

CADTH Health Technology Review

Oral Feeding for Preterm Infants on Respiratory Support

Authors: Khai Tran, Sharon Bailey

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Abbreviations

CPAP	continuous positive airway pressure
HFNC	high-flow nasal cannula

Key Messages

- No health technology assessments or systematic reviews were identified regarding the clinical effectiveness of oral feeding in preterm infants while on continuous positive airway pressure or high-flow nasal cannula.
- No evidence-based guidelines were identified regarding oral feeding in preterm infants while on continuous positive airway pressure or high-flow nasal cannula that met the criteria for this review.

Context and Policy Issues

Preterm birth, defined as babies born alive before 37 weeks of pregnancy, occurs in about 8% of pregnancies in Canada every year.¹ It is the leading cause of infant morbidity and mortality, and it is estimated to cost the Canadian health care system more than 8 billion dollars per year.² As preterm infants have immature respiratory control mechanisms, non-invasive ventilation, such as nasal continuous positive airway pressure (CPAP) and high-flow nasal cannula (HFNC), is often required.³

Enteral feeding, also known as tube feeding, which directly delivers nutrition to the stomach or small intestine,⁴ is usually started in the first 2 to 5 days for very preterm infants (i.e., infants born at less than 32 weeks gestation) whose swallowing mechanisms have not fully matured to ensure that the infant receives appropriate nutrition.⁵ The maturation of suck, swallow, and breath coordination occurs in preterm infants around 33 to 36 weeks of gestation, at which time oral feeding – including breast feeding, bottle feeding, and cup feeding – can be initiated.⁶ Initiation of oral feeding before a preterm infant's swallowing mechanism has become fully established can lead to aspiration.^{7,8} However, research has shown that delays in transition from tube feeding to oral feeding may lead to delayed oral motor development, prolonged hospital stays, and persistent feeding disorders.^{9,10}

As non-invasive ventilation mechanisms provide access to the mouth, oral feeding is increasingly provided to preterm infants receiving nasal CPAP and HFNC with an attempt to optimize nutrition, support neurodevelopment outcomes, and reduce hospital length of stay.^{11,12} However, the safety of oral feeding in preterm infants while on non-invasive ventilation is unknown.^{13,14} Nasal CPAP has been shown to inhibit the swallow reflex in adults.^{15,16} HFNC may also impact swallowing safety by affecting the airway protection mechanisms in neonatal and adult populations.^{14,17} Thus, oral feeding to preterm infants while receiving nasal CPAP and HFNC may not be free from adverse events.

The objective of this report is to summarize the evidence regarding the clinical effectiveness of oral feeding compared with alternative feeding strategies such as enteral feeding in preterm infants while on nasal CPAP and HFNC. This report also aims to summarize the recommendations from evidence-based guidelines regarding oral feeding given to this population.

Research Questions

1. What is the clinical effectiveness of oral feeding while on continuous positive airway pressure or high-flow nasal cannula in preterm infants?
2. What are the evidence-based guidelines regarding oral feeding while on continuous positive airway pressure or high-flow nasal cannula in preterm infants?

Methods

Literature Search Methods

A limited literature search was conducted by an information specialist on key resources including MEDLINE, the Cumulative Index to Nursing and Allied Health Literature (CINAHL), the Cochrane Database of Systematic Reviews, the international HTA database, and the websites of Canadian and major international health technology agencies, as well as a focused internet search. The search strategy comprised both controlled vocabulary, such as the National Library of Medicine’s MeSH (Medical Subject Headings), and keywords. The main search concepts were preterm infants, artificial respiration, and feeding methods. CADTH-developed search filters were applied to limit retrieval to health technology assessments, systematic reviews, meta-analyses, network meta-analyses, and guidelines. Where possible, retrieval was limited to the human population. The search was also limited to English-language documents published between January 1, 2017, and September 26, 2022.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed and potentially relevant articles were retrieved and assessed for inclusion. The final selection of full-text articles was based on the inclusion criteria presented in [Table 1](#).

Table 1: Selection Criteria

Criteria	Description
Population	Preterm infants (< 37 weeks) requiring respiratory support
Intervention	Q1 to Q2: Oral feeding while on CPAP or HFNC
Comparator	Q1: Alternative feeding strategies while on CPAP or HFNC (i.e., enteral feeding) Q2: NA
Outcomes	Q1: Clinical effectiveness (e.g., length of stay, transition to oral feeding, weight gain) Q2: Guidelines and recommendations on best practices (e.g., assessing readiness, transition strategies)
Study designs	Health technology assessments, systematic reviews, evidence-based guidelines

CPAP = continuous positive airway pressure; HFNC = high-flow nasal cannula; NA = not applicable; Q = question.

Exclusion Criteria

Articles were excluded if they did not meet the selection criteria outlined in [Table 1](#), or if they were published before 2017.

Summary of Evidence

Quantity of Research Available

A total of 167 citations were identified in the literature search. Following screening of titles and abstracts, 158 citations were excluded and 9 potentially relevant reports from the electronic search were retrieved for full-text review. No potentially relevant publications were retrieved from the grey literature search for full-text review. None of these 9 potentially relevant articles met the inclusion criteria and they were excluded from this report for various reasons. [Appendix 1](#) presents the PRISMA¹⁸ flow chart of the study selection.

Summary of Findings

No relevant health technology assessments, systematic reviews, or evidence-based guidelines were identified regarding the clinical effectiveness of or recommendations for oral feeding while on CPAP or HFNC in preterm infants; therefore, no summary can be provided.

Limitations

No relevant health technology assessments, systematic reviews, or evidence-based guidelines were identified that met the criteria for this review. This report is limited by the parameters for the search, such as the time frame (i.e., from 2017 onward) and the study designs for the clinical effectiveness question (i.e., only health technology assessments and systematic reviews were searched). It unknown whether there is literature that was published more than 5 years ago or that used a different study design (e.g., randomized controlled trials, non-randomized studies) that was excluded due to the limitations of the search.

Conclusions and Implications for Decision- or Policy-Making

Conclusions could not be drawn regarding the clinical effectiveness of and recommendations for oral feeding while on nasal CPAP or HFNC in preterm infants because no relevant literature was identified to answer the research questions.

Further research is needed to determine the efficacy and safety of oral feeding in comparison with alternative feeding strategies such as enteral feeding in preterm infants while on nasal CPAP or HFNC. Likewise, evidence-based guidelines are needed to provide recommendations on feeding strategies for preterm infants while on respiratory support.

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Appendix 1: Selection of Included Studies

Figure 1: Selection of Included Studies

