Efficacy of glucose-based oral rehydration therapy

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Authors' objectives
To synthesise evidence on the safety and efficacy of oral rehydration therapy (ORT) among young children with paediatric gastroenteritis in developed nations.

Searching
MEDLINE was searched to 1993 (the start date was unclear, but was in the 1970's) using the keywords 'diarrhea' and/or 'gastroenteritis', in association with 'pediatrics', 'children', 'infants' and 'Native Americans'. Major organisations focusing on diarrhoea treatment were also contacted. Trials judged relevant to the treatment of children in the United States were included.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) comparing the efficacy of oral and intravenous rehydration, or comparing the safety and efficacy of oral rehydration solutions with differing sodium content.

Specific interventions included in the review
ORT.

Participants included in the review
Well-nourished children, over 1 month and up to 14 years old, were included.

Outcomes assessed in the review
Success in rehydrating children with gastroenteritis within 12 to 24 hours of the start of treatment; treatment failure, defined by the need for intravenous rehydration; safety, measured by the relative incidence of hypernatraemia and treatment-induced hyponatraemia.

How were decisions on the relevance of primary studies made?
Two investigators selected articles and discussed the selection with eight paediatric gastroenterology experts. The selection was then narrowed by the investigators to include only RCTs of ORT in children. Only articles with descriptions of their methods were included, in order to check that randomisation methods were appropriate.

Assessment of study quality
Various aspects of the studies, which would affect their validity, are discussed. These include study size, setting, patient characteristics, treatment protocol, and criteria used to determine treatment failure. The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.

Data extraction
The authors do not state how the data were extracted for the review, or how many of the authors performed the data extraction.

Methods of synthesis
How were the studies combined?
Failure rates, for all studies combined and for each trial type, were computed by meta-analysis; details of the method are given in an appendix.
How were differences between studies investigated?
Heterogeneity of failure rates across studies was computed; details of the statistical method used are reported.

**Results of the review**

Thirteen studies (n=803) were included.

The overall failure rate was 3.6% (95% confidence interval, CI: 1.4, 5.8). Patients in trials with intravenous arms were more severely dehydrated, but the difference in outcomes in these trials and those including less severely dehydrated children was not statistically significant: failure rates were 5.7% (95% CI: 1.8, 9.6) and 3.0% (95% CI: 0.6, 5.4), respectively. Trials without an intravenous arm showed significant heterogeneity, whereas those with an intravenous arm did not.

There was no significant difference in outcome with rehydration solutions of differing sodium content; although the combined failure rate for the high-sodium formula was the lowest at 1.9%, the CIs (0, 5.4) overlapped with those for medium- and low-sodium formulae.

There was also no difference in failure rates between out- and in-patient settings.

Other outcomes were discussed in the narrative. The few studies that showed significant differences between oral and intravenous rehydration favoured the former: patients who received oral rehydration had diarrhoea of shorter duration and gained greater weight. There is little evidence that formulae of varying sodium content produce different outcomes.

**Cost information**

One study reported that oral rehydration costs considerably less than intravenous rehydration.

**Authors’ conclusions**

The results suggest that over-the-counter oral rehydration solutions available in the United States are appropriate and effective for the treatment of well-nourished children.

**CRD commentary**

Whilst this study was designed to be relevant to the United States, the literature search was sufficiently broad that its findings could be expected to be equally applicable to other developed countries. There is not much detail in this paper on the individual studies reviewed and some aspects of the methods used; more detail is likely to be available in an earlier, wider-ranging review on which the meta-analysis was largely based. Sufficient information is given in the review to suggest that the findings are likely to be reliable.

**Bibliographic details**


**PubMedID**

8668411

**Other publications of related interest**


**Indexing Status**

Subject indexing assigned by NLM
MeSH
Adolescent; Child; Child, Preschool; Clinical Protocols; Fluid Therapy /methods; Gastroenteritis /therapy; Glucose; Humans; Infant; Randomized Controlled Trials as Topic; Rehydration Solutions /therapeutic use; Treatment Failure; Treatment Outcome

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract 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.