

A.12 EMOLLIENTS

Recommendation and remarks

RECOMMENDATION A.12 (NEW)

Application of topical oils to the body of preterm or low-birth-weight infants may be considered.

(Conditional recommendation, moderate-certainty evidence)

Remarks

- The recommendation is conditional on shared decision-making with parents; this includes informing parents about the benefits and risks and the need for further research.
- The GDG noted that there were limited data on the type, dose, timing of initiation and duration of oil use. Based on most of the trials included in the evidence review, the GDG suggested that sunflower or coconut oils may be used and that initiation and duration of use may be based on clinical judgement. The GDG also felt that application of oils should be done gently to avoid disrupting skin integrity.
- The GDG decided not to make a recommendation on the use of ointments or creams due to little or no effect on mortality and morbidity (invasive infection, necrotizing enterocolitis, bronchopulmonary dysplasia, retinopathy of prematurity) and no evidence on other critical outcomes.

Background and definitions

Emollients are moisturizing treatments applied topically, i.e. directly to the skin. They include ointments (water-in-oil suspensions), creams (oil-in-water suspensions) and natural vegetable or plant topical oils (e.g. sunflower and coconut oils). The skin of preterm infants is developmentally immature (141,142) and can be easily abraded, which can allow entry of pathogenic organisms (143). Topical

emollients can improve skin integrity and barrier (protective) functions but they can also disrupt skin integrity, remove normal flora and microorganisms and increase colonization with other microorganisms (142). Emollients also contain fatty acids and other fluids that can be absorbed through the skin (141). However, there have been no recent systematic reviews of the effectiveness of topical ointments, creams or oils in preterm and LBW infants.

Summary of the evidence

OVERVIEW	A.12a Topical oil	A.12b Topical ointment or cream
PICO	Population - Preterm and LBW infants Intervention 1 - Topical oil Comparator 1 - No topical oil Outcomes - All-cause mortality, morbidity, growth, neurodevelopment at latest follow-up	Population - Preterm and LBW infants Intervention 2 - Topical ointment or cream Comparator 2 - No topical ointment or cream Outcomes - All-cause mortality, morbidity, growth, neurodevelopment at latest follow-up
Timing, setting, subgroups	Timing of the intervention - Birth to 6 months of age Setting - Health-care facility or home in any country or setting Subgroups <ul style="list-style-type: none"> • Gestational age at birth (< 32 weeks, ≥ 32 weeks) • Birth weight (< 1.5 kg, ≥ 1.5 kg) 	

Effectiveness: Comparison 1 - Topical oil versus no topical oil

Sources and characteristics of the evidence

For this comparison, the effectiveness evidence was derived from a systematic review of 15 RCTs enrolling a total of 3718 infants (144) from nine countries (Bangladesh, Brazil, Egypt, France, Germany, India, the Islamic Republic of Iran and Pakistan). All trials used natural vegetable or plant oils: sunflower (8

trials), coconut (4 trials), and soybean, almond, vegetable and olive oil (1 trial each). The population was very preterm babies (< 32 weeks' gestation) in three trials. The intervention generally commenced within a few days of birth and continued until about 1-4 weeks chronological age or until hospital discharge. The oils were applied 2-6 times each day onto the whole skin surface (except the face and head) by the family or health worker.

Critical outcomes

For topical oil compared with no topical oil, 11 trials reported all-cause mortality, 9 reported morbidity (9 reported invasive infection, 1 necrotizing enterocolitis, 1 bronchopulmonary dysplasia, 1 retinopathy of prematurity), 7 reported growth (7 weight gain, 6 length, 6 head circumference) and 1 reported neurodevelopment (cognitive, language, motor and socioemotional outcomes [BSID-III]). No trials reported on serious adverse events. (Full details are provided in GRADE Table A.12a, in the Web Supplement.)

- **Mortality:** Low-certainty evidence from 11 trials totalling 1119 participants suggests little to no effect on all-cause mortality by hospital discharge (RR 0.94, 95% CI 0.82 to 1.08).
- **Morbidity:** Low-certainty evidence from nine trials totalling 3256 participants suggests a decrease in invasive infection by hospital discharge (RR 0.71, 95% CI 0.52 to 0.96). Very-low certainty evidence from one trial with 72 participants suggests a decrease in necrotizing enterocolitis by hospital discharge (RR 0.20, 95% CI 0.01 to 4.03). Very-low-certainty evidence from one trial with 72 participants suggests little to no effect on bronchopulmonary dysplasia at 26 weeks PMA (RR 0.93, 95% CI 0.53 to 1.64). Very-low-certainty evidence from one trial with 72 participants suggests little to no effect on retinopathy of prematurity by hospital discharge (RR 1.00, 95% CI 0.27 to 3.69).
- **Growth:** Low-certainty evidence from seven trials totalling 433 participants suggests an increase in the rate of weight gain (in grams per kilogram per day) by hospital discharge (MD 2.93, 95% CI 2.11 to 3.76). Moderate-certainty evidence from six trials totalling 358 participants suggests an increase in crown-heel length (millimetres

per week) by hospital discharge (MD 1.34, 95% CI 0.2 to 2.74). Low-certainty evidence from six trials totalling 358 participants suggests little to no effect on change in head circumference (in millimetres per week) by hospital discharge (MD 0.66, 95% CI 0.54 to 1.85).

- **Neurodevelopment:** Very-low-certainty evidence from one trial with 51 participants suggests little to no effect on cognitive developmental delay at 24 months of age (RR 0.25, 95% CI 0.06 to 1.11). Very-low-certainty evidence from one trial with 51 participants suggests little to no effect on language developmental delay at 24 months of age (RR 0.48, 95% CI 0.21 to 1.11). Very-low-certainty evidence from one trial with 51 participants suggests little to no effect on motor developmental delay at 24 months of age (RR 0.25, 95% CI 0.06 to 1.11). Very-low-certainty evidence from one trial with 51 participants suggests little to no effect on socio-emotional developmental delay at 24 months of age (RR 0.30, 95% CI 0.07 to 1.33). All neurodevelopmental outcomes were measured using BSID-III.

Subgroup analyses

The effect of gestational age and birth weight could not be assessed as there were insufficient trials for any critical outcome.

Other studies

One additional trial also reported a decrease in infection-specific mortality by 28 days of age (adjusted odds ratio 0.72, 95% CI 0.39 to 1.34; 1 trial, 103 participants) and a decrease in nosocomial infections by 28 days of age (adjusted incidence ratio 0.46, 95% CI 0.26 to 0.81; 1 trial, 103 participants) (145).

Effectiveness: Comparison 2 – Topical ointment or cream versus no topical ointment or cream

Sources and characteristics of the evidence

For the second comparison, the effectiveness evidence was derived from a systematic review of eight RCTs including 2086 preterm or LBW infants from five countries (144) (Austria, Bangladesh, Saudi Arabia, Türkiye and the USA). Most trials enrolled very preterm babies born at gestational ages up to 30 weeks while others enrolled babies born before 31 weeks (1 study), before 33 weeks (3 studies), before 34 weeks (1 study) or up to 36 weeks' gestation (2 studies). The trials used commercially available ointments or creams. The intervention generally commenced within a few days after birth and continued until about 1–4 weeks postnatal age or until hospital discharge. The ointments or creams were applied 2–6 times each day onto the whole skin surface (except the face and head) by the family or health worker.

Critical outcomes

For topical ointment or cream compared with no topical ointment or cream, seven trials reported all-cause mortality and eight reported morbidity (8 reported invasive infection, 4 necrotizing enterocolitis, 2 bronchopulmonary dysplasia, 1 retinopathy of prematurity). Growth and neurodevelopment outcomes were not reported. (Full details are provided in GRADE Table A.12b, in the Web Supplement.)

- **Mortality:** Low-certainty evidence from seven trials totalling 2067 participants suggests little or no effect on all-cause mortality by hospital discharge (RR 0.87, 95% CI 0.75 to 1.03).
- **Morbidity:** Low-certainty evidence from eight trials totalling 2086 participants suggests little or no effect on invasive infection (at least one infection with any organism) by hospital discharge (RR 1.13, 95% CI 0.97 to 1.31). Low-certainty evidence from four trials totalling 1472 participants suggests little or no effect on necrotizing enterocolitis by hospital discharge (RR 1.25, 95% CI 0.89 to 1.76). Low-certainty evidence from two trials totalling 1009 participants suggests little or no effect on bronchopulmonary dysplasia by hospital discharge (RR 1.00, 95% CI 0.88 to 1.14).

Very-low-certainty evidence from one trial with 952 participants suggests little or no effect on retinopathy of prematurity by hospital discharge (RR 0.99, 95% CI 0.77 to 1.28).

Subgroup analyses

The effect of gestational age and birth weight could not be assessed as there were insufficient trials for any critical outcome.

Values and acceptability

The systematic review about what matters to families about the care of the preterm or LBW infant (see Table 1.1) reported that families want to be involved in delivering care to infants, and want to take an active role in deciding what interventions are given to infants, including what and how they receive skin care (14). There was no specific evidence available about whether families value emollients for their preterm or LBW baby or find them more or less acceptable.

Resources required and implementation considerations

Organization of care

Emollients can be provided in the health-care facility or at home. They can be spread gently over the infant's abdomen, back and limbs. The family needs accurate information on how to apply the emollients gently. National or local guidance for health-care facilities should be used.

Infrastructure, equipment and supplies

Emollient preparations include sunflower and coconut oils. National or local guidance for health-care facilities should be used.

Workforce, training, supervision and monitoring

Health workers at all levels can support mothers and families. Standardized packages are needed for training, supervision and monitoring. Dispensing needs to be documented in clinical records.

Feasibility and equity

There was no specific evidence available about the feasibility and equity of topical emollient application for preterm or LBW babies.

Summary of judgements

	Comparison 1. Topical oil vs no topical oil (A.12a)	Comparison 2. Topical ointment or cream vs no topical ointment or cream (A.12b)
Justification	<ul style="list-style-type: none"> Evidence of moderate benefits: decreased severe infection (<i>low-certainty evidence</i>), increased weight (<i>low-certainty evidence</i>) and increased length (<i>moderate-certainty evidence</i>) No evidence of harms Evidence of little or no effect on: mortality (<i>low-certainty evidence</i>), necrotizing enterocolitis, bronchopulmonary dysplasia, retinopathy of prematurity (<i>low-certainty evidence</i>), head circumference (<i>low-certainty evidence</i>) and neurodevelopment (<i>very-low-certainty evidence</i>) No evidence on other critical outcomes 	<ul style="list-style-type: none"> Evidence of little or no effect on all-cause mortality, invasive infection, necrotizing enterocolitis, bronchopulmonary dysplasia and retinopathy of prematurity (<i>low-certainty evidence</i>) No evidence on other critical outcomes

Evidence-to-Decision summary		
Benefits	Moderate	Trivial or none
Harms	Trivial or none	Trivial or none
Certainty	Low	Low
Balance	Probably favours topical oils	Does not favour ointments or creams
Values	No uncertainty or variability about outcomes	No uncertainty or variability about outcomes
Acceptability	Probably yes	Probably yes
Resources	Low to moderate	Low to moderate
Feasibility	Probably yes	Varies
Equity	Probably equitable	Probably equitable