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ORIGINAL RESEARCH

Association of Sickle Cell Disease with Nutritional Status Among Under-Five Children and Mediating Role of Hemoglobin Level: Secondary Analysis of Data From 2020-2022 Demographic and Health Survey

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Abstract

Background: Malnourishment remains the main issue that affect under-five children in Kenya to an overwhelming proportion. The condition is further compounded by the burden of sickle cell disease (SCD). However, association of SCD with stunting, wasting, and underweight in a nationally representative sample of under-five children remains unknown. The main aim of this study was to describe prevalence of under malnutrition by sickle cell status, to evaluate its association with growth faltering ascertained with anthropometric indices, and to explore mediating role of hemoglobin.

Methods: The data were availed from the 2020 to 2022 Demographic and Health Survey (DHS) of Kisumu County and the sample comprised 11233 children aged 6–59 months who were successfully genotyped for SCD. The DHS employed a two-stage striated sampling strategy. Sickle SCAN rapid diagnostic test was used for SCD genotyping. Z-scores of length/height-for-age (HAZ), weight-for-height (WHZ), and weight-for-age (WAZ) were computed against the 2006 World Health Organization Child Growth Standards. Logistic regression models were fitted to evaluate association of SCD with stunting, wasting, and underweight.

Results: Prevalence of stunting, wasting, and underweight among children with SCD were 55.4% (54.5– 56.4), 9.1% (8.6–9.7), and 38.9% (38.0-39.8), respectively. The odds of stunting were 2.39 times higher (adjusted odds ratio [aOR]) 2.39, 95% CI: 1.26–4.54) among sickle children than those with normal hemoglobin. SCD was also signicantly associated with underweight (aOR 2.64, 95% CI: 1.25–5.98), but not with wasting (aOR 1.60, 95% CI: 0.85–3.02). Hemoglobin level signicantly mediated SCD-HAZ (adjusted indirect effect (aIE) -0.328, 95% CI: -0.387, -0.270), SCD-WHZ (aIE − 0.080, 95% CI: -0.114, -0.050), and WAZ (aIE − 0.245, 95% CI: -0.291, -0.200) associations. The extent of mediation was highest for SCD-HAZ association (adjusted proportion mediated 0.928, 95% CI: 0.535–2.770).

Conclusion: We presented convincing evidence of the negative impact of SCD on nutritional status of under-five children. Integration of a nutrition-oriented approach into a definitive SCD care package and its nation-wide implementation could bring promising results by mitigating the nutritional vulnerability of children with SCD

Keywords: Sickle cell disease, Nutritional status, Under-five children, Hemoglobin level