belief and newborn care practices not conforming to	support positive practices		
	recommended practices	Improving health worker		
	Perception that hunger is not met or	communication skills and social management of patients		
	satisfied by breast-milk alone			
		Lowering healthcare costs		
		Programs in urban slum areas		
		Interventions to improve social		
		support to women, especially first- time mothers		
		First-time mothers' mothers		
		Working with employers and developing supportive employment policies		
		Providing postnatal support and working with lay people and health professionals		
		Research to identify optimal combination of interventions		
		Using religious leaders, trained health workers, family health action groups, and radio to disseminate messages		
Care seeking for illness	Lack of transportation	Addressing locally existing cultural beliefs	7, 2008	7/37
	Geographic isolation/remoteness from health facilities	Strengthening facility care	8, 2011	
			11, 2013	
	Financial ability/constraints	Urging families to seek medical care for any symptom of illness in a	17, 2008	
	Seclusion of mother and baby in postpartum period may lead to late	newborn	25, 2015	

identification of illness and delay to seeking care  Community understanding of the newborn period and cultural expectations  Caretaker knowledge about newborn sickness  Individual experiences in household and caretaker autonomy  Women's inability to seek care without being accompanied by a male relative  Healthcare decisions influenced by community members  Perceived health system gaps  Confidence in healthcare providers is issue-specific  Sequential care-seeking practices, with traditional medicine as first-line of treatment for 7 days  Untimely action after recognition of danger signs  Previous negative experiences with health services facilities  Local understanding of illness affects treatment practices  Mothers blamed for infant illness	Addressing financial barriers  Recognition of danger signs  Targeted behavior-change communication programs  Using religious leaders, trained health workers, family health action groups, and radio to disseminate messages  Understanding traditional illnesses in designing care-seeking interventions	26, 2014 27, 2010	
issue-specific  Sequential care-seeking practices, with traditional medicine as first-line of treatment for 7 days  Untimely action after recognition of danger signs  Previous negative experiences with health services facilities  Local understanding of illness affects treatment practices			

Other newborn care	Cultural perception of emollients as improving the skin, keeping the baby	Association of emollient therapy in reduction of mortality among preterm	4, 2014	4/37
	warm, and shaping the baby	infants	20, 2014	
	Social pressure to use emollients	Newborn emollient trials, specifically designed to reflect contextual	26, 2010	
	Emollient choice influenced by cost, availability, and traditional norms	differences	30, 2015	
	Massage, associated with application of emollients, is potentially damaging to skin	If emollients are proven effective, policy makers deciding whether to provide emollients free of charge or through social marketing		
	Potential impact of emollients, such as engine oil, on harm and even mortality	Improving practice of massage associated with emollient application		
	TBAs applying mild pressure inside baby's mouth on the soft palate with water and local herb	Understanding traditional illnesses in designing care-seeking interventions		
	Application of powders directly into dermal incisions of ill children to ward off malevolent spirits			
Low birth weight	Babies not weighed	Better knowledge of home care	9, 2014	3/37
recognition	Belief in supernatural powers	practices when delivery at health facility	12, 2014	
	Less knowledge of home care practices when baby delivered at home or in	Health education at community level to reach mothers that deliver at home	24, 2014	
	lower level health facility	Mechanisms to support mothers		
	Lack of knowledge of how to provide care or when to take baby to health facility	Provision of warmth to preterm newborns		
	Perceptions of preterm birth, including young and old maternal age, heredity, sexual impurity, and maternal illness during pregnancy	Addressing cultural practices for preterm babies among community members		
	Poverty	Vernix considered important for preterm newborns		
	Women placed with main responsibility for preterm newborns	31		
	High time burden of care for preterm babies leading to neglect of household, farming, and business duties	7		

#### **Contributorship statement:**

Authors have contributed as follows to this work. Conception and design of the work: ANB, RH; Data collection: ANB, AK, EFK, RH; Data analysis and interpretation: ANB, AK, EFK; Drafting the article: ANB, AK, EFK, SE, RH; Critical revision of the article: ANB, AK, EFK, SE, RH; Final approval of the version to be published: ANB, AK, EFK, SE, RH.

Competing interests: All authors declare they have no conflicts of interest.

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**Data sharing statement:** All data came from published articles available from electronic databases which are openly accessible.

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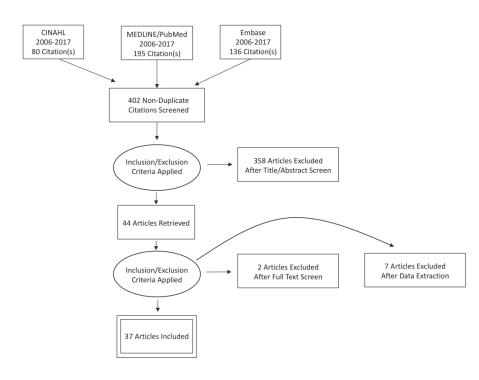


Figure 1
264x190mm (300 x 300 DPI)

## **Appendix 1. Search Strategy**

Search String	Notes
"infant, newborn"[mesh] OR	Includes "health
newborn[Title/Abstract] OR "newborn	knowledge, attitudes,
care"[tiab])) AND ("breast feeding"[MeSH	practices"
Terms] OR "immediate	
breastfeeding"[Title/Abstract] OR	
"exclusive breastfeeding"[tiab] OR	
"exclusive breast feeding"[tiab] OR	
"initiation of breastfeeding"[tiab] OR	
"thermal care"[tiab] OR "cord care"[tiab])	
OR "Thermal care" [tiab] OR "Thermal	
care"[ot] OR "bathing"[tiab] OR bathing[ot]	
OR "cord care"[tiab] OR "cord care"[OT] OR	
"umbilical cord care"[tiab] OR "umbilical	
cord care"[ot] OR "health knowledge,	
attitudes, practice"[MeSH Terms]	
"mothers"[MeSH Terms] OR	Parent Perspective
mothers[Title/Abstract] OR	Concept
mother[Title/Abstract] OR "fathers"[MeSH	
Terms] OR fathers[Title/Abstract] OR	
"parents"[MeSH Terms] OR parents[Tiab]	
OR parent[Tiab] OR "Grandparents"[MeSH]	
OR grandmother[Tiab] OR	
grandmother's[Tiab] OR	
grandmothers[Tiab] OR	
grandmothers'[Tiab)	
(("Qualitative Research"[Mesh] OR	Qualitative concept
"qualitative research"[TIAB] OR "qualitative	(w/o exclusions)
research"[OT] OR "qualitative studies"[tiab]	
OR "qualitative study"[tiab] OR "qualitative	
studies"[OT] OR "qualitative studies"[OT]	
OR "qualitative study"[OT] OR "Interviews	
as Topic"[Mesh] OR "semi structured	
interview"[TIAB] OR "semi structured	
interviewer"[TIAB] OR "semi structured	
interviewing"[TIAB] OR "semi structured	
interviews"[TIAB] OR "semi structured	
interview"[OT] OR "semi structured	
interviews"[OT] OR "semistructured	
interview"[TIAB] OR "semistructured	
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interview"[OT] OR "unstructured interview"[TIAB] OR "unstructured interviewing"[TIAB] OR "unstructured interviews"[TIAB] OR "unstructured interview"[OT] OR "in depth interview"[TIAB] OR "in depth interviewees"[TIAB] OR" in depth interviewing"[TIAB] OR "in depth interviews"[TIAB] OR "in depth interview"[OT] OR "in depth interviewing"[OT] OR "in depth interviews"[OT] OR "Focus Groups"[Mesh] OR "focus group" [TIAB] OR "focus groups"[TIAB] OR "focus group"[OT] OR "focus groups"[OT] OR "group interview"[OT] OR "group interview"[TIAB] OR "Direct observation"[tiab] OR "Participant observation"[tiab] OR "Nonparticipant observation"[tiab] OR "Direct observation"[OT] OR "Participant observation"[ot] OR "Non-participant observation"[OT] OR "Ethnology"[Mesh] OR "ethnographic research"[OT] OR "ethnographic research"[TIAB] OR ethnology[OT] OR ethnology[TIAB] OR "ethnographic study"[tiab] OR "ethnographic study"[ot] OR "Community-Based Participatory Research" [Mesh] OR "community-based participatory research"[OT] OR "community-based participatory research"[TIAB] OR "action research"[TIAB] OR "action research"[OT] OR "Formative research"[tiab] OR "Formative research"[ot] OR "Key informant"[tiab] OR "Key informant"[OT] OR "Interpretative perspective" [TIAB] OR "Phenomenological Research"[TIAB] OR Phenomenology[tiab] OR Phenomenology[ot] OR "Phenomenological Research"[OT])) ALL LMIC terms and ALL countries names (not pig OR hen) OR Developing country/LMIC terms (see above) Country names

"infant, newborn"[mesh] OR	This is our main
newborn[Title/Abstract] OR "newborn	concept and prioirity.
care"[tiab]	Reintroduced within
	context of other
	concepts
(("infant, newborn"[mesh] OR	
newborn[Title/Abstract] OR "newborn	
care"[tiab])) AND ((#110 AND #93 AND #94	
AND #101))	
(("infant, newborn"[mesh] OR	Published Jan 1, 2016 -
newborn[Title/Abstract] OR "newborn	Dec 31, 2017
care"[tiab])) AND ((#110 AND #93 AND #94	
AND #101)) Filters: Publication date from	
2016/01/01 to 2017/12/31	
(("infant, newborn"[mesh] OR	Published English Jan 1,
newborn[Title/Abstract] OR "newborn	2016 -Dec 31, 2017
care"[tiab])) AND ((#110 AND #93 AND #94	·
AND #101)) Filters: Publication date from	
2016/01/01 to 2017/12/31; English	
(("infant, newborn"[mesh] OR	
newborn[Title/Abstract] OR "newborn	
care"[tiab])) AND ((#110 AND #93 AND #94	
AND #101)) Sort by: Relevance Filters:	
published in the last 10 years; Humans;	
English	

# Reporting checklist for systematic review and meta-analysis.

Based on the PRISMA guidelines.

## Instructions to authors

Complete this checklist by entering the page numbers from your manuscript where readers will find each of the items listed below.

Your article may not currently address all the items on the checklist. Please modify your text to include the missing information. If you are certain that an item does not apply, please write "n/a" and provide a short explanation.

Upload your completed checklist as an extra file when you submit to a journal.

In your methods section, say that you used the PRISMA reporting guidelines, and cite them as:

Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group. Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement

		Reporting Item	Page Number
	#1	Identify the report as a systematic review, meta-analysis, or both.	0-1
Structured summary	#2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number	0-1
Rationale	#3	Describe the rationale for the review in the context of what is already known.	1
Objectives	#4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	2
Protocol and registration	<b>#5</b> For	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address) and, if available, provide registration information including the registration number.  peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml	0-1

	Eligibility criteria	#6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rational	3
ı	Information sources	#7	Describe all information sources in the search (e.g., databases with dates of coverage, contact with study authors to identify additional studies) and date last searched.	3
!	Search	#8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	See note
	Study selection	#9	State the process for selecting studies (i.e., for screening, for determining eligibility, for inclusion in the systematic review, and, if applicable, for inclusion in the meta-analysis).	4-5
	Data collection process	#10	Describe the method of data extraction from reports (e.g., piloted forms, independently by two reviewers) and any processes for obtaining and confirming data from investigators.	5
	Data items	#11	List and define all variables for which data were sought (e.g., PICOS, funding sources), and any assumptions and simplifications made.	5-6
	Risk of bias in individual studies	#12	Describe methods used for assessing risk of bias in individual studies (including specification of whether this was done at the study or outcome level, or both), and how this information is to be used in any data synthesis.	6-7
; )	Summary measures	#13	State the principal summary measures (e.g., risk ratio, difference in means).	6-7
	Planned methods of analyis	#14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I2) for each meta-analysis.	6-7
, , ,	Risk of bias across studies	#15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	6-7
	Additional analyses	#16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	6-7
;	Study selection	#17	Give numbers of studies screened, assessed for eligibility, and	7-8
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		included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	
Study characteristics	#18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citation.	7-8
Risk of bias within studies	#19	Present data on risk of bias of each study and, if available, any outcome-level assessment (see Item 12).	7
Results of individual studies	#20	For all outcomes considered (benefits and harms), present, for each study: (a) simple summary data for each intervention group and (b) effect estimates and confidence intervals, ideally with a forest plot.	7
Synthesis of results	#21	Present the main results of the review. If meta-analyses are done, include for each, confidence intervals and measures of consistency.	8-10
Risk of bias across studies	#22	Present results of any assessment of risk of bias across studies (see Item 15).	7
Additional analysis	#23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	8-10
Summary of Evidence	#24	Summarize the main findings, including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., health care providers, users, and policy makers	11
Limitations	#25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review level (e.g., incomplete retrieval of identified research, reporting bias).	11
Conclusions	#26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	12
Funding	#27	Describe sources of funding or other support (e.g., supply of data) for the systematic review; role of funders for the systematic review.	12

# **Author notes**

1. 4, Appendix

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