

## **ABSTRACT**

The objective of this research was to assess the effectiveness and identify the factors influencing the adoption of Hydroxyapatite (HAP) technology by community-based water projects in Nakuru County, Kenya. Excessive fluoride in drinking water leads to Fluorosis, a condition of fluoride poisoning. HAP technology provides a sustainable solution by reducing fluoride levels in water to acceptable limits. The study examined the awareness level, cost, and complexity of the technology. A descriptive cross-sectional survey research design was employed, targeting 100 project staff members from existing community water projects in Nakuru County. A sample of 50 participants was randomly selected using a stratified random sampling design. Data collected were analyzed using SPSS version 20 for descriptive and inferential analysis, presented using frequency distribution tables and percentages. The response rate was 80%. The study found a strong positive correlation between awareness, cost, complexity of the technology, and adoption of HAP technology by community water projects. This suggests that increased awareness among project beneficiaries positively influences technology adoption. The study concluded that addressing the cost, awareness level, and complexity of the technology will enhance adoption, leading to reduced fluoride levels in drinking water. Additionally, to evaluate the effectiveness of the defluoridation program, an experimental design was employed. The Nakuru Water Defluoridation Company provided a list of individuals who received buckets for the program. Ten participants were randomly selected, with five using household filters and the other five representing nearby institutions that implemented institutional filters. Samples of water were collected and tested for fluoride levels before and after defluoridation. The study concluded that post-defluoridation fluoride levels met the standards set by the World Health Organization (WHO), indicating the effectiveness of HAP technology.