

Section 2

Executive Summary of the Project

Health hazards due to excessive ingestion of fluoride are well documented such as dental, soft tissue and skeletal fluorosis. In addition, there is emerging evidence for potential renal damage associated with excessive fluoride intake. Studies have also shown that malnutrition could aggravate fluoride toxicity. Excess fluorides in ground and surface water in some parts of the country pose a serious water quality issue. There are no studies conducted on non dental effects of excessive fluoride ingestion. Therefore, the present study was aimed at determining the prevalence and severity of fluorosis in people living in endemic areas, investigating the relationship of nutritional status of people with the occurrence of fluorosis and introduction of a simple defluoridation method and to assess its effectiveness.

The study area was Thambuttegama MOH area. The sample consisted of 750 people (382 children aged 12-15 years and 368 adults aged 35-44 years) selected randomly from 13 PHM areas. Data were collected by an interviewer administered, pre-tested questionnaire, clinical oral examination, measurement of body weight and height, performance of three physical tests and analyses of drinking water and early morning spot sample of urine. Urine fluoride levels were analyzed among a subsample 278 (145 children and 133 adults). The majority (85.8%) of children and 49.3% of adults had dental fluorosis as assessed by TF index. Moreover, 23.2% of children and 11.4% of adults carried a severe burden of dental fluorosis with opacities and surface losses of enamel. There were no statistically significant associations between nutritional status assessed by BMI and occurrence of dental fluorosis and skeletal fluorosis: assessed by severity of self reported symptoms and performance of three physical tests. Similarly, there were no statistically significant relationships among estimated minimum daily intake of fluoride and occurrence of dental and skeletal fluorosis. Moreover, the Community Fluorosis Index (CFI) was discernibly high for children (2.24) and also for adults 1.34 thus illustrated that dental fluorosis as *a public health problem* for inhabitants in Thambuttegama and especially among 12-15 year old adolescent children. However, there was no evidence for skeletal fluorosis to be considered as a public health problem.

Therefore, in conclusion fluoride filters using newly burnt bricks could be considered as an effective method of de-fluoridation for endemic areas of fluorosis. Nevertheless, after 6 months, of their distribution there was evidence for declined number of users (30% reduction) due to acquired tap lines and subsequent substitution of source of water for household use. In addition, the number of *effective users (fluoride levels in filtered water <0.8 mg/l)* appeared to be lowering down from 51.2% to 36.4% which could be attributed to practical problems such as difficulties in getting regular supply of bricks. The present study denotes one of the first attempts to assess the effectiveness of fluoride filters as a simple de-fluoridation method for people who consume excess amounts of fluoride in an endemic area of fluorosis in Sri Lanka. It had the added strength of two assessments and a long- term follow period extended

up to 14 months after distribution of filters thus giving rise to many practical implications of its findings. Feedback from recipients is fundamental to assessing effectiveness of these de-fluoridation methods which should compliment assessment of fluoride levels in filtered water based on an upper threshold limit as used in this study. Importantly, there are basic issues such as ensuring a regular supply of bricks and making improvements to the design of filters which need to be considered in order to empower rural communities already burdened with many other aspects of their daily living in order to sustain their commitment to use fluoride filters.

The present study constituted a relatively comprehensive and novel approach to assess the effects of excessive ingestion of fluorides in people living in an endemic area and long-term effectiveness of fluoride filters. Nevertheless, its findings related to prevalence of symptoms related to fluorosis merit further investigations with methodological refinements. Sustainability of the fluoride filter use is a vital issue which needs special concern.