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Expression of urinary Beta-2-microglobulin (β2M) in selected fishing and farming communities: A CKDu perspective

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Background: Chronic Kidney Disease of unknown etiology (CKDu) is an epidemic among dry zone farming communities in Sri Lanka (SL). Histopathological studies revealed tubular damage is most prominent in CKDu. Traditional biochemical parameters are still being used to detect tubular damage, although new biomarkers are being investigated. Urinary beta-2-microglobulin (β2M) is a novel biomarker that detects tubular damage. However, standardization of urinary β2M to reveal CKDu prevalence in SL is not fully evaluated.

Objectives: To determine the association between urinary β2M with traditional biochemical parameters such as Serum Creatinine (SCr), Albumin to Creatinine ratio (ACR), Uric acid (UA) and Blood Urea Nitrogen (BUN) in selected fishing and farming communities. It was also aimed to evaluate the utilization of urinary β2M to reveal CKDu prevalence in selected occupational cohorts in SL.

Methodology: Forty two (n=42) voluntary individuals from a farming community in Medabedda, Moneragala District in Uva Province (Site I) in comparison to a fishing community in Kottegoda, Matara District in the Southern Province (Site II) were selected. Early morning urine samples and blood samples were collected. SCr, ACR, UA and BUN were determined using the standard protocols by Human Biochemical Analyzer using standard calibrators and quality controls for each set of samples. Urinary β2M were analyzed by commercial Enzyme Linked Immuno Sorbent Assay kits (CrusiaBio) according to the manufactures instructions.

Results: CKDu prevalence (2%) was higher in the farming community compared to the fishing community where no CKDu cases were reported**.** Urinary β2M (0.054 µg/mL) and creatinine adjusted β2M (84.857 ng/mg/Cr) were significantly higher in the farming community compared to the fishing community (0.053 µg/mL and 55.639 ng/mg/Cr). Urinary β2M was correlated with urine uric acid (UUA) in site I ($p < 0.0001$) and site II ($p = 0.0083$) while creatinine adjusted β2M was correlated with UUA and ACR in site I ($p = 0.0012$ and $p < 0.0001$) and site II ($p = 0.0437$ and $p = 0.0005$).

Conclusion: This preliminary study indicated that Urinary β2M can also be useful as a detecting tool for CKDu diagnosis with traditional biochemical parameters. Due to small sample size it is recommended to do further studies with larger cohorts to evaluate the validation and standardization of urinary β2M together with traditional biochemical parameters.

Keywords: *CKDu, Farming community, Fishing community, Urinary β2M*

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