20th Academic Sessions 2023
University of Ruhuna
Matara, Sri Lanka
ISSN: 2362-0412

Comparative Analysis of Urinary Fluoride Excretion and Kidney Health among Children in Rural Sri Lanka. A Cross-Sectional Study

P.M.M.A. Sandamini[a], P.Mangala C.S. De Silva[a], E.P.S. Chandana[b], S.S. Jayasinghe[c], C.Herath[d], and E.S. Wijewickrama[e]

[a] *Department of Zoology, Faculty of Science, University of Ruhuna, Sri Lanka.*
[b] *Department of Biosystems Technology, Faculty of Technology, University of Ruhuna, Sri Lanka.*
[c] *Department of Pharmacology, Faculty of Medicine, University of Ruhuna, Sri Lanka.*
[d] *Department of Nephrology, Sri Jayewardenepura General Hospital, Colombo, Sri Lanka.*
[e] *Department of Clinical Medicine, Faculty of Medicine, University of Colombo, Sri Lanka.*

Abstract

Exposure to fluoride at elevated levels is known to contribute to kidney damage and is also proposed as a risk factor for chronic kidney disease of unknown aetiology (CKDu). Urinary fluoride excretion is considered a reliable measure of fluoride exposure in community studies. As fluoride exposure and its associations with renal health in paediatric communities in Sri Lanka are poorly understood, this cross-sectional study aimed to perform a comparative assessment of the renal health of selected paediatric populations with high and low levels of fluoride exposure in rural Sri Lanka. A total of 163 children of both sexes (12-15 years of age) in the Ampara education zone where CKDu is not endemic participated in the study. The first-morning urine samples of the children were analysed for creatinine, albumin, Cystatin-C (UCysC), and fluoride (UF). According to creatinine-adjusted UF levels, individuals with UF levels above the 75th percentile of the relevant fluoride distribution were considered the high fluoride exposure group (HFEG) while, others were considered the low fluoride exposure group (LFEG). The median (Interquartile range (IQR)) of UF (mg/gCr) levels for girls and boys were respectively 1.33(0.90-2.40) and 1.34(0.87-2.16). The median (IQR) of UACR (mg/g) in HFEG and LFEG were respectively [2.97(2.50-4.28)] and [2.73(1.58-4.95)]. The median (IQR) UCysC level (ng/mgCr) of girls in the HFEG [125.63(59.71-302.48)] was significantly higher (p=0.009) compared to the girls in the LFEG [73.17(12.79-167.46)]. However, there was no significant difference between the median (IQR) UCysC levels of boys in HFEG and LFEG. The UF showed a weak positive association with UCysC (r=0.189, p=0.015). A significant increase of UCysC with increasing fluoride exposure may indicate a potential risk of renal injury among children, as elevated UCysC is a sign of impaired renal function. However, detailed studies are warranted to validate these associations in depth.

Keywords*: ACR, Children, Cystatin-c, Renal Health, Urinary Fluoride Excretion.*

Corresponding Author: *chathura@zoo.ruh.ac.lk*