

Possible Causative Factors for Dental Fluorosis in the Monaragala District

D.S.M. Attanayake¹, and G.W.A.R.Fernando^{1,2}
¹Postgraduate Institute of Science, University of Peradeniya,
²The Open University of Sri Lanka

Abstract

Monaragala District; the study area in the South-eastern part of Sri Lanka, belongs to dry zone and was recorded as with a high number of patients with dental fluorosis recently. It was revealed from a questionnaire survey on a representative 370 families that 131 (35.4%) were affected from various stages of dental fluorosis especially from Wellawaya, Sewanagala, Buttala, Thanamalwila and Kataragama areas that are located in the South and South-western part of the Monaragala District. Fairly large area of the District has low fluoride concentration in groundwater between 0.0 and 1.0 mg/L. Also, relatively high fluoride concentrations ranging between 0.61 and 2.82 mg/L are found in the water sources in South and South-western part of the district. The rock-water interaction is the main process in which F⁻-rich minerals are decomposed/dissociated from the source rock and F⁻ is dissolved in the groundwater by dissolution in the Monaragala district. Source rocks could be identified as hornblende-biotite gneiss or nearby serpentinite rock.

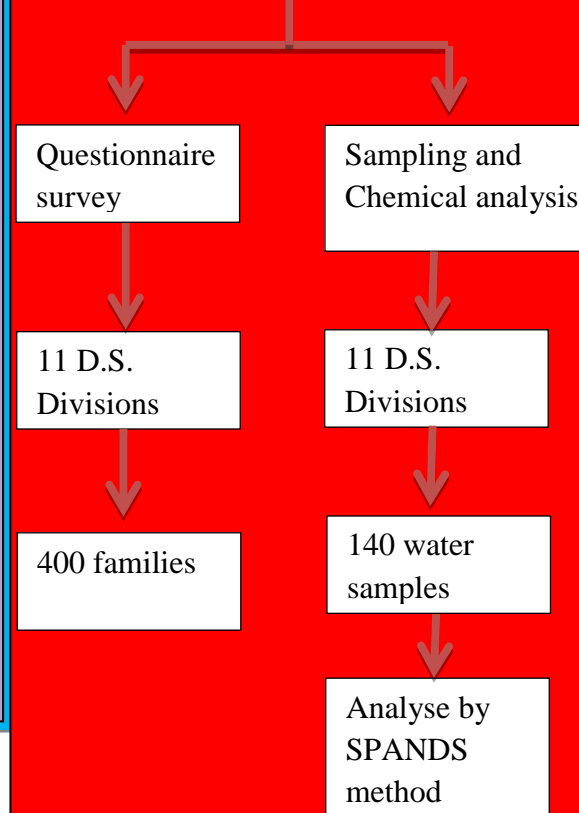
Introduction

Fluoride is an essential element for the human body. It is available in soils and water due to the weathering and erosion of fluoride-bearing minerals. Fluoride rich drinking water is a widespread problem which can be seen all over the world (WHO, 2004).

Dental caries may result when the fluoride concentration in drinking water is less than 0.5 mg/L. However, dental health problems may also be created when the fluoride content is between 0.5 and 1.5 mg/L (WHO 1984). Fluoride concentrations of more than 4 mg/L lead to dental, skeletal, and crippling fluorosis (Teotia and Teotia, 1988). The World Health Organization (WHO) limit for maximum fluoride in water is 1.5 mg/L.

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Materials and Method



Discussion

The Monaragala District in the South-eastern part of Sri Lanka recorded fairly low contents of fluoride.

The low fluoride areas lie mainly in the intermediate climatic zone. On the other hand, Wellawaya, Thanamalwila and Buttala regions of the Monaragala District recorded higher fluoride levels as shown in this study.

The presence of high F⁻ concentration in water bodies in the Monaragala district was initially recognized by when people exhibit symptoms of fluorosis. Geologically, the study area is dominated by high grade metamorphic rocks with hornblende biotite gneiss and charnockites dominated rocks belongs to Precambrian age.

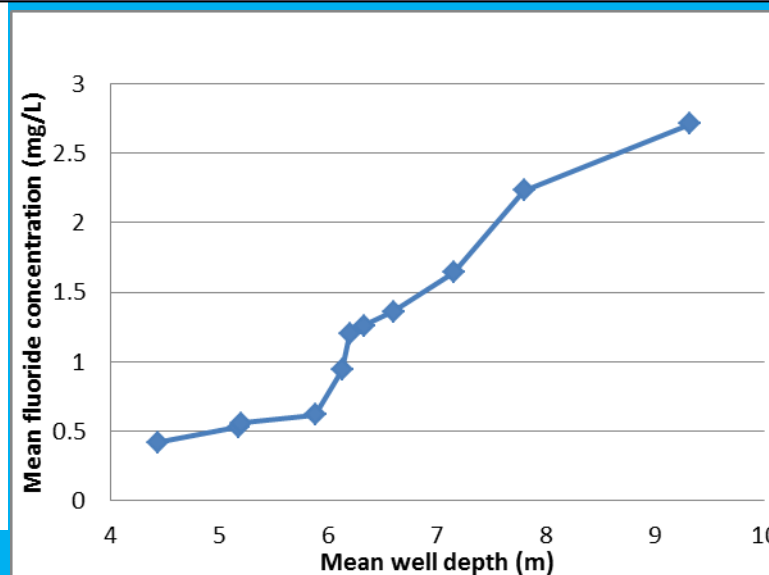
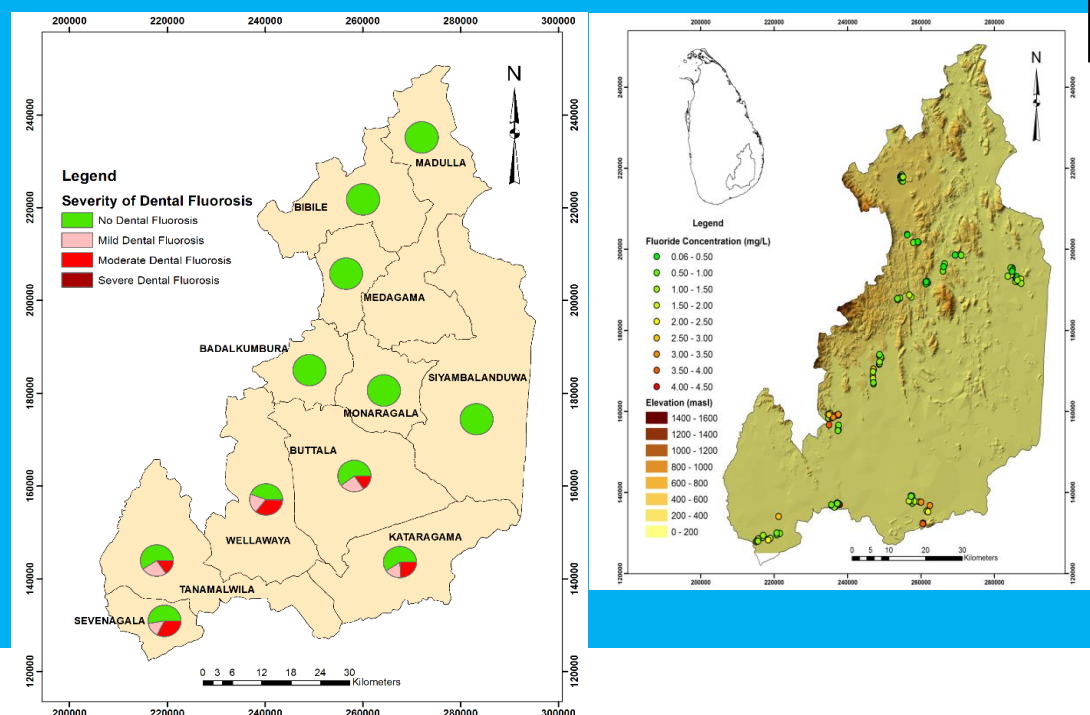
Thus, the rock-water interaction seems to be the prime geogenic factor responsible for high fluoride concentration in the study area.

Conclusions

- Five DS in the southern part in the study area having dental disorder that is mainly fluorosis and it is positive correlation with concentration of fluoride.
- Fluoride content of well water ranged from 0.61 mg/L - 2.82 mg/L.
- The rock-water interaction is the main process in which F⁻-rich minerals are decomposed/dissociated from the source rock and F⁻ is dissolved in the groundwater by dissolution in the Monaragala district.
- Source rocks could be identified as hornblende-biotite gneiss or nearby serpentinite rock.

References

- WHO (1984). Guide lines for drinking water quality. Health criteria and other supporting information, vol 12. World Health Organization, Geneva.
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Relationships between well depth and concentration of fluoride
 Severity of dental fluorosis in Monaragala district

DS Division	Mean concentration of fluoride in groundwater mg/L	Total population (families/ individuals)	Affected individual (%)	Affected Male (%)	Affected Female (%)
Wellawaya	2.23	193	56	55.54	44.44
Thanamalwila	2.71	83	41	64.63	35.24
Sewanagala	1.64	54	46	68.00	32.00
Buttala	1.20	123	40	55.00	45.00
Kataragama	1.36	42	40	47.00	53.00

