Investigating Differences in Nutritional Parameters in Ugandan Children with *Plasmodium falciparum* Severe Malaria

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Background: In 2018, malaria produced an estimated 272,000 deaths in children <5 years of age, accounting for 67% of all malaria deaths worldwide, with a majority in the WHO African Region. Malnutrition is an important risk factor for malaria. Wasting, Stunting and Underweight are crucial indicators of malnutrition. Annually, 14 million children <5 are classified as wasted and 59 million children are classified as stunted.

Objective: The objective of this study is to determine the association between each of the major manifestations of severe malaria (SM) and nutritional parameters – weight-for-age (WAZ), height-for-age (HAZ), and weight-for-height (WHZ) – in children from the Ugandan cities Mulago and Jinja.

Methods: To assess differences in WAZ, HAZ, and WHZ by the five types of SM and community controls (CC), we evaluated Z-scores from children <5 years old enrolled in a prospective cohort study (NDI, Neurodevelopmental Impairment in Children with Severe Malaria) at enrollment and 12-month follow-up.

Results: WAZ and WHZ at baseline were significantly lower among SM groups than in CC ($p<0.001$), but there were no significant differences observed at 12-month follow-up. There were no major differences in HAZ between the SM and CC groups. WAZ and HAZ at baseline were significantly lower among High Mortality (HM) versus Low Mortality (LM) groups ($p<0.01$). At 12-month follow-up, HAZ remained significantly lower in HM versus LM ($p<0.01$). There were no major differences in WHZ between the HM and LM groups. Compared to those who survived, the 27 children who died had significantly lower WAZ ($p<0.05$), but no major differences in HAZ or WHZ.

Conclusion: Underweight, stunting, and wasting may be risk factors for SM. Overall, a more comprehensive understanding of how SM elicits adverse effects in children is necessary. Nutrition intervention programs must be implemented to prevent child stunting, wasting, underweight, and mortality.