



## Does Environmental Heat Exposure during Outdoor Sports Practices Affect Kidney Health of School Students?

T.D.K.S.C. Gunasekara<sup>a</sup>, P. Mangala C.S. De Silva<sup>a</sup>, E.P.S. Chandana<sup>b</sup>, S.S. Jayasinghe<sup>c</sup>,  
C. Herath<sup>d</sup>, S. Siribaddana<sup>e</sup>, and N. Jayasundara<sup>f</sup>.

<sup>a</sup> Department of Zoology, Faculty of Science, University of Ruhuna, Sri Lanka.

<sup>b</sup> Department of Biosystems Technology, Faculty of Technology, University of Ruhuna, Sri Lanka.

<sup>c</sup> Department of Pharmacology, Faculty of Medicine, University of Ruhuna, Sri Lanka.

<sup>d</sup> Department of Nephrology, Sri Jayewardenepura General Hospital, Sri Lanka.

<sup>e</sup> Department of Medicine, Faculty of Medical & Allied Sciences, Rajarata University, Sri Lanka.

<sup>f</sup> The Nicholas School of the Environment, Duke University, USA.

### Abstract

Strenuous physical activities under high solar heat exposure can result in adverse renal health outcomes in the absence of proper safety precautions. School students in the dry climatic zone in Sri Lanka are more likely to experience relatively high heat exposure during outdoor sports practices. However, current knowledge on pediatric renal health outcomes associated with heat exposure is not comprehensive, and the present study aimed to fill these knowledge gaps. We conducted a cross-sectional study with 234 school students (12-16 years of age) from selected education zones in the Moneragala and Ampara districts within the dry climatic zone of Sri Lanka. Students who engaged in regular sports practices (more than two hours per day, and five days per week for a consecutive period of at least one year) were included in the high heat exposure group (Hex), while the students who did not engage in sports practices represented the age-matched control group (Lex). Urinary kidney injury molecule (KIM-1) and albumin creatinine ratio (ACR) were used as biomarkers of renal health. The median (interquartile range) KIM-1 levels (ng/mgcr) of boys and girls were 0.082 (0.001-0.167) and 0.040 (0.002-0.214) in Hex, and 0.039 (0.001-0.192) and 0.078 (0.002-0.239) in Lex, respectively. Similarly, in Hex, urinary ACR levels (mg/g) of boys and girls were 2.390 (1.519-4.047) and 2.806, and these were 2.305 (1.479-3.719) and 3.113 (2.022-5.589) for boys and girls in Lex respectively. There was no significant difference ( $p > 0.05$ ) in urinary KIM-1 or ACR levels of the boys and girls in Hex compared to their counterparts in Lex. Here, we did not observe any significant elevation of kidney injury biomarkers in students with high heat exposure, particularly KIM-1, which is a more sensitive marker of low-grade renal injury. Within the context of these findings, there is no strong evidence to establish a potential link between heat exposure and pediatric renal injury. However, detailed studies with longitudinal observations are recommended for more precise interpretations in this regard.

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Corresponding Author: [chathura@zoo.ruh.ac.lk](mailto:chathura@zoo.ruh.ac.lk)