Is dental health education effective: a systematic review of current evidence

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Authors' objectives
To determine the effectiveness of dental health education using a combination of both qualitative and quantitative review techniques.

Searching
MEDLINE was searched from 1982 to 1994 with the following MeSH: 'dental health education', 'oral health promotion' and 'effectiveness'. The reference lists of retrieved articles were also reviewed.

Study selection
Study designs of evaluations included in the review
Qualitative review: studies were included if they achieved a validity score of at least 12 out of a maximum of 20. All studies using some form of control group were included.

Quantitative meta-analysis: studies were included if they achieved a validity score of at least 15 out of a maximum of 20. Only good quality randomised controlled trials (RCTs) were included.

Reviews, case reports, editorials, and studies lacking quantitative data on outcomes were excluded.

Specific interventions included in the review
(1) Programmes aimed at plaque removal and gingival health (professional instruction, self-instruction manuals, home visits, cognitive therapy, self-assessments).

(2) Programmes designed to reduce levels of caries (pre-school dental health education programmes, professional instruction, practice-based prevention).

(3) Dietary change ('sugar clocks', learning by teaching, school programmes, role play).

(4) Promoting change in knowledge and attitudes (leaflets, professional prophylaxis, school programmes, films, professional instruction).

Participants included in the review
The authors do not provide details of the participants.

Outcomes assessed in the review
Qualitative review: plaque reduction, gingival bleeding scores, caries increments, change in dietary habits, and improvement in knowledge and attitudes.

Quantitative meta-analysis: plaque index and percentage of surfaces with plaque.

How were decisions on the relevance of primary studies made?
It is stated that studies describing interventions that were not primarily dental health education were excluded, but the process used for study selection is not described.

Assessment of study quality
A 20-point set of validity criteria was used based on the following: definition of research aims, inclusion and exclusion criteria, reporting of drop-outs, whether group allocation was random, control group (whether present, comparability with treatment group), whether sample size was given per group, details of intervention, blinding, outcome measures
(definition, assessment and validity), reporting of baseline measures, statistical methods (reporting, appropriateness, consideration of type 1 and type 2 errors), definition of follow-up period, and consideration of clinical significance of findings. Each study was assessed by two independent reviewers according to the 20-point set of validity criteria.

**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?

Qualitative review: the studies were combined by tabulation and by narrative review.

Quantitative meta-analysis: a pooled intervention effect was calculated by weighting each study’s intervention effect, by the square of the inverse of the standard error of the mean difference in outcome measure.

How were differences between studies investigated?

The authors do not state how differences between the studies were investigated.

**Results of the review**

Qualitative review: 37 controlled studies; the total number of participants was stated.

Quantitative meta-analysis: 7 RCTs with 401 participants.

Qualitative review.

Knowledge and attitudes (14 studies) can be improved through dental health education (all studies showed a positive effect). Plaque reduction and gingival health programmes (15 studies) are sometimes successful but positive effects are short term. The clinical significance of small but statistically-significant reductions in plaque and gingival bleeding is unclear. Interventions to reduce dental decay (4 studies) showed no reductions in caries increments among test groups. The effectiveness of programmes to modify diet (4 studies) remains unclear.

Quantitative meta-analysis.

Three RCTs with 259 participants used plaque reduction as an outcome measure. Dental health education resulted in a small, statistically-significant reduction in plaque accumulation: mean effect size -0.37 (95% confidence interval, CI: -0.29, -0.59). Pooling of 4 RCTs (142 participants) using the percentage of tooth surfaces with plaque as the outcome measure, produced a statistically-significant mean intervention effect: effect size -11.28 (95% CI: -6.68, -15.53).

**Authors’ conclusions**

To date, rigorous, well-designed research concerning the outcomes of dental health education is scarce. This should not be taken to mean that dental health education activities cannot be supported. Health professionals have a responsibility to disseminate information about disease and its prevention.

**CRD commentary**

There are no details of study participants or methods of data extraction. The search strategy was limited to one database and there is no attempt to identify unpublished literature, although the authors do acknowledge the difficulties associated with both these points, i.e. relevant literature may have been missed. The meta-analysis is not preceded by tests of homogeneity. The number of participants in the meta-analysis is unclear due to discrepancies between the table and the text. Some of the primary studies are of poor methodological quality and the authors discuss the difficulties involved in constructing a review from such literature.
Implications of the review for practice and research
The authors stated that further efforts to synthesise current information about dental health education, in a systematic way, are required, along with maintenance of rigorous scientific standards in evaluation research.

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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.