

THE BURDEN AND RISK OF DENTAL FLUOROSIS IN THE UPPER NORTHERN REGION OF THAILAND

Chatpat Kongpun,^{a,*} Supoj Chamnarnprai,^a Jumpol Promsaka Na Sakon Nakorn^a
Chiang Mai, Thailand

SUMMARY: Fluoride (F) is the most common ground water contaminant in Thailand and high-F drinking and cooking water is harmful to human health. According to the World Health Organization (WHO), the upper limit for the safe daily dose of F in drinking water is 0.5–0.7 mg/L with a safe daily dose for adults of 0.05–0.07 mg/kg body weight (bw)/day and for children under 2 years old of 0.01–0.16 mg/kg body weight (bw)/day. Geological studies have shown that the high concentration of F in drinking water in northern Thailand is the result of contamination of groundwater sources by high-F geothermal water. The aim of the present study was to study community water F levels and the prevalence of dental fluorosis in school children in 5 provinces in Northern Thailand: Chiang Mai, Lampang, Phayao, Phrae, and Lamphun. The subjects, 1,254 school children, aged 6–15 years, were examined for dental fluorosis in 2012. The results showed a high prevalence rate for dental fluorosis of 522.6 per 1000 population in the regions with the highest rate, in the areas with the highest F levels, being 739.3 per 1000 population. The presence of dental fluorosis was significantly associated with high levels of F in both drinking water ($p=0.010$) and cooking water ($p=0.0320$). A Dose-Response Assessment showed that the critical F concentration for the development of dental fluorosis was 0.51 mg F/L (OR=1.16, $\chi^2=4.15$, $p=0.041$) which was lower than Thai FDA Standard of 0.7 mg/L. The survey was repeated in 2013–2014 with similar results being found for the prevalence of dental fluorosis and in the dose-response assessment. Thus, dental fluorosis in the upper northern region of Thailand has been identified as a public health problem requiring urgent attention and is due to children consuming water with high F levels.

Keywords: Burden of disease; Chiang Mai province, Thailand; Dental fluorosis; Fluoride; Fluorosis; Fluorosis prevalence; Lampang province, Thailand; Lamphun province, Thailand; Phayao province, Thailand; Phrae province, Thailand.

^aInter-country Centre for Oral Health, Department of Health, Ministry of Public Health, Thailand; ^bThe Dental Research Center, Faculty of Dentistry, Chiang Mai University. *For correspondence: Chatpat Kongpun, E-mail: chatpat.k@anamai.mail.go.th