WHO recommendation on effectiveness of plastic bags/wraps in providing thermal care for preterm newborns immediately after birth

17 November 2015

Recommendation

There is insufficient evidence on the effectiveness of plastic bags/wraps in providing thermal care for preterm newborns immediately after birth. However, during stabilization and transfer of preterm newborns to specialized neonatal care wards, wrapping in plastic bags/wraps may be considered as an alternative to prevent hypothermia.

(Conditional recommendation based on low-quality evidence)

Publication history

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Assessed as up-to-date: November 2015

Background

Preterm birth, defined as birth before 37 weeks of gestation, is the single most important determinant of adverse infant outcomes, in terms of survival and quality of life. (1) Globally, it is the leading cause of perinatal and neonatal mortality and morbidity. (2) Preterm infants are particularly vulnerable to complications due to impaired respiration, difficulty in feeding, poor body temperature regulation and high risk of infection. (3-5) With the increasing contribution of neonatal deaths to overall child mortality, it is critical to address the determinants of poor outcomes related to preterm birth to achieve further reductions in child mortality. (6-8)

Infant mortality and morbidity from preterm birth can be reduced through interventions delivered to the mother before or during pregnancy, and to the preterm infant after birth. (9) Interventions can be directed at all women for primary prevention and reduction of the risk of preterm birth (e.g. smoking cessation programme) or aimed at minimizing the risk in women with known risk factors (e.g. progestational agents, cervical cerclage). (10) However, the most beneficial set of maternal interventions are those that are aimed at improving outcomes for preterm infants when preterm birth is inevitable (e.g. antenatal corticosteroids,
magnesium sulfate and antibiotic prophylaxis). (9) Special care of the preterm newborn to prevent and treat complications of prematurity is also critical to newborn survival. In high-income countries, reductions in mortality rates in infants that were born preterm have been driven largely by improved care and, more importantly, by appropriate policy changes.

**Methods**

The recommendations were developed using standard operating procedures in accordance with the process described in the WHO handbook for guideline development (11). Briefly, these included (i) identification of priority questions and critical outcomes, (ii) retrieval of the evidence, (iii) assessment and synthesis of evidence, (iv) formulation of recommendations, and (v) planning for the dissemination, implementation, impact evaluation and updating of the guideline.

The scientific evidence underpinning the recommendations was synthesized using the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach (12). Up-to-date systematic reviews were used to prepare evidence profiles for the priority questions. WHO then convened a Technical Consultation in May 2014 where an international group of experts – the Guideline Development Group (GDG) – formulated and approved the recommendations based on the evidence profiles.

In November 2014, an online consultation of the GDG was conducted to review and revise the recommendations in the light of the findings of a large implementation trial of antenatal corticosteroids in low-resource countries.

Further information on procedures for developing this recommendation are available here.

**Recommendation question**

For this recommendation, we aimed to answer the following question:

- In newly born extremely preterm or very preterm infants (P), is the use of plastic wraps/caps (I), compared with conventional care including Kangaroo mother care (C), effective in improving newborn outcomes? If so:
  - Should these plastic wraps/caps be used instead of KMC immediately after birth in a subgroup of preterm infants?

**Evidence summary**

*Plastic wraps or bags before stabilization for thermal care versus conventional thermal care for preterm infants:*

A systematic review that addressed this question identified 24 hospital-based studies (13).

Twenty of these studies involved preterm babies exclusively while the other four had results for term babies. Sixteen of the 20 studies with preterm babies involved very preterm babies with either birth weight < 1500 g or gestational age below 32 weeks, while two included moderately preterm babies (32–34 weeks of gestation) and two involved late preterm babies (34–37 weeks). Nine of the 24 studies were conducted in LMICs. The intervention consisted of wrapping of the neonate in a plastic bag, wrap or cap immediately
following vaginal birth or caesarean section (prior to drying), and keeping the bag, wrap or cap on until the neonate had been stabilized or had a normal body temperature. Materials used for wrapping included saran wraps (a transparent polythene film or sheet), shopping bags and other manufactured plastic sheets. In the control group, thermal care was provided using incubators or radiant warmers, or by keeping the baby wrapped in clothes in a warm room. No study compared this intervention with provision of KMC.

**Neonatal death:** Five trials involving 341 very preterm neonates (<29 weeks) from HICs showed no significant difference in terms of all-cause neonatal mortality when plastic wrapping was compared with wrapping in a blanket (absolute risks: 16.3% versus 19.4%; RR 0.84, 95% CI 0.54–1.30). When the analysis was restricted to three studies where radiant warmers were used for the control group, the overall effect on neonatal mortality was similar in the intervention and control groups (RR 0.86; 95% CI 0.49–1.49; 290 neonates). A study from Zambia, among 104 newborns born at 26–36 weeks or weighing < 2500 g, found absolute mortality risks of 14.3% versus 5.5% for wrapping versus conventional thermal care although the study lacked sufficient power to detect a statistically significant difference in mortality (RR 2.62, 95% CI 0.72–9.58). Another small trial conducted in Malaysia, among 110 neonates born at 24–34 weeks of gestation admitted to the NICU, showed absolute mortality risks of 10.0% versus 16.7% for wrapping versus conventional thermal care (RR 0.60, 95% CI 0.22–1.64). There were six observational studies that evaluated mortality outcomes comparing plastic wrapping with wrapping in a blanket; the results were again similar (RR 1.10, 95% CI 0.84–1.46; 849 neonates).

**Severe neonatal morbidity:** Three studies, including one randomized controlled trial (RCT) and two observational studies, examined the impact of wrapping in plastic bags compared with conventional care on the risk of necrotizing enterocolitis (NEC). The RCT involving 110 preterm newborns (born at 24–34 weeks of gestation) had only two reported events – both in the intervention group – and thus lacked power to detect meaningful differences between the groups (RR 5.98, 95% CI 0.29–121.80). Similarly, results from the two observational studies did not demonstrate any significant difference with regard to the risk of NEC in neonates < 1500 g (RR 1.29, 95% CI 0.85–1.97; 273 neonates). Four studies (including two RCTs from Malaysia and Uruguay) examined the impact of the intervention on severe IVH (grade 3–4). The results from the RCTs showed no statistically significant effects of the intervention on the risk of IVH. The study from Malaysia, which involved 110 preterm newborns < 1000 g, showed no significant difference in the risk of IVH when wrapping in plastic bags was compared to keeping the baby under a radiant warmer (RR 0.30, 95% CI 0.03–2.60). In the study from Uruguay, which compared the intervention with every other means of thermal care, there was a trend towards a reduction in the incidence of IVH (RR 0.38, 95% CI 0.15–1.02; 77 neonates). Two RCTs conducted in HICs assessed the impact of the intervention on other major brain injuries in preterm neonates born at > 29 weeks of gestation: no evidence of an effect was found (RR 1.10, 95% CI 0.41–2.98; 152 neonates). An RCT of plastic bags used for neonates with gestational ages of 24–34 weeks in Malaysia found no evidence of a difference in incidence of respiratory distress syndrome (RDS) between the intervention and control groups (RR 1.04, 95% CI 0.78–1.38; 110 neonates). Similarly, an observational study of neonates <1000 g showed no evidence of a reduced risk of BPD (RR 0.98, 95% CI 0.57–1.69; 209 neonates). Three RCTs involving 229 very preterm neonates (>29 weeks) showed a 42% reduction in the risk of hypothermia (temperature < 36.5 °C) with plastic bag use compared to controls (absolute risks: 46.0% versus 79.0%; RR 0.58, 95% CI 0.46–0.72). Plastic wraps were also associated with a reduction in risk of hypothermia in more mature preterm neonates: one RCT of preterm neonates born at 24–34 weeks reported a 21% reduction in the risk of hypothermia (RR 0.79, 95% CI 0.67–0.93; 110 neonates). Two RCTs in neonates ranging in gestational age from 26 to 36 weeks showed a 46% reduction in the risk of hypothermia (RR 0.54, 95% CI 0.36–0.79; 194 neonates). Ten observational studies reporting the risk of hypothermia estimated impacts ranging from no effect to 85% reduction in hypothermia. The results of these observational studies were not pooled because of differences in the definition of hypothermia. Hyperthermia, defined as temperature ? 37.5 °C or 38.0 °C, was reported in nine RCTs but was a rare outcome in all the studies. It was reported in only eight cases out of 286 infants in the intervention group, and none of 312 infants in the control group.
Further information and considerations related to this recommendation can be found in the WHO guidelines, available at:

http://apps.who.int/iris/bitstream/handle/10665/183037/9789241508988_eng.pdf?sequence=1

http://apps.who.int/iris/bitstream/handle/10665/183038/WHO_RHR_15.17_eng.pdf?sequence=1

Implementation considerations

- The successful introduction of this recommendation into national programmes and health-care services depends on well-planned and participatory consensus-driven processes of adaptation and implementation. The adaptation and implementation processes may include the development or revision of existing national guidelines or protocols based on this recommendation.
- The recommendation should be adapted into a locally appropriate document that can meet the specific needs of each country and health service. Any changes should be made in an explicit and transparent manner.
- A set of interventions should be established to ensure that an enabling environment is created for the use of the recommendations, and that the behaviour of the healthcare practitioner changes towards the use of this evidence-based practice.
- In this process, the role of local professional societies is important and an all-inclusive and participatory process should be encouraged.

Research implications

The GDG did not identify priority any question related with this recommendation:

Related links

WHO recommendations on interventions to improve preterm birth outcomes (2015) –[full document](http://apps.who.int/iris/bitstream/handle/10665/183037/9789241508988_eng.pdf?sequence=1) and evidence tables

Supporting systematic reviews:

Oatley H, Blencowe H, Lawn JE. Systematic review of the effect of coverings including plastic bags and wraps on mortality and morbidity in preterm and term neonates. 2014

Other links of interest

Managing Complications in Pregnancy and Childbirth: A guide for midwives and doctors

Pregnancy, Childbirth, Postpartum and Newborn Care: A guide for essential practice
References


Published on RHL (https://extranet.who.int/rhl)