

# THE IMPACT OF RICKETS ON GROWTH AND MORBIDITY DURING RECOVERY AMONG CHILDREN WITH COMPLICATED SEVERE ACUTE MALNUTRITION IN KENYA: A COHORT STUDY

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**Background:** The effects of rickets on children recovery from severe acute malnutrition (SAM) is unknown. Rickets may affect growth and susceptibility to infectious diseases. In this study, we investigated the associations of clinically diagnosed rickets with life-threatening events and anthropometric recovery during one year following inpatient treatment for complicated SAM.

**Methods:** This was a secondary analysis of clinical trial data amongst uninfected HIV Kenyan children with complicated SAM (2-59 months) followed for one year post-hospital discharge (ClinicalTrials.gov ID NCT00934492). The outcomes were mortality, hospital re-admissions and growth during 12 months. The main exposure of interest was clinically diagnosed rickets systematically collected at study enrolment. Clinical rickets was diagnosed by the presence of swelling of wrists and ankles, bowed legs, rachitic rosary, craniotabes, or features of rickets on wrist x-ray.

**Results:** Of 1,778 children recruited, 230 (12.9% (95% CI 11.4, 14.6%)) had clinical signs of rickets at baseline. Enrolment at an urban site, height-for-age and head circumference-for-age z scores were associated with rickets. Rickets was associated with increased mortality; adjusted Hazard Ratio (aHR) 1.61 (95% CI 1.14, 2.27), any re-admission to hospital; aHR 1.37 (95% CI 1.09, 1.72); re-admission for severe pneumonia; aHR 1.37 (95% CI 1.05, 1.79), but not with diarrhoea; aHR 1.05 (95% CI 0.73, 1.51). Rickets was associated with increased height gain; adjusted regression co-efficient 0.19 (95% CI 0.10, 0.28), but not changes in head circumference, mid-upper arm circumference (MUAC) or weight.

**Conclusions:** Rickets was common among children with SAM at urban sites and associated with increased risks of severe pneumonia and death. Increased height gain may have resulted from vitamin D and calcium treatment. Future work should explore the possibility of other concurrent micronutrient deficiencies and optimal treatment of rickets in this high-risk population.

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