Nutritional Status and Prevalence of Rotavirus Diarrhea Among Children in Zambia

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Background
Rotavirus remains the leading cause of moderate-to-severe diarrhea among children under 5 years of age in low-income countries.[1] Counter to abundant evidence demonstrating the ways in which undernutrition can impair the body's immune system[2-3], numerous observational studies have suggested an association between "better" nutritional status and increased susceptibility to rotavirus infection.[4-6] As food security levels in Sub-Saharan Africa continue to increase, it is imperative to examine the impact of improved nutritional status on susceptibility to rotavirus infection in early life.

Methods
Study participants were children under the age of 5 recruited to participated in a case-control study evaluating the effectiveness of Rotarix™ vaccine against severe gastroenteritis in Zambia. Case-patients were those with moderate to severe gastroenteritis with a stool specimen positive for rotavirus, while control-patients were asymptomatic for diarrhoea in the previous 1 month. Nutritional status at the time of study enrollment, as measured by weight-for-age Z-score (WAZ), weight-for-height Z-Score (WHZ), and height-for-age Z score (HAZ), was calculated using WHO child growth standards.[7] Logistic regression models examining each measure of nutritional status were adjusted for potential common causes of nutritional status and rotavirus diarrhea (ex. socioeconomic status, water, sanitation and hygiene (WASH)).

Results
Among 576 case and 121 control study participants, the prevalence of malnutrition (WAZ <-2), wasting (WHZ <-2), and stunting (HAZ <-2) was 14.6%, 9.0%, and 23.0%, respectively. Better nutritional status as measured by WAZ was positively associated with odds of rotavirus diarrhea.
Specifically, for each one unit increase in WAZ, odds of rotavirus diarrhea increased by 26.6% (aOR=1.27; 95% CI (1.01, 1.59); p=0.04). No significant association was found between rotavirus diarrhea and wasting or stunting.

Conclusion
Our findings suggest that well-nourished infants experience a higher odds of rotavirus diarrhea compared to infants experiencing malnutrition even after adjustment for demographic and WASH-related characteristics. Further research to understand the causal mechanisms for the potentially increasing importance of rotavirus vaccine coverage in well-nourished children is needed.

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