

Application of Geographic Information System (GIS) to Monitor Dental Fluorosis Status in High Natural Fluoridated Area

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Target Audience: All 8-12-year-old children, parents, school principals, local health authorities, public health care workers, village health volunteers, village leaders.

Background: Dental fluorosis is a complex problem which requires high cooperation from many groups of professional as well as people in the community. Monitoring of the prevalence and severity of dental fluorosis is necessary to determine if any preventive activities should be conducted to restrict fluoride intake in young children during the enamel formation phase.

In Thailand, there are many areas with high level of natural fluoride in drinking water. The affected community should be informed of the existing problem. At present, the Geographic Information System (GIS) has been introduced in public health to enhance the management and monitoring health status. However, in Thailand GIS has not been used effectively in dental public health.

Since dental fluorosis has been an immense concern in the field of preventive dentistry especially in Chiang Mai area, our team is exceedingly interested to develop the GIS application to enhance an understanding of relationships among its prevalence, severity and associating factors. Furthermore, GIS could be used to present the existing problem in the community to all stakeholders.

Objective: To develop GIS application to monitor dental fluorosis status in a high natural fluoridated area

Method: This project was conducted in Maehoy-ngern village which is the high natural fluoridated area. All children were examined for dental fluorosis using Thylstrup and Fejerskov index of fluorosis (TFI). Data in those children such as their birthplace, breast feeding time, water consumption habit and oral hygiene were collected. Parents were interviewed for the information on all water sources consumed by children. Drinking water, water used in the household especially for cooking and communal water supply were collected and analyzed for the fluoride content. Global Positioning System (GPS) was used to collect ground control points of all the children's houses as well as, school, communal water supplies, wells and landmark points. Aerial photos were taken and used as the base map to locate the research field. The system was developed by Arcview program which could also make the overlay analysis. Clinical data, data from the interview, level of fluoride in drinking and cooking water, as well as aerial images were use to constructed digital mapping database based on geographical information of the area. The association among factors in database was also established to elucidate aetiology of the fluorosis condition in this area.

The GIS application was used to present the prevalence and severity of dental fluorosis status of all children to all stakeholders in the community. This process could be able to advocate the community and raise awareness of this oral health related quality of life problem of children. Active participation of the community will be expected to seek

appropriate preventive measures for the young generation in the community not to be affected by this problem in the future.