Evidence-based review of oral sucrose administration to decrease the pain response in newborn infants

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CRD summary
This review assessed the efficacy and safety of oral sucrose solution as a pain reliever for infants receiving minor invasive procedures such as heelstick. The author concluded that sucrose solution should be used for full-term infants, but further work is needed to assess safety for pre-term neonates. Overall, this review was poorly reported and the conclusions may not be reliable.

Authors' objectives
To review the efficacy and safety of oral sucrose solution as a pain reliever for infants receiving minor invasive procedures.

Searching
MEDLINE was searched for English language papers; keywords and MeSH terms were reported. Reference lists were searched manually, and older known studies were also included. Only full publications were considered for this review.

Study selection
Studies were eligible if the population consisted of pre-term or term infants still in hospital following birth; the included studies reported on both term and pre-term infants. The intervention of interest was oral sucrose, with other sugars excluded; the included studies used sucrose solutions of varying concentrations. Outcomes were not specified as a criteria for selection. Randomised placebo-controlled trials were the only eligible study design.

The author did not state how the papers were selected for the review, or how many reviewers performed the selection.

Assessment of study quality
The author did not state that they assessed validity.

Data extraction
For each included study, data on the following pain responses were extracted where available: cry duration as a percentage, heart rate change, oxygen saturation, movement, facial expression, Neonatal Infant Pain Score and Premature Infant Pain Profile score. Some comparative p-values between active and control groups were also extracted.

The author did not state how the data were extracted for the review, or how many reviewers performed the data extraction.

Methods of synthesis
A narrative synthesis appears to have been carried out, grouping studies according to population: term or pre-term infants.

Results of the review
Overall, 16 randomised placebo-controlled studies of 1,077 infants were included in this review. Seven studies (n=512) reported on outcomes from term infants who received either circumcision, heelstick or venipuncture. Nine studies (n=565) reported on pre-term infants receiving heelstick or another painful procedure.

All 7 studies of term infants showed decreased pain response in the sucrose group compared with placebo, regardless of sucrose dosage, delivery method used or type of procedure carried out.

Overall, the 9 studies of pre-term infants found mixed results with no clear benefit of sucrose solution.
Authors' conclusions
Sucrose solution may be added to the treatment of full-term infants to relieve pain and distress. However, the evidence is unclear for pre-term infants. In particular, there is a lack of evidence on the safety of using sucrose solution for premature neonates.

CRD commentary
The research question was clearly framed, and appropriate search terms were used to locate the evidence. The review process itself may have been subject to various biases and sources of variability since several aspects were poorly reported. Only papers published in English were considered, which may have introduced language and/or publication bias. Although only randomised controlled trials were included in the review, no formal assessment of quality was reported. Poorly reported details of the data extraction process make it difficult to judge how rigorously this was carried out. The author commented on aspects of study quality, but these do not seem to have been taken into account when reporting the results. A narrative synthesis was carried out, but it is unclear why this was chosen rather than a formal meta-analysis. The author's precise recommendation for using 25% sucrose solution was not clearly drawn from the results.

Implications of the review for practice and research
Practice: The author stated that a pacifier dipped in 25% sucrose solution should be used following non-pharmacological comfort measures for term infants undergoing minor painful procedures.

Research: The author stated that further studies, particularly in the pre-term neonatal population, are required. These should evaluate multiple sucrose doses and record blood sugar measurements.

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contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.