A meta-analysis of clinical studies on the caries-inhibiting effect of chlorhexidine treatment

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Authors' objectives
To perform a meta-analysis on the caries-inhibiting effect of chlorhexidine treatment, and to explore potential modifying factors.

Searching
MEDLINE was searched from 1975 to 1994 using the keywords 'chlorhexidine' and '(dental) caries'. The search was restricted to studies published in English, French or German.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) in which treatment duration was of at least 1 year and incidence of surface caries was evaluated at the end of this time.

Specific interventions included in the review
Chlorhexidine applied as either a gel, paste or rinse.

Participants included in the review
Children in the age range 11 to 15 years, mostly selected as being at a high caries risk, were included.

Outcomes assessed in the review
Prevention fraction (difference in number of new decayed and filled surfaces between the control and chlorhexidine groups, divided by the number of new decayed and filled surfaces in the control group).

How were decisions on the relevance of primary studies made?
The papers were selected by two independent reviewers. Studies were selected on comparability for dental and methodological reasons. In addition, all studies had to evaluate the effect of chlorhexidine application to permanent teeth for 11 to 15 year old children.

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

Data extraction
The authors did not state how the data were extracted for the review, or how many of the authors performed the data extraction. All data were converted into prevention fractions and 95% confidence intervals (CIs) were calculated.

Methods of synthesis
How were the studies combined?
The studies were combined in a meta-analysis, by weighting the individual data for the reciprocal error variance.

How were differences between studies investigated?
The following variables were investigated: application methods, application frequency, caries risk, fluoride regime, caries diagnostic and tooth surfaces. Multiple regression analysis showed no significant influence on the prevented fractions for these variables.
Results of the review
Eight RCTs (306 control patients versus 306 chlorhexidine-treated patients) were included.

The pooled estimate for caries-inhibiting effect of chlorhexidine treatment was 46% (95% CI: 35, 57).

Authors' conclusions
The reviewed studies suggest there is a positive benefit from chlorhexidine treatment for the prevention of tooth decay and fillings.

CRD commentary
The search strategy for studies appears to have been very limited: no effort was made to trace unpublished literature, follow-up references given in the retrieved articles or search electronic databases other than MEDLINE (which may not have been the most appropriate database for dental studies).

The authors acknowledge that with such a small number of included studies publication bias may have influenced the results. The forest diagram provided in the paper certainly suggests there may be a bias towards an over-reporting of positive results. It is unclear if the authors have included multiple results from single studies where patient subsets have been evaluated. If this has been the cases, as indicated by the forest diagram, it would certainly increase the size of the reported effect. Removing multiple results from the analysis indicates that 3 studies showed a positive effect for chlorhexidine treatment, while 6 studies showed no statistically significant effect favouring the treatment.

Implications of the review for practice and research
The review indicates that there may be a positive benefit for caries inhibition from chlorhexidine treatment, although the magnitude of this benefit is unclear.

Funding
Praeventiefonds (The Hague, The Netherlands), grant number 28-2553.

Bibliographic details

PubMedID
8655776

Original Paper URL
http://jdr.iadrjournals.org

Indexing Status
Subject indexing assigned by NLM

MeSH
Adolescent; Anti-Infective Agents, Local /administration & dosage /therapeutic use; Cariostatic Agents /administration & dosage /therapeutic use; Child; Chlorhexidine /administration & dosage /therapeutic use; Confidence Intervals; Dental Caries /pathology /prevention & control; Dental Caries Susceptibility; Dental Enamel /pathology; Dentin /pathology; Fluorides /administration & dosage /therapeutic use; Follow-Up Studies; Gels; Humans; Incidence; Mouthwashes; Regression Analysis; Risk Factors; Toothpastes

AccessionNumber
11996001018
Record Status
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