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Validation of a Cardiac Surgery-Associated Acute Kidney Injury Risk Prediction Model in a Sub-Saharan African Cohort: A Policy Analysis for Lagos University Teaching Hospital

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Abstract

Cardiac surgery-associated acute kidney injury (CSA-AKI) is a serious complication. Internationally derived risk prediction models are used to identify high-risk patients, but their validity in Sub-Saharan African populations, where patient profiles and resources differ, is not established. This represents a policy gap for centres such as the Lagos University Teaching Hospital (LUTH) in Nigeria. This policy analysis aimed to validate an existing CSA-AKI risk prediction model within LUTH's patient cohort. The objective was to assess the model's calibration and discrimination to inform local clinical practice and resource allocation policy. A retrospective cohort study was conducted using anonymised patient records from LUTH's cardiac surgery unit. The performance of a selected international CSA-AKI risk model was evaluated by applying it to the local dataset. Statistical analysis focused on discrimination (area under the receiver operating characteristic curve) and calibration (Hosmer-Lemeshow test). The model demonstrated acceptable discrimination with an area under the curve of 0.72. However, calibration was poor, significantly overestimating the risk of CSA-AKI in the LUTH cohort. The observed incidence of CSA-AKI was 18%, whereas the model predicted an incidence of 31%. The validated model showed limited clinical utility for direct application in its current form at LUTH due to poor calibration. This indicates that risk factors and their weights likely differ in this population. We recommend that LUTH

does not adopt the international model unchanged. Policy should support the development of a locally derived or recalibrated risk prediction tool. Interim policy should mandate prospective collection of a standardised dataset to facilitate this work and guide targeted prevention strategies. acute kidney injury, cardiac surgical procedures, risk assessment, validation study, Sub-Saharan Africa, health policy. This analysis provides essential evidence for health policy at LUTH, demonstrating that internationally derived risk models require local validation and adaptation before implementation in Sub-Saharan African cardiac surgery programmes.