

Summary of: Fluoride intake of infants living in non-fluoridated and fluoridated areas

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VERIFIABLE CPD PAPER

FULL PAPER DETAILS

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Objectives Data on fluoride exposure of infants are sparse. This study aimed to estimate total daily fluoride intake (TDFI) of infants aged 1–12 months, living in non-fluoridated and fluoridated areas in north-east England. **Methods** Daily dietary fluoride intake was assessed using a three-day food diary coupled with analysis of fluoride content of food/drink consumed, using a F-ISE and diffusion method. A questionnaire with an interview was used to collect information on toothbrushing habits. TDFI was estimated from diet, plus fluoride supplements and dentifrice ingestion where used. **Results** Thirty-eight infants completed the study; 19 receiving fluoridated water (mean 0.97 mgF/l) and 19 receiving non-fluoridated water (mean 0.19 mgF/l). Mean (SD) TDFI for the infants living in fluoridated and non-fluoridated areas was 0.107 (0.054) and 0.024 (0.015) mg/kg body weight per day, respectively. Diet was the only fluoride source for 87% of infants and none used fluoride supplements. For infants for whom mouth/teeth cleaning was undertaken, dentifrice contribution to TDFI ranged from 24 to 78%. **Conclusions** Infants living in fluoridated areas, in general, may receive a fluoride intake, from diet only, of more than the suggested optimal range for TDFI. This emphasises the importance of estimating TDFI at an individual level when recommendations for fluoride use are being considered.

EDITOR'S SUMMARY

It is always pleasing to be able to publish some unique research and this paper provides such an occasion. To date there have been no data available on the fluoride intake of infants and young children, especially as a comparison between those living in fluoridated and non-fluoridated areas. Other factors aside, this may have a lot to do with the logistics of collecting this data and the lengths necessary to ensure it is as robust as possible. The detailed planning and execution of this study emphasise the complex nature of work of this kind.

Knowledge of fluoride intake is of obvious importance to establish the appropriate levels for optimum caries prevention benefit and minimum risk of fluorosis. Although it is likely to be impractical for a general dental practitioner to ascertain this for an individual patient, the overall relative values for infants and young children in these two differing community types is valuable background information.

The influence of diet is not surprising in children of this age but serves to underline the importance of nutritional intake at all ages and emphasises once again the role that we need to take in discussing the wellbeing of the whole patient and not just their oral cavity in isolation. There is also an important potential practical link here with other healthcare professionals involved in early-years care such as health visitors and perhaps nursery staff. The possibility exists of using information such as this to raise awareness not only of fluoride exposure at this immediate stage of the individual's development but also in her or his later stages, increasingly from toothpaste and possibly other oral health routes and sources.

With the continuing dubious record of child dental health, particularly in younger age cohorts in the UK, as highlighted in a recent editorial,¹ the need for greater vigilance and certainly for increased knowledge is aided by the results of important work such as this.

The full paper can be accessed from the *BDJ* website (www.bdj.co.uk), under 'Research' in the table of contents for Volume 216 issue 2.

1. Hancocks S. Editorial. Who cares about caries? *Br Dent J* 2013; 215: 313.

Stephen Hancocks
Editor-in-Chief
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IN BRIEF

- Highlights the large impact that the fluoride content of drinking water has on the total daily fluoride intake of very young children.
- Illustrates that diet is the only source of fluoride intake for most infants.
- Stresses the need for dental professionals to evaluate the daily fluoride intake of their young child patients before making any recommendations for fluoride use.

COMMENTARY

This study analysed the fluoride intake of infants aged 1-12 months, living in fluoridated and non-fluoridated areas. This study builds on the extensive body of work the authors have contributed to in this field and is the first detailed report of total daily fluoride intake of infants in the UK, but it also has relevance to other regions with similar fluoride exposures.

The methods in the study included three-day food diaries, parental questionnaires and interview to establish toothbrushing practices (to estimate fluoride ingestion from toothpaste). Fluoride analyses of food and milk samples were performed using a F ion specific electrode. The study revealed comparatively few infants in the sample were exclusively breast-fed. The data suggests diet is the main source of fluoride intake for infants. Furthermore, for non-weaned infants, living in fluoridated areas and fed infant formula the intake of fluoride exceeded the UL of 0.1 mg/F/kg/day. This contrasted with infants living in non-fluoridated areas who were potentially receiving less than optimum fluoride levels for the prevention of dental caries.

The study highlights the relevance of calculating not only the quantity of fluoride ingestion, but also the effective dose (related to the weight of the infant). It is accepted there is no threshold below which fluorosis does not occur, therefore scrutiny of total fluoride intake is an important consideration in determining fluorosis risk. It is, however, more difficult to establish what the likely adsorption of fluoride would result. It is therefore prudent to minimise the ingestion of excessive fluoride during the critical periods of infant development.

The findings of this study provide useful comparisons with data obtained from other work – particularly the Iowa Fluoride Study. The study shows the importance of the risk-benefit balance in the prevention of dental caries and the ingestion of fluoride in the first 12 months of life. The study findings support the need for dental professionals and health visitors to deliver the correct advice to parents and carers. Consideration should be given to the benefits of breast-feeding, labelling of infant formulae (and reconstitution) and appropriate oral hygiene practices – in the knowledge of fluoride exposure from all sources.

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AUTHOR QUESTIONS AND ANSWERS**1. Why did you undertake this research?**

Estimation of total daily fluoride intake in infants and young children in both fluoridated and non-fluoridated areas is important when recommendations for fluoride use and therapy are being considered to optimise oral health, while minimising risk of dental fluorosis. Infants and young children can be systemically exposed to fluoride from a number of sources apart from inadvertent intake of fluoridated toothpaste if used. Information on fluoride intake is available for four to six-year-old children in the UK but none is available for infants and young children, despite the importance of monitoring of fluoride exposure in these groups.

2. What would you like to do next in this area to follow on from this work?

Several factors such as growth rate and existing skeletal mass can alter fluoride ingestion, absorption and retention rates. Therefore, knowing the proportion (or fraction) of fluoride intake retained in the body is more crucial in estimating the impact of fluoride exposure on the body's hard tissues (bones and teeth) than the absolute fluoride intake in infants and young children. We are planning to measure total fluoride intake and excretion in infants in order to measure body fluoride retention.