High fluoride in drinking water sources in Kenya and their health implications: Challenges of establishing local solutions

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Keywords: Fluoride in drinking water, Kenya, defluoridation.

Kenya has a complex geology which include the volcanic East African Rift Valley, the metamorphic Mozambique Mobile Belt and sediments of the coastal region with known high concentrations of potentially harmful elements. This diverse geology results to varying hydrogeochemistry across the county, some which could have adverse human health implications. Due to the semi-aridity of most regions in Kenya, rainfall is unreliable leaving groundwater resources highly relied on. Evidence of fluoride concentrations, ten-folds higher than recommended limits, and resultant health complications such as dental and skeletal fluorosis, have been reported in groundwater sources across Kenya as early as the 1980's. However, despite this known challenge in drinking water quality, there has not been established an efficient, reliable and user friendly defluoridation system in the country. To overcome this challenge, this paper will review the occurrence of high fluoride groundwaters in Kenya, their health implications, and defluoridation status in Kenya and its challenges. Solutions will be proposed to solve these challenges and successful defluoridation methods used in other parts of the world will be suggested for establishment in the country. This review is the first step of establishing an effective defluoridation techniques to be used in the country. Its significance comes with the fact that Kenya is trying to achieve her UN SDGs and is currently ranked 125th of 157 countries in achieving these goals. Among these goals include provision of clean water and good health for the population. Therefore, it is important for Kenya to establish and use locally tailored technologies that help in provision of clean drinking water to the population.