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Relationship Between Dietary and Serum Aflatoxin Levels and Nutritional Status of Children of 6–24 Months

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Abstract

In Chipata and Monze districts of Zambia, most of the mothers/caregivers use cereal-based complementary foods that are prone to aflatoxin contamination. This study aimed at evaluating aflatoxin exposure in children 6–24 months and its effect on their nutritional status. The study covered 400 mothers having children 6–24 months. The nutritional status of children was assessed by measuring weight and height using standard procedures and height-for-age, weight-for-age and weight-for-height indices were determined using WHO-Anthro software 2006. The children serum samples were analysed for aflatoxin B1-lysine (AFB-Lys) using high performance liquid chromatography–electrospray tandem quadrupole mass spectrometry (HPLC-ESI-MS/MS), and normalised to serum albumin (Alb+) determined by use of a colourimetric assay on a clinical analyzer. Binary logistic regression analysis was used to find the factors affecting child stunting level. A total of 19.82 % of the children were stunted, 9.78 % underweight and 2.85 % were wasted. The AFB-Lys for children from Chipata children ranged from 0.03 to 6.4 ng mL^{-1} and that of Monze ranged from 0.04 to 13.0 ng mL^{-1}. The mean level of AFB-Lys of children from Monze was significantly($p = 0.05$) higher that of Chipata. The Chipata and Monze children showed mean level of Alb+ of 4.14±0.36 g dL^{-1} and 4.16±0.34 g dL^{-1} respectively. The AFB-Lys (Normalised to Albumin) level was found to range from 0.78 to 202 pg mg^{-1} for Chipata children and that of Monze children ranged from 0.92 to 315 pg mg^{-1}. Child sickness, child age, exposure to aflatoxin in foods and AFB-Lys (normalized to albumin) level were found to be significantly ($p < 0.05$) associated with child stunting except the child age that was not significant at $p = 0.05$. The increase in the exposure of aflatoxin through consumption of contaminated complementary foods leads to 1.771 times likelihood of the child being stunted (odd ratio =1.999, P-value =0.0488). However, the children with increase in the blood serum aflatoxin B1 lysine adduct are likelihood to be stunted (odd ratio=1.301, P-value= 0.0146). These results have shown that dietary exposure to aflatoxin could lead to increase in the serum aflatoxin level and both are associated with stunting.

Keywords: Aflatoxin, children, complementary foods, dietary exposure, nutritional status

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