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Urban residence is associated with higher prevalence of individual-level double burden of malnutrition in Malawian women

To assess the prevalence of the individual-level DBM in Malawian women. To model the associations between 1- overweight, 2- anemia, 3- micronutrient deficiencies, 4-DBM and urban or rural residence. To test whether the prevalence of the DBM would differ from that expected by chance, assuming the conditions were independent.

We analyzed nationally representative data based on a sample of 723 non-pregnant women of reproductive age (15-49 years) from the 2015-16 Malawi Micronutrient Survey. DBM was defined two ways: 1- co-occurring overweight (body mass index >25 kg/m2) and anemia (hemoglobin adjusted for altitude and smoking <12.0 g/dL) and 2- co-occurring overweight and any micronutrient deficiency (zinc deficiency [<70 µg/dL morning fasted samples, <66 µg/dL morning non-fasting samples, and <59 µg/dL afternoon non-fasting samples], iron deficiency [inflammation-adjusted ferritin <15 µg/L], vitamin A deficiency [retinol binding protein <0.46 µmol/L calibrated to equal retinol <0.7 µmol/L], vitamin B12 deficiency [<150 pmol/L], or folate deficiency [<6.8 nmol/L]). We modeled five associations: between 1- overweight, 2- anemia, 3- micronutrient deficiencies, 4 and 5-DBM with each definition (dependent variables) and residence (independent variable) using unadjusted and adjusted (for wealth, education, age) logistic regression models. The Rao-Scott modified Chi Square test was used to compare the observed and expected prevalence (product of the prevalence estimates of overweight and anemia or micronutrient deficiencies) of DBM.

National prevalence (95% CI) estimates of overweight, anemia, and any micronutrient deficiency were 14.5 (10.6, 18.4), 19.9 (16.5, 23.4), and 72.8 (67.7, 77.8), respectively. The DBM prevalence (95% CI) estimates were 3.4 (1.3, 5.5) and 10.8 (7.0, 14.5) for co-occurring overweight and anemia and co-occurring overweight and any micronutrient deficiency, respectively. Overweight prevalence in women differed by residence [urban 34.4 (25.8, 43.0), rural 12.5 (8.8, 16.2), adjusted prevalence ratio [aPR]: 1.8 (1.3, 2.6)]. Prevalence of either anemia or any micronutrient deficiency did not differ by residence. Co-occurring overweight and anemia prevalence in women did not differ by residence [urban 6.9 (0.6, 13.2) vs. rural 3.0 (0.8, 5.3), p=0.36], whereas urban women were 2-times more likely to have co-occurring overweight and micronutrient deficiencies than rural women [urban 32.6 (24.1, 41.2) vs. rural 8.6 (5.2, 11.9), aPR: 2.4 (1.5, 3.8)]. There were no statistically significant differences in observed and expected prevalence estimates of the DBM, by either definition.

The national co-occurrence of overweight and anemia or micronutrient deficiencies were independent, suggesting that programs need to address these public health problems separately. However, the higher prevalence of overweight and co-occurring overweight and micronutrient deficiencies in urban women, suggests that urban programs need to target both over- and undernutrition to improve women's health.

Institution

Emory University

Country

USA

Author: Mrs RHODES, Elizabeth (Emory University)

Co-authors: Dr WILLIAMS, Anne M. (Centers for Disease Control and Prevention); Mrs MAPANGO, Carine (Centers for Disease Control and Prevention); NARAYAN, K. M. Venkat (Emory University); Mrs TRIPP, Katie (Centers for Disease Control and Prevention); Dr WEBER, Mary Beth (Emory University); Dr SUCHDEV, Parminder (Emory University, Centers for Disease Control and Prevention); Dr CUNNINGHAM, Solveig (Emory University); Dr RAMAKRISHNAN, Usha (Emory University)

Presenter: Mrs RHODES, Elizabeth (Emory University)

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