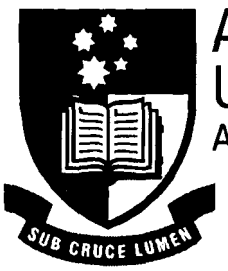

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The Relationship Between Fluoride Concentration in Drinking Water with Dental Caries and Fluorosis in Vietnamese Children

By

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Submitted for the degree of
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SIGNED STATEMENT

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university or other tertiary institution and, to the best of my knowledge and belief, the thesis contains no material previously published or written by another person, except where due reference has been made in the text of the thesis.

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Thuy Thanh Nguyen

June 20, 2001

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For my parents, my husband and my children

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ABSTRACT

According to the First National Oral Health Survey in Vietnam conducted 1989, the prevalence of dental caries in Vietnamese children was high. To prevent dental caries and dental fluorosis, it is essential to investigate factors relating to both dental caries and dental fluorosis. The relationship between fluoride concentration in drinking water with dental caries and fluorosis was first investigated thoroughly in the 1930s and has been continuously explored until now in many countries of the world. Unfortunately, the relationship between fluoride concentration in drinking water with dental caries and fluorosis in Vietnam has never been explored.

The present study was designed to obtain information on dental caries and fluorosis among a representative sample of Vietnamese children. The study also collected information on factors likely to influence caries experience and dental fluorosis and undertook statistical analyses to examine the relationship between fluoride in drinking water, dental caries and dental fluorosis.

The study used a cross-sectional study design with a multistage stratified random sample of Vietnamese children. The study was a part of the Second National Oral Health Survey of Vietnam conducted in 1999. Subjects were selected randomly from school children aged from 6 to 17 years residing throughout Vietnam. At each stage the probability of selection was proportional to population size. A total of 2672 children participated, stratified into four age groups (6 to 8 year-olds; 9 to 11 year-olds; 12 to 14 year-olds and 15 to 17+ year-olds).

Quantitative data collected consisted of a dental examination, a self–reported questionnaire completed by the child's parent and an estimation of fluoride concentration in drinking water samples collected from the child's usual source of drinking at a convenient location near to surveyed schools. In the dental examination, coronal caries criteria of the US National Institute of Dental Research (NIDR) were used to assess dental caries experience on the primary and permanent teeth and dental fluorosis was examined on upper central and labial incisors using Dean's Index. The questionnaire completed by the child's parent sought information about the drinking water source used daily, socio-economic and demographic status, dietary habits, dental care behaviours and discretionary fluoride intake. Fluoride exposure of children was measured by fluoride concentration in the drinking water samples.

Initial findings are presented using descriptive statistics. Bivariate and multivariate analysis were used to examine the influence of social economic and demographic factors, dietary habits, dental behaviours and discretionary fluoride on dental caries and fluorosis at the child level for each of the four age groups. The relationship between fluoride concentration in the drinking water and dental caries and fluorosis was examined using linear regression at cluster levels for each of the four age groups. Fluoride concentration was transformed to a logarithmic scale due to its curvilinear relationship with dental caries.

The analysis found that the prevalence of dental caries remains at high level and may be on the increase. Untreated decay was a main component of caries experience. This indicated insufficient dental treatment capacity in Vietnam. The prevalence of dental fluorosis was low. However, some areas had high numbers of children with fluorosis and a few children had severe forms of fluorosis. The study found that fluoride concentration in the drinking water had an inverse relationship with the mean dmfs and DMFS in all age groups except

the 15–17+ years age group. The results also showed fluoride concentration in the drinking water had a positive relationship with the mean CFI (Community Fluorosis Index) in all age groups.

Analysis also revealed that mother's education level, sugar consumption and dental visit patterns were risk factors for dental caries experience, and residential location of children and parental occupations were risk factors for dental fluorosis.

In conclusion, the naturally-occurring fluoride in daily drinking water was associated with dental caries and dental fluorosis in Vietnamese children. However, socio economic and demographic factors, sugar consumption and dental behaviours also play an important role in the prevalence of dental caries and fluorosis, which in turn influence the relationship between fluoride concentration in drinking water with dental caries and fluorosis of Vietnamese children. This study provides fundamental information to assist government consideration of the implementation of water or salt fluoridation as a population preventive strategy for Vietnam.

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