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(REVIEW ARTICLE)

Neonatal hypothermia: Risk factors, prevention and outcomes

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Abstract

Neonatal hypothermia remains a major contributor to neonatal morbidity and mortality, particularly in low-resource settings. It is defined as a core body temperature below 36.5°C and is associated with increased risks of infection, respiratory distress, and death. This narrative review aims to summarize the current evidence regarding the risk factors, prevention strategies, and clinical outcomes associated with neonatal hypothermia. Several maternal, environmental, and neonatal factors contribute to hypothermia, especially in preterm and low birth weight infants. Preventive measures, including thermal care at birth, skin-to-skin contact, and appropriate use of incubators, have been shown to significantly reduce its incidence. Despite these interventions, hypothermia remains highly prevalent in many developing countries. Strengthening neonatal care practices and improving awareness are essential to reduce its burden.

Keywords: Neonates; Hypothermia; Low birth weight; Thermal care; Kangaroo mother care

1. Introduction

Neonatal hypothermia is a common and preventable condition that significantly contributes to neonatal morbidity and mortality worldwide. According to the World Health Organization, hypothermia is defined as a body temperature below 36.5°C and is classified into mild, moderate, and severe forms [1].

Newborns, particularly preterm and low birth weight infants, are highly vulnerable to hypothermia due to their large surface area, limited subcutaneous fat, and immature thermoregulatory mechanisms [2]. Hypothermia has been associated with an increased risk of sepsis, respiratory distress, hypoglycemia, and mortality [3].

Despite advances in neonatal care, hypothermia remains highly prevalent in low- and middle-income countries. This review aims to explore the risk factors, prevention strategies, and outcomes associated with neonatal hypothermia.

2. Methods

This narrative review was conducted using a literature search in electronic databases including PubMed and Google Scholar. Articles published in English between 2005 and December 2024 were considered.

The search included keywords such as “neonatal hypothermia,” “thermal care,” “low birth weight,” and “kangaroo mother care.” Relevant studies, including clinical trials, observational studies, and international guidelines, were reviewed.

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Articles were selected based on their relevance to the risk factors, prevention, and outcomes of neonatal hypothermia.

2.1. Risk Factors of Neonatal Hypothermia

Several factors contribute to neonatal hypothermia, particularly in resource-limited settings.

Major risk factors include:

- Prematurity and low birth weight [2,4]
- Delivery in cold environments
- Delayed drying and inadequate thermal care at birth
- Lack of skin-to-skin contact
- Neonatal illness such as sepsis

Preterm infants are particularly vulnerable due to their immature thermoregulation and reduced brown fat stores [2].

2.2. Prevention of Neonatal Hypothermia

Preventive strategies play a crucial role in reducing neonatal hypothermia.

Key interventions include:

- Immediate drying and warming after birth [1]
- Skin-to-skin contact (kangaroo mother care) [5]
- Use of warm delivery rooms
- Early breastfeeding
- Use of incubators or radiant warmers

Kangaroo mother care has been shown to significantly reduce hypothermia and improve neonatal survival, particularly in low-resource settings [5].

2.3. Outcomes of Neonatal Hypothermia

Neonatal hypothermia is associated with several adverse outcomes.

These include:

- Increased risk of neonatal mortality [3,6]
- Higher incidence of infections and sepsis
- Respiratory distress
- Hypoglycemia
- Prolonged hospital stay

Studies have demonstrated a strong association between hypothermia at admission and increased mortality in neonates [6].

3. Discussion

Neonatal hypothermia remains a significant and preventable contributor to neonatal morbidity and mortality worldwide, particularly in low- and middle-income countries [3,7,8]. Despite global recommendations, its prevalence remains high due to gaps in the implementation of essential thermal care practices [1,9].

Prematurity and low birth weight are consistently identified as the most important risk factors. These infants have immature thermoregulatory mechanisms, reduced subcutaneous fat, and increased heat loss, making them highly vulnerable to hypothermia [2,4,10]. Environmental factors, such as low delivery room temperature and inadequate thermal protection at birth, further increase the risk [11].

Preventive strategies are simple and cost-effective but are not always adequately implemented. Immediate drying, early skin-to-skin contact, and appropriate use of warming devices have been shown to significantly reduce hypothermia

rates [1,5]. Kangaroo mother care, in particular, is a highly effective intervention that improves thermal regulation and reduces neonatal mortality, especially in resource-limited settings [5,8].

Hypothermia is strongly associated with adverse outcomes, including increased risk of sepsis, respiratory complications, hypoglycemia, and death [3,6,12]. Several studies have demonstrated that even mild hypothermia at admission can significantly increase mortality risk, highlighting the importance of early detection and intervention [2].

In low-resource settings, barriers such as lack of equipment, inadequate training, and poor adherence to guidelines contribute to the persistence of neonatal hypothermia [7,9]. Strengthening healthcare systems, improving staff education, and implementing standardized protocols are essential to address this issue.

Overall, neonatal hypothermia remains a major but preventable challenge. Improving awareness and ensuring the consistent application of simple thermal care measures can significantly reduce its burden and improve neonatal outcomes.

4. Conclusion

Neonatal hypothermia remains a common and preventable condition associated with significant morbidity and mortality, particularly in preterm and low birth weight infants.

Simple preventive measures such as adequate thermal care at birth and skin-to-skin contact are effective but not consistently implemented.

Improving neonatal care practices and ensuring early recognition are essential to reduce its burden, especially in resource-limited settings.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

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