



Evidence that fluoride in the infant formula causes enamel fluorosis weak

Abstracted from

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Infant formula and enamel fluorosis: a systematic review.
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Question: Does the use of infant formula compared with the use of breast or cow's milk increase the risk of fluorosis?

Data Sources Information was sourced from PubMed, the Cochrane Library, the Web of Science, Controlled Trials, Clinical Trials (a service of the US National Institutes of Health), ProQuest UMI (a dissertation and thesis database), National Institute for Health and Clinical Excellence, Virtual Health Library, Bireme-PAHO-WHO, and the Latin America and Caribbean Centre on Health Sciences Information, along with the reference lists of relevant reports and review articles. Authors were contacted for missing information.

Study selection Studies conducted in humans were selected if they evaluated fluorosis and infant formula. Studies focussed exclusively on primary teeth were excluded. There were no restrictions on study designs.

Data extraction and synthesis Two authors independently extracted data and assessed study quality. Disagreements were resolved by discussion. Summary odds ratios and confidence intervals were calculated using a random-effects model. Heterogeneity was quantified using the I^2 statistic and publications bias using a funnel plot and Egger test.

Results Twenty-seven out of 41 studies evaluating the effect of infant formula on enamel fluorosis risk were included. These 27 papers reported the results of 19 observational studies (comprising one prospective cohort study, five retrospective cohort studies, six case-control studies, four cross-sectional studies and three historical-control studies). Seventeen of these 19 studies reported odds ratios (OR) and, among these, infant formula consumption was associated with a higher prevalence of enamel fluorosis in the permanent dentition [summary OR, 1.8; 95% confidence interval (CI), 1.4–2.3]. The studies showed significant heterogeneity (66%) and evidence of publication bias (P 0.002). Metaregression suggests that the OR associating infant formula with enamel fluorosis increased by 5% for each 0.1-ppm increase in the reported levels of fluoride in the water supply (OR, 1.05; 95% CI, 1.02–1.09).

Conclusions Infant formula consumption may be associated with an increased risk of developing at least some detectable level of enamel fluorosis, but this depends on the level of fluoride in the water supply. The evidence that the fluoride in the infant formula caused enamel fluorosis was weak, as other mechanisms could explain the observed association.

Commentary

This systematic review aimed to determine the evidence on the association between infant formula consumption and risk of dental fluorosis. Although it is accepted that there could be no randomised controlled trials comparing breast and formula feeding, there was only one prospective cohort study in this review. The remaining 18 studies suffered from being retrospective, with all the associated problems of recall bias, and no validation of responses on feeding practices. There were also difficulties in establishing the fluoride content of formulas purchased a decade earlier. Many of the studies did not report this in the original paper, which seems a serious omission. Compounding this, the fluoride content of the water supply was often not included. Other confounding factors included lack of reporting regarding blinding of examiners, a high nonresponse rate and no adjustment for socioeconomic status and use of fluoride from other sources, including toothpaste and supplements.

Other limitations identified by the authors included publication bias, where only studies with positive results were published, and within-study reporting bias, where increased fluorosis was found in areas with high levels of fluoride in the water supply. In all, six different fluorosis indices were used in the various studies, with different criteria chosen for the presence of fluorosis. With these varying thresholds, it is not possible to determine which levels of fluorosis were of aesthetic concern, so it is important to consider that the reported increase in fluorosis may not be of significance to the individuals involved.

This review was commissioned by the American Dental Association, in a country where fluoride levels in the water supply are generally higher than in the UK. With just 10% of the population of the UK currently drinking water fluoridated at 1 ppm, this study is probably only relevant to a small proportion of our population. It would seem sensible, however, to endorse the recommendation that manufacturers state the fluoride content of formula and bottled water (as this may be used to reconstitute formula). Finally, it is acknowledged in the review that, from the public health perspective, breastfeeding should be encouraged, so discussing fluoride content of formula with mothers is likely to be a moot point for some. Breastfeeding rates in the UK are low, particularly in Scotland, so, as health professionals, we should be endorsing this where possible, along with all the ensuing health benefits that breastfeeding brings.

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